

Report

Report no. 22/20

Hazard Classification and Labelling of Petroleum Substances in the European Economic Area - 2020

ISBN 978-2-87567-134-9



9 782875 671349 >

Hazard Classification and Labelling of Petroleum substances in the European Economic Area - 2020

H. Keränen (Concawe Science Executive)

This report was prepared by:

Concawe Classification and Labelling Task Force (STF-23): S. Barber, J. Candeal Duro, E. Di Caprio, I. Dyrssen, J. Eklund, F. Guerra Perez, H. Keränen, C. Kotsiki, V. Marinov, C. Mertl, M. Rooseboom, P. Svendsen, E. Vaiopoulou, M. Vaissiere, C. Verge Lopez, E. Wasilewska, I. Weselak

Under the supervision of H. Keränen (Concawe Science Executive)

Reproduction permitted with due acknowledgement

© Concawe
Brussels
October 2020

ABSTRACT

This report updates Concawe's classification and labelling recommendations Report No. 13/17 to address changes to CLP regulation and include classification and labelling recommendations for Petroleum Gases and Other Petroleum gases.

KEYWORDS

Hazard, health, environment, physical, flammability, petroleum substances, classification, packaging, labelling, REACH, GHS, CLP.

INTERNET

This report is available as an Adobe pdf file on the Concawe website (www.concawe.eu).

| CONTENTS | | Page |
|-----------------|--|-------------|
| SUMMARY | | V |
| 1. | INTRODUCTION | 1 |
| 2. | SCOPE OF THIS REPORT | 3 |
| 3. | CLASSIFICATION APPROACH ACCORDING TO CLP | 5 |
| 3.1. | CLASSIFICATION OF SUBSTANCES | 5 |
| 3.1.1. | CLP Hazard / Precautionary Statements | 6 |
| 3.2. | HAZARD CLASSIFICATION CRITERIA | 6 |
| 3.2.1. | Physical Endpoints | 6 |
| 3.2.2. | Health Endpoints | 7 |
| 3.2.2.1. | Acute Toxicity | 7 |
| 3.2.2.2. | Irritation/Corrosion | 7 |
| 3.2.2.3. | Sensitisation | 9 |
| 3.2.2.4. | Germ Cell Mutagenicity | 10 |
| 3.2.2.5. | Carcinogenicity | 11 |
| 3.2.2.6. | Reproductive Toxicity | 11 |
| 3.2.2.7. | Specific Target Organ Toxicity | 12 |
| 3.2.3. | Environmental Endpoints | 13 |
| 4. | SPECIAL CONSIDERATIONS FOR PETROLEUM SUBSTANCES | 15 |
| 4.1. | GROUPING/CATEGORY APPROACH | 15 |
| 4.2. | CLASSIFICATION AND LABELLING OF PETROLEUM SUBSTANCES - 'SPECIAL TESTING CONSIDERATIONS' | 15 |
| 4.3. | ASPIRATION HAZARD | 16 |
| 4.4. | HARMONISED CLASSIFICATIONS | 16 |
| 4.5. | SELECTION OF PRECAUTIONARY STATEMENTS | 16 |
| 4.6. | REGULATORY AND OIL INDUSTRY NOTES | 17 |
| 4.7. | SUPPLY AND TRANSPORT LABELLING | 17 |
| 4.7.1. | Content of the label | 17 |
| 4.7.2. | Interaction with transport labelling | 18 |
| 4.8. | SAFETY DATA SHEET - IMPACT OF CLP | 19 |
| 4.9. | DOWNSTREAM LEGISLATIVE IMPACT OF CLP ON OPERATIONS | 19 |
| 4.10. | CLASSIFICATION AND LABELLING INVENTORY | 19 |
| 4.10.1. | Obligation to notify the Agency | 20 |
| 4.10.2. | Format for notification | 20 |
| 4.10.3. | Agreed entries | 20 |
| 4.10.4. | Timing - notification deadline | 20 |
| 4.11. | CLP UPDATING PROCESS | 21 |
| 5. | REFERENCES FOR BODY OF REPORT | 22 |
| 6. | CLASSIFICATION AND LABELLING RECOMMENDATIONS | 25 |
| 6.1. | CRUDE OILS (CRUDEOIL) | 25 |
| 6.2. | PETROLEUM GASES | 33 |
| 6.3. | OTHER PETROLEUM GASES | 38 |
| 6.4. | LOW BOILING POINT NAPHTHAS (GASOLINES) (Naphtha) | 45 |
| 6.5. | KEROSINES (Kerosine) | 54 |
| 6.6. | MK1 DIESEL FUEL (MK1) | 63 |
| 6.7. | STRAIGHT-RUN GAS OILS (SRGO) | 71 |
| 6.8. | CRACKED GAS OILS (CrackedGO) | 78 |
| 6.9. | VACUUM GAS OILS, HYDROCRACKED GAS OILS & DISTILLATE FUELS (VHGO) | 86 |
| 6.10. | OTHER GAS OILS (OtherGO) | 94 |
| 6.11. | HEAVY FUEL OIL COMPONENTS (HFO) | 101 |

| | | |
|--------------------|---|------------|
| 6.12. | UNREFINED / ACID TREATED OILS (UATO) | 108 |
| 6.13. | HIGHLY REFINED BASE OILS (HRBO) | 115 |
| 6.14. | OTHER LUBRICANT BASE OILS (LBO) | 121 |
| 6.15. | UNTREATED DISTILLATE AROMATIC EXTRACTS (UDAE) | 128 |
| 6.16. | TREATED DISTILLATE AROMATIC EXTRACTS (TDAE) | 134 |
| 6.17. | RESIDUAL AROMATIC EXTRACTS (RAE) | 143 |
| 6.18. | SLACK WAXES (Slackwax) | 149 |
| 6.19. | PARAFFIN AND HYDROCARBON WAXES (Paraffinwax) | 156 |
| 6.20. | FOOTS OILS (Footsoil) | 161 |
| 6.21. | PETROLATUMS (Petrolatum) | 168 |
| 6.22. | BITUMENS (Bitumen) | 176 |
| 6.23. | OXIDIZED ASPHALT (OxiAsph) | 182 |
| 6.24. | PETROLEUM COKES (PetCoke) | 187 |
| 6.25. | SULFUR (Sulfur) | 191 |
| APPENDIX 1: | LISTING OF PETROLEUM SUBSTANCES | 197 |
| APPENDIX 2: | REGULATORY AND OIL INDUSTRY NOTES | 203 |
| APPENDIX 3: | DOWNSTREAM LEGISLATION IMPACTED BY THE CLP REGULATION | 204 |
| APPENDIX 4: | APPLICATIONS FOR USING TEST DATA FOR THE UVCB SUBSTANCE | 206 |
| APPENDIX 5: | HAZARD CLASSIFICATION FOR DEVELOPMENTAL TOXICITY ACCORDING TO CLP | 208 |
| APPENDIX 6: | C&L PERMUTATIONS | 210 |
| | CRUDE OILS (Crudeoil) | 211 |
| | LOW BOILING POINT NAPHTHAS (GASOLINES) (Naphtha) | 227 |
| | KEROSINES (Kerosine) | 289 |
| | MK1 DIESEL FUEL (MK1) | 294 |
| | STRAIGHT-RUN GAS OILS (SRGO) | 296 |
| | CRACKED GAS OILS (CrackedGO) | 303 |
| | VACUUM GAS OILS, HYDROCRACKED GAS OILS & DISTILLATE FUELS(VHGO) | 308 |
| | OTHER GAS OILS (OtherGO) | 317 |
| | HEAVY FUEL OIL COMPONENTS (HFO) | 326 |
| | UNREFINED / ACID TREATED OILS (UATO) | 330 |
| | HIGHLY REFINED BASE OILS (HRBO) | 334 |
| | OTHER LUBRICANT BASE OILS (LBO) | 337 |
| | UNTREATED DISTILLATE AROMATIC EXTRACTS (UDAE) | 344 |
| | TREATED DISTILLATE AROMATIC EXTRACTS (TDAE) | 348 |
| | RESIDUAL AROMATIC EXTRACTS (RAE) | 353 |
| | SLACK WAXES (Slackwax) | 355 |
| | PARAFFIN AND HYDROCARBON WAXES (Paraffinwax) | 358 |
| | FOOTS OILS (Footsoil) | 359 |
| | PETROLATUMS (Petrolatum) | 364 |
| | BITUMENS (Bitumen) | 367 |
| | OXIDIZED ASPHALT (OxiAsph) | 368 |
| | PETROLEUM COKES (PetCoke) | 369 |
| | SULFUR (Sulfur) | 370 |
| APPENDIX 7: | HISTORICAL CONTENT OUTLINING THE CHANGES FROM PREVIOUS LEGISLATION TO THE CLP REGULATION | 371 |

SUMMARY

The Concawe recommendations on classification and labelling were last updated in November 2017 (CONCAWE 2017).

This report also contains an assessment of the hazardous properties of petroleum substances against the criteria of the CLP Regulation (EC 1272/2008) up to and including the 13th ATP and Corrigendum to Annex VI.

The Regulation on Registration, Evaluation and Authorisation of Chemicals (REACH) requires, where possible, the submission of a harmonised classification, thereby restricting the possibility for individual manufacturers to self-classify their substances. In addition, REACH, through *informal communication platforms similar to former* Substance Information Exchange Fora (now post-SIEFs), encourages the sharing of unpublished data in a wider group of stakeholders, which may impact hazard classification. CLP, based on the UN Global Harmonised System (UN GHS), has introduced further changes to the criteria for hazard classification and labelling. The combination of these developments has had the following major impacts on the classification and labelling of petroleum substances:

- When to classify and label
- How to classify and label
 - Pictograms
 - Signal words “Danger” or “Warning”
 - Hazard statements
 - Precautionary statements
- Less possibility for an individual manufacturer to self-classify due to the REACH requirement for harmonised classifications where possible.
- Increased amount of data from data sharing due to REACH has led to more comprehensive evaluations of dossiers and substances, which results in updated classifications for many substances.

Classification and labelling recommendations are included in specific chapters of this Report.

1. INTRODUCTION

The EU regulation on classification, labelling and packaging of substances and mixtures, known as the 'CLP' Regulation (EC No 1272/2008) entered into force on 20 January 2009 (EU, 2008). This Regulation has subsequently been subject to several legislative Adaptations to Technical Progress (ATPs) and Corrigendum to Annex VI of CLP¹. CLP applies the terminology, evaluation principles and criteria of the United Nations Globally Harmonized System (GHS) of Classification, Labelling and Packaging of Chemicals. The stated purpose of CLP is to ensure a high level of protection of human health and the environment as well as the free movement of substances, mixtures and articles.

UN GHS is intended to provide a common basis globally, to define and classify chemicals according to their hazards and to communicate this information via labels and safety data sheets. As such, target audiences include consumers, workers and emergency responders.

In 1992, the United Nations Conference on the Environment and Development (UNCED) established a programme to strengthen national and international efforts related to the environmentally sound management of chemicals. Due to the disparity of existing regional systems, the need for a globally harmonised hazard classification and labelling system for chemicals was identified. The World Summit on Sustainable Development held in 2002, encouraged implementation of the GHS as soon as possible, with a view to having the system fully operational by 2008. Work to update 'Globally Harmonized System' continues with publication of the eighth revised edition of the UN GHS document, known as the 'purple book', in 2019 (UN, 2019).

Although the UN GHS provides a common basis for hazard classification and communication for transport and supply and use, it also includes a "building block" approach. Since it is recognised that UN GHS will not be completely "harmonised" at first, these building blocks will facilitate implementation by individual countries or regions. The UN states that *"...countries are free to determine which of the building blocks will be applied in different parts of their systems . . . While the full range is available to everyone . . . the full range does not have to be adopted"*. It is intended that the UN GHS document will be updated every two years to reflect the technical changes needed. CLP applies the building block approach in seeking to align EU legislation as far as possible with the UN GHS, whilst maintaining some elements from previous Community legislation, that are not currently addressed in UN GHS.

Manufacturers and importers (or groups of manufacturers and importers) who place hazardous substances on the market, will also have to notify ECHA of certain information within one month of placing on the market, in particular the substance identity and the classification and labelling of each hazardous substance, unless this information has already been submitted as part of a registration dossier under REACH. ECHA will then include the notified information in the C&L Inventory.

Guidance on the application of CLP in the context of REACH has been developed by ECHA (ECHA, 2017).

¹ EU, 2009; EU, 2011; EU, 2012; EU, 2013a; EU, 2013b; EU, 2013c, EU, 2013d; EU, 2014; EU 2015; EU 2016a, EU 2016b

The purpose of this report is to provide guidance on the classification and labelling of substances produced by the petroleum industry and placed on the market, according to the requirements of CLP.

The provisions of CLP also apply to classification, labelling and packaging of mixtures that are placed on the market. Detailed guidance regarding mixtures is not however within the scope of this report.

2. SCOPE OF THIS REPORT

This report contains an assessment of the hazardous properties of petroleum substances against the criteria of the CLP Regulation (EC 1272/2008) up to and including the 13th ATP (EU, 2018b) and Corrigendum to Annex VI (EU, 2013c).

This report has been developed as industry guidance for the classification, labelling and packaging of petroleum substances under CLP, which introduces the GHS into the European legislative framework.

This report outlines the objectives and principles of CLP and the classification and labelling requirements that it introduces; its entry and phased implementation into EU legislation; specific issues that apply to petroleum substances; and Concawe recommendations for classification, labelling, and packaging of petroleum substances.

The classification recommendations have been updated from the previous Concawe guidance to reflect new information, changes in classification criteria and to accommodate REACH categories of petroleum substances.

These recommendations apply to petroleum substances produced in the refinery but **do not** apply to formulated petroleum products placed on the market which are considered mixtures.

Substances of similar chemical composition and/or similar hazard profiles can be collected together in categories. With the exception of a few petroleum gases, petroleum coke and sulphur, most petroleum industry substances are Substances of Unknown or Variable composition, Complex reaction products or Biological materials (UVCB). A category approach allows data on individual category members to be applied to other members of the category for which complete data may not be available or are impractical to obtain.

It is important to note that for each category, the most severe hazard classification and labelling recommendation is presented as the default recommendation in the body of the report. However, based on the application of regulatory or oil industry notes, concentration limits and physical-chemical properties (e.g., flashpoint, viscosity), several classification and labelling permutations may be possible within a category. In those cases where EU harmonised classifications for certain endpoints exist, the EU harmonised classifications are supplemented with self-classifications for all other endpoints (see section 4.4) as required by the CLP regulation.

The following categories and stand-alone substances are covered in this report. Full names and the acronyms ('short names') used in the REACH registration dossiers are provided.

| Full name | Short name |
|---|-------------|
| Crude oils (stand-alone) | Crudeoil |
| Petroleum Gases | |
| Other Petroleum Gases | |
| Low Boiling Point Naphthas (Gasolines) | Naphtha |
| Kerosines | Kerosine |
| MK1 Diesel Fuel (stand-alone) | MK1 |
| Straight-run Gas Oils | SRGO |
| Cracked Gas Oils | CrackedGO |
| Vacuum Gas Oils, Hydrocracked Gas Oils & Distillate Fuels | VHGO |
| Other Gas Oils | OtherGO |
| Heavy Fuel Oil Components | HFO |
| Unrefined / Acid Treated Oils | UATO |
| Highly Refined Base Oils | HRBO |
| Other Lubricant Base Oils | LBO |
| Untreated Distillate Aromatic Extracts | UDAE |
| Treated Distillate Aromatic Extracts | TDAE |
| Residual Aromatic Extracts | RAE |
| Slack Waxes | Slackwax |
| Paraffin and Hydrocarbon Waxes | Paraffinwax |
| Foots Oils | Footsoil |
| Petrolatums | Petrolatum |
| Bitumens | Bitumen |
| Oxidized Asphalt (stand-alone) | OxiAsph |
| Petroleum Cokes | PetCoke |
| Sulfur (stand-alone) | Sulfur |

Information on Petroleum Gases and Other Petroleum Gases categories is available in the LOA (Lower Olefins and Aromatics) REACH Consortium. Changes for these categories in the 12th ATP are not included in this report.

The following categories are not covered herein: lubricant greases; used oils; re-refined oils; reclaim petroleum substances, other petroleum substances, renewable or synthetic hydrocarbons and hydrocarbon solvents². Manufacturers of these substances need to classify their materials according to legislative requirements.

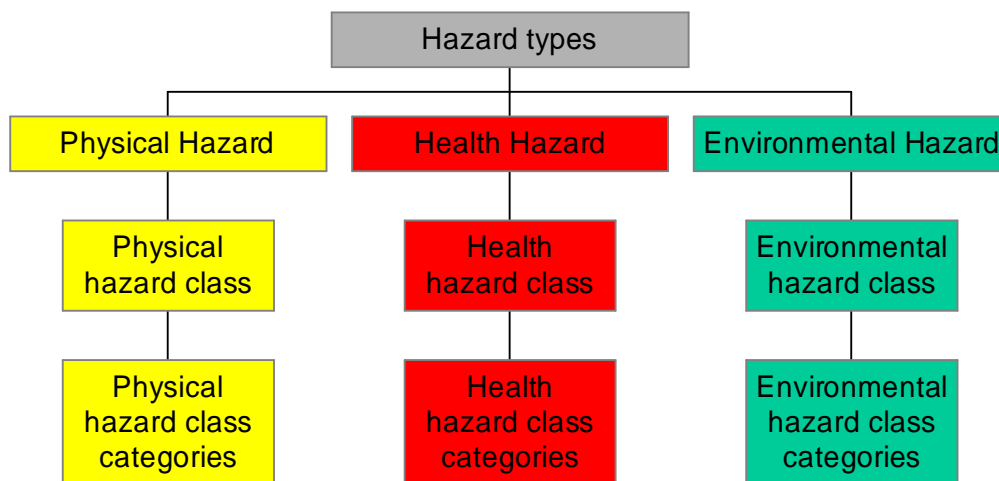
Changes since last report: Appendix 6 (C&L Permutations) is revised. Text is updated according to implementation of all published ATPs up to the 13th ATP of CLP Regulation. List of petroleum substances in Appendix 1 has been updated according to active registrations in the Concawe substance portfolio. Regulatory notes in Annex VI of the CLP Regulation will be updated by the European Commission. List of notes in Appendix 2 of the C&L report will be updated accordingly, when the regulatory process is finished. Impact of ATPs on Petroleum Gases and Other Petroleum Gases categories will be updated when information will be available from LOA Consortium.

² This report addresses the classification and labelling of groups of substances which are the primary products of petroleum refining. It should be recognized that some of these groups contain substances which may also be identified as hydrocarbon solvents. Hydrocarbon solvents are derived, among others, from refinery streams by further refining e.g. redistillation, hydrogenation, and extraction. As a result, the composition of hydrocarbon solvents may differ significantly from refinery streams. The classification and labelling of hydrocarbon solvents are not considered further in this report.

3. CLASSIFICATION APPROACH ACCORDING TO CLP

3.1. CLASSIFICATION OF SUBSTANCES

CLP distinguishes three hazard types (physical, health and environmental hazards), with their respective “classes” (endpoints). In most cases, hazard classes are further sub-divided into hazard categories.



Not all GHS endpoints have been adopted by CLP in line with the ‘Building Block’ approach. Below in the table, there are indicated differences in hazard class/categories between GHS and CLP regulation.

| GHS v.8 (2019) | CLP (as up to 13th ATP) |
|---|---|
| Flammable liquids: hazard category 1, 2, 3, 4 | Flammable liquids: hazard category 1, 2, 3 |
| Acute toxicity (oral): hazard category 1, 2, 3, 4, 5 | Acute toxicity (oral): hazard category 1, 2, 3, 4 |
| Acute toxicity (dermal): hazard category 1, 2, 3, 4, 5 | Acute toxicity (dermal): hazard category 1, 2, 3, 4 |
| Acute toxicity (inhalation): hazard category 1, 2, 3, 4, 5 | Acute toxicity (inhalation): hazard category 1, 2, 3, 4 |
| Skin corrosion/irritation: hazard category 1A, 1B, 1C, 2, 3 | Skin corrosion/irritation: hazard category 1A, 1B, 1C, 2 |
| Serious eye damage/eye irritation: hazard category 1, 2A, 2B | Serious eye damage/eye irritation: hazard category 1, 2 |
| Aspiration toxicity: category 1, 2 | Aspiration toxicity: category 1 |
| Hazardous to the aquatic environment (acute toxicity): category 1, 2, 3 | Hazardous to the aquatic environment (acute toxicity): category 1 |

Furthermore, not all CLP hazard classes can be found in GHS. They originate in some R-phrases under former DSD and are included as supplemental hazard statements (EUH) in Part 1 of Annex II to CLP.

3.1.1. CLP Hazard / Precautionary Statements

The CLP regulation uses hazard statements (H-statements). For example, eye irritation category 2 H319 ‘causes serious eye irritation’. CLP Annex III lists the correct wording of the hazard statements, as these should appear on the label.

Furthermore, labelling advice to prevent or minimise adverse effects to human health or environment is communicated under CLP with precautionary statements (P-statements). CLP Annex IV Part II, as amended, lists the correct wording of the precautionary statements, as they should appear on the label.

Classification of a substance for a specific hazard “class” and “category” is thus accompanied by specific H- and P-statements. These are specified at the end of every section dealing with classification criteria.

These statements are assigned a unique alphanumerical code, which consists of one letter (H = Hazard, P = Precautionary) and three digits, as follows:

- One digit to designate the class (type) of hazard, e.g. ‘2’ for physical hazard
- Two further digits corresponding to the sequential numbering of statements as follows:

| Hazard (H) | Precautionary (P) |
|----------------------------------|------------------------|
| 200 - 299 : Physical Hazard | 100 - 199 : General |
| 300 - 399 : Health Hazard | 200 - 299 : Prevention |
| 400 - 499 : Environmental Hazard | 300 - 399 : Response |
| | 400 - 499 : Storage |
| | 500 - 599 : Disposal |

Several of these P-statements are incomplete and require completion by the classifying entity. For example: P264 reads “Wash ... thoroughly after handling” meaning that the words “hands” and/or “affected skin areas” should be inserted to replace “...”.

3.2. HAZARD CLASSIFICATION CRITERIA

Classification is based on comparison of test data against criteria for each of the hazard classes/categories. The criteria for classification are found in CLP Annex I.

3.2.1. Physical Endpoints

Data are used to assess the physical hazards (e.g. flammability) and help predict possible toxicological or environmental hazards, fate and behaviour. They are used for the purposes of safe handling and to help in the identification of risks posed to humans and the environment from all stages of a substance life cycle.

For petroleum UVCB substances, some physical endpoints as required under CLP are not applicable or relevant; alternative endpoints should be used (e.g. Initial Boiling Point instead of Boiling point range).

Due to their inherent properties and chemical structure considerations, the following hazard categories do not apply or are considered irrelevant for petroleum substances:

- Explosive
- Oxidising (gas, liquid, solid)
- Pyrophoric (solid, liquid)
- Self-reactive and Self-heating

- Organic Peroxide
- Corrosive to Metal
- Substance which in contact with water emits flammable gas

In classifying liquid petroleum substances for flammability, it is necessary to evaluate information on flash point and initial boiling point.

| Classification criteria | Cat. 1 | Cat. 2 | Cat. 3 |
|--------------------------|--------|--------|---------------|
| Flash point °C | < 23 | < 23 | ≥ 23 and ≤ 60 |
| Initial boiling point °C | ≤ 35 | > 35 | |

It should be recognised that under CLP, gas oils, diesel, and light heating oils having a flash point between ≥ 55°C and ≤ 75°C might be regarded as flammable liquid Category 3.

3.2.2. Health Endpoints

3.2.2.1. Acute Toxicity

Under CLP, acute toxicity hazard is differentiated into oral, dermal and inhalation routes of exposure CLP uses acute lethality e.g. LD₅₀ (oral, dermal) or LC₅₀ (inhalation) values, to assess acute toxicity. CLP divides acute toxicity into 4 categories: Category 1 to 4. For the inhalation route, there are three different types of exposure: gases, vapours and dusts/mists that have different cut-off values in CLP.

Acute toxicity cut-off values in CLP are shown in the following table.

| Exposure route | Cat. 1 | Cat. 2 | Cat. 3 | Cat. 4 |
|--|--------|------------|------------|--------------|
| Oral (LD ₅₀ mg/kg _{bw}) | < 5 | 5 - 50 | 50 - 300 | 300 - 2000 |
| Dermal (LD ₅₀ mg/kg _{bw}) | < 50 | 50 - 200 | 200 - 1000 | 1000 - 2000 |
| Gases (LC ₅₀ ppmV) ³ | < 100 | 100 - 500 | 500 - 2500 | 2500 - 20000 |
| Vapours (LC ₅₀ mg/l) ⁴ | < 0.5 | 0.5 - 2 | 2 - 10 | 10 - 20 |
| Dusts and mists (LC ₅₀ mg/l) ⁵ | < 0.05 | 0.05 - 0.5 | 0.5 - 1 | 1 - 5 |

3.2.2.2. Irritation/Corrosion

Skin

CLP distinguishes between corrosion and irritation of the skin. The legislative text regards corrosion as the irreversible destruction of skin tissue within an exposure period of up to 4 hours, and irritation as a reversible effect after 4 hours exposure.

CLP emphasises the use of a tiered approach for classification and labelling under this endpoint. Use of existing human, animal and validated in vitro data can be used to perform a weight-of-evidence decision for hazard classification.

In the absence of existing data, for corrosion in particular, the use of extreme pH values as a surrogate to predict corrosion for the purpose of classification is also

³ For gases the measurement units are ppmV. It must be noted that CLP specifies that for a vapour which is near the gaseous phase, classification shall be based on ppmV.

⁴ Vapours are defined as: the gaseous form of a substance or mixture released from its liquid or solid state.

⁵ Dusts (suspended solid particles, from mechanical processes) and mist (suspended liquid droplets, from condensation of supersaturated vapours or physical shearing of liquids) are defined as generally having particle sizes in a range from >1 to ca. 100 µm.

outlined (pH range, strong acid or alkali reactions at $\text{pH} \leq 2$ or ≥ 11.5 respectively). Buffering effects should be taken into account, and if data suggest the substance is unlikely to be corrosive despite the low or high pH value, then further testing (preferably by validated in vitro test) should be carried out prior to assigning a classification.

The cut-off values for classification is based on the criteria set in the CLP use the exposure period and the persistence of the effect during the observation period, as well as mean values of erythema/eschar and oedema scores.

The 8th ATP to the CLP has included an additional category for Skin Corrosion. Where data are not available to allow sub-categorisation as shown in the table below. It is possible select Category 1 when it evident that corrosive effects will occur (e.g. extreme pH) or have occurred but there is no information available on exposure time or the observation period.

Corrosion

| Category | Exposure time: t | Observation period |
|----------|---|------------------------|
| Cat. 1 | Corrosive effects observed, no information on exposure time or length of observation period | |
| Cat. 1A | $t \leq 3 \text{ min}$ | $\leq 1 \text{ hour}$ |
| Cat. 1B | $3 \text{ min} < t \leq 1 \text{ hour}$ | $\leq 14 \text{ days}$ |
| Cat. 1C | $1 \text{ hour} < t \leq 4 \text{ hours}$ | $\leq 14 \text{ days}$ |

Other effects such as hyperplasia, hyperkeratosis, scaling, fissures, scab formation and alopecia are also taken into account in the overall evaluation of skin effects at the end of the observation period.

Skin irritation for reversible effects is assessed after a semi-occluded exposure of up to 4-hours. After exposure, erythema and/or oedema are assessed according to scores after 24, 48, and 72 hours.

Skin irritation studies of some petroleum substances (e.g. distillate aromatic extracts and straight-run gas oils) have been performed under non-guideline conditions, such as exposure for up to 24 hours, under occluded conditions. The mean scores for erythema and oedema need to be assessed against the deviations in methodology. Following that, expert judgement should be used to decide whether irritation, sufficient for classification purposes would be expected, if the test had been conducted under guideline conditions. Data from repeat exposure tests can also be considered as part of a weight of evidence approach, and may be used as the basis for classification in the absence of other more definitive data.

Under CLP the major criteria for the irritant category are:

- At least 2 of 3 tested animals have a mean score of $\geq 2.3 - \leq 4.0$.
- Reversibility of skin lesions is another consideration in evaluating irritant responses. When inflammation persists to the end of the observation period in 2 or more test animals, taking into consideration alopecia (limited area), hyperkeratosis, hyperplasia and scaling, then a material shall be considered irritant.

Irritation

| | Erythema or oedema mean value | Reading times |
|---------------|-------------------------------|---|
| Cat. 2 | $\geq 2.3 - \leq 4.0$ | 24, 48, 72 hours and: a) delayed reactions on 3 consecutive days b) persisting inflammation for 14 days |

Eye

CLP criteria are based on the severity of the effect in the eye, namely whether they are reversible or irreversible. CLP: according to OECD test guideline 405, effects are fully or not fully reversible within 21 days of application.

For classification purposes, the cut-off values of the criteria used to discriminate between reversible or irreversible ocular effects.

This is based on the severity of effects on either the cornea and/or iris, and/or the severity of conjunctival redness and/or oedema, which is assessed by calculating the respective mean scores at each of the reading times (24, 48, 72 hours) for that effect and taking into account the number of animals in which an effect was observed. Please refer to the legislative text for the specific criteria.

| Effect | Irreversible | Reversible |
|----------------------|--------------|------------|
| | Cat. 1 | Cat. 2 |
| Cornea opacity | ≥ 3.0 | ≥ 1.0 |
| Iris lesion | > 1.5 | ≥ 1.0 |
| Conjunctival redness | - | ≥ 2.0 |
| Oedema (chemosis) | - | ≥ 2.0 |

- For classification purposes, CLP allows the use of human experience to assess the degree of the effects.
- Validated in vitro data should be used to make classification and labelling decision instead of conducting new animal tests (where available).
- Materials corrosive to skin are classified as causing irreversible ocular damage, hence extreme pH values are important considerations in this respect.

3.2.2.3. Sensitisation

Through implementation of the 2nd ATP, CLP introduces the concept of potency using two new subcategories (1A - strong sensitisers, 1B - moderate sensitisers) for both respiratory and skin sensitisation using primarily animal data. Potency is the concentration at which a substance induces sensitisation and is described by dose-response relationships at either the induction or the elicitation phase.

Respiratory sensitisation

Under CLP, evidence that a substance can induce specific respiratory hypersensitivity will normally be based on human experience. Although there is no validated OECD animal test for this endpoint, CLP accepts animal data with measurements on specific markers as evidence of potential hazard.

Skin sensitisation

Animal studies for identification of skin sensitisation hazard, in contrast to respiratory sensitisation have been validated and are commonly used.

When assessing potency, cut-off values are applied to animal test results (mainly guinea pig tests or local lymph node assay). However, this sub-categorisation can only be applied where sufficient data exist to make the distinction; where the data are insufficient, the classification in Category 1 should be maintained.

CLP allows the use of human data for classification purposes. It must be pointed out that according to Article 7(3) of CLP; tests on humans shall not be performed for the purposes of classification. However, data obtained from other sources, such as clinical studies, can be used.

In the case of conflicting results with human and animal data, CLP has explicit text dealing with this issue. In brief, positive evidence from animal studies is regarded as more reliable than evidence from human studies. Evaluation of human data must be carried out with caution, since negative human data cannot normally be used to negate positive results from animal studies.

Following the criteria used in CLP, the respective classifications for respiratory and skin sensitisation are summarised in the following table:

| | | |
|---------------------------|------------|-----------------|
| Respiratory sensitisation | Category 1 | Sub-category 1A |
| | | Sub-category 1B |
| Skin sensitisation | Category 1 | Sub-category 1A |
| | | Sub-category 1B |

3.2.2.4. Germ Cell Mutagenicity

Under CLP this hazard class is primarily concerned with substances that may cause mutations in the germ cells of humans that can be transmitted to the progeny.

The categories for classification are shown in the following table.

| | | |
|---------|---------|--------|
| Cat. 1 | | Cat. 2 |
| Cat. 1A | Cat. 1B | |

Evaluation of the test results for petroleum substances requires expert judgement taking into account all the available data in arriving at a classification.

The “Modified Ames Test” (Blackburn G.R. et al, 1986) is often used to assess the *in vitro* mutagenic activity of petroleum substances. The test was developed to maximise detection sensitivity of mutagenic activity in petroleum substances that is mediated by polycyclic aromatic compounds. Results are expressed as a Mutagenicity Index (MI), which represents the slope of the mutagenic dose response relationship. A positive result in this test indicates *in vitro* gene mutation.

Data from Mouse Lymphoma Assays (MLA) need to be evaluated with caution. Mouse lymphoma assays (MLAs) have historically exhibited a lack of performance and acceptability standards, hence the validity of MLA data has been questioned, and the possibility that the positive results in these studies are not actually evidence of *in vitro* mutagenic activity must be considered.

Some petroleum substances are classified and labelled as carcinogenic and it is generally accepted that carcinogenic activity is sometimes mediated via a genotoxic mechanism. Classification as a genotoxic carcinogen does not however automatically prompt additional classification as a germ cell mutagen since the criteria for germ cell mutagen classification require evidence of heritable damage, i.e. evidence that the substance is a somatic mutagen and the substance or a relevant metabolite can reach the germ line cells in the reproductive organs. Most

petroleum carcinogenesis studies assess skin tumour induction, so any potential *in vivo* mutagenic activity is limited to the site of application and does not explicitly imply systemic effects. The mere presence of Polycyclic Aromatic Compounds (PAC) in petroleum streams are not necessarily an indication of hazard, because the complex nature of the substance may inhibit or enhance mutagenic activity. Thus, individual levels of PAC are not regarded as adequate surrogates for hazard evaluation. Consequently, unless there is clear evidence that germ cells are affected in germ cell assays, petroleum substances that have been classified as carcinogenic are not also classified as germ cell mutagens.

3.2.2.5. Carcinogenicity

Under CLP, this hazard concerns whether a substance has the potential to induce cancer or increase its incidence. Substances that have induced benign and malignant tumours in well-performed experimental studies on animals are considered to be presumed or suspected human carcinogens unless there is strong evidence that the mechanism of tumour formation is not relevant for humans.

The categories for classification are shown in the following table.

| | | |
|---------|---------|--------|
| Cat. 1 | | Cat. 2 |
| Cat. 1A | Cat. 1B | |

Carcinogenicity classification for petroleum substances may also be dependent on data from other predictive tests. The IP346 assay (Institute of Petroleum, 1993) is a measure of the DMSO extractables, results that have an established relationship with the outcome in *in vivo* carcinogenicity mouse skin painting studies. When the weight percent of extractables is less than three percent of the total weight of the extracted material, then the substance is not classified. When the weight percent is three or greater, then the substance becomes classified as a carcinogen. The IP346 assay is used as a predictive test for classification for Other Lubricant Base Oils, Foots Oils, Slack Wax, Petrolatum and Treated Aromatic Extracts Concawe categories. It is important to note that IP346 is not a method intended to measure PAC levels, but rather an indirect assessment of refinement to manufacture non-carcinogenic products.

Another predictive test that is used for carcinogenic classification is the modified Ames test. Described above in the germ cell mutagenicity section, this test is a measure of the *in vitro* genotoxic potential. In order to assess the carcinogenic potential of Residual Aromatic Extracts, the results of the assay, namely the MI value, have been correlated with mouse skin painting data, and a classification cut-point has been established. If the MI is less than 0.4, no classification is required.

These predictive tests and their impact on classification have been captured in EU Regulatory Notes and/or Oil Industry Notes for the appropriate categories (Appendix 2).

3.2.2.6. Reproductive Toxicity

Reproductive and developmental toxicity

Under CLP reproductive toxicity includes adverse effects on sexual function and fertility (adult males and females), as well as developmental toxicity in the offspring. The induction of genetically based heritable effects in the offspring is addressed under Germ Cell Mutagenicity and is not part of the scope of the reproductive toxicity endpoint.

The developmental effects of substances must be evaluated carefully to eliminate the possible confounding effects of maternal toxicity on the developing foetus. Generic guidance on this is given in **Appendix 5**.

Under CLP, reproductive toxicity is subdivided under two main headings:

- Adverse effects on sexual function and fertility.
- Adverse effects on development of the offspring.

The categories for classification are shown in the following table.

| Cat. 1 | | Cat. 2 | Effects on or via lactation |
|---------|---------|--------|-----------------------------|
| Cat. 1A | Cat. 1B | | |

In cases where there are no clear data to the contrary, the hazard statement specifying both 'damage to fertility' AND 'damage to the unborn child' should be assigned. It is possible to omit the specific hazard statement for fertility or developmental effects, in cases where there are clearly negative results.

Effects during lactation

Under CLP, adverse effects on or via lactation are included under reproductive toxicity, but for classification purposes such effects are treated separately. This is because it is desirable to be able to classify substances specifically for an adverse effect on lactation (“Effects on or via lactation, H362”) so that a specific hazard warning about this effect can be provided for lactating mothers independently of whether the substance is classified for reproductive toxicity.

Accordingly, in CLP, the assignment of H362 (“May cause harm to breast-fed children”) is independent of consideration of effects on development or fertility, and hence a substance can be assigned H362 whether or not the substance is also classified for reproductive toxicity.

3.2.2.7. Specific Target Organ Toxicity

Under CLP, reference is made to those specific effects caused by single or repeated exposure to a substance (Specific Target Organ Toxicity or STOT).

These effects refer to significant systemic effects that can impair function, that may be reversible or irreversible, immediate and/or delayed, or which are not specifically addressed by another hazard class (e.g. reproductive toxicity, irritation, carcinogenicity).

Specific target organ toxicity can occur by any route that is relevant for humans, i.e. oral, dermal or inhalation.

Specific Target Organ Toxicity - Single Exposure (STOT-SE)

Specific target organ toxicity (single exposure) is defined as specific, non-lethal target organ toxicity arising from a single exposure to a substance or mixture. STOT-SE should only be assigned when another hazard class (e.g. irritation, acute toxicity) does not cover the observed toxicity more appropriately.

The hazard class Specific Target Organ Toxicity - Single Exposure is differentiated into:

- STOT - Single Exposure, Category 1 and 2; for non-lethal “significant and/or severe toxic effects”
- STOT - Single Exposure, Category 3; for “transient effects” after single exposure, specifically respiratory tract irritation and narcotic effects

Note that there are no guideline values for Category 3, as this is done on a case-by-case basis using human data and relevant animal studies, according to the classification criteria under CLP.

| Classification cut-off guideline (LOAEL) | | | | |
|--|----------------------------|--------|------------------|------------------|
| Exposure route | Dose unit | Cat. 1 | Cat. 2 | Cat. 3 |
| Oral | mg/(kg _{bw} *day) | ≤ 300 | 300 < C ≤ 2000 | expert judgement |
| Dermal | mg/(kg _{bw} *day) | ≤ 1000 | 1000 < C ≤ 2000 | |
| Inhalation (gas) | PpmV/4 hrs | ≤ 2500 | 2500 < C ≤ 20000 | |
| Inhalation (vapour) | mg/l/4hrs | ≤ 10 | 10 < C ≤ 20 | |
| Inhalation (dust/mist/fume) | mg/l/4 hrs | ≤ 1 | 1 < C ≤ 5 | |

Specific Target Organ Toxicity - Repeated Exposure (STOT-RE)

This endpoint relates to specific target organ effects arising from repeated exposure to a substance or mixture. All significant health effects that can impair function, that are reversible or irreversible, immediate and/or delayed are classified into either Category 1 or 2. Specific target organ toxicity can occur by any route that is relevant for humans, i.e. oral, dermal or inhalation.

According to CLP, STOT-RE should only be assigned where the observed toxicity is not covered more appropriately by another hazard class (e.g. carcinogenicity, reproductive toxicity).

The purpose of STOT-RE is to identify the primary target organ(s) of toxicity for inclusion in the hazard statement.

The following table provides classification cut-off values for STOT-RE.

| Classification cut-off guideline (LOAEL) | | | | |
|--|----------------------------|--------|----------------|--|
| Exposure route | Dose unit | Cat. 1 | Cat. 2 | |
| Oral | mg/(kg _{bw} *day) | ≤ 10 | 10 < C ≤ 100 | |
| Dermal | mg/(kg _{bw} *day) | ≤ 20 | 20 < C ≤ 200 | |
| Inhalation (gas) | ppm for 6 hrs./day | ≤ 50 | 50 < C ≤ 250 | |
| Inhalation (vapour) | (mg/l) for 6 hrs./day | ≤ 0.2 | 0.2 < C ≤ 1.0 | |
| Inhalation (dust/mist/fume) | (mg/l) for 6 hrs./day | ≤ 0.02 | 0.02 < C ≤ 0.2 | |

3.2.3. Environmental Endpoints

In CLP, only Acute 1, Chronic Hazard 1, or Chronic 2, or Chronic 3 (dependent on a combination of the acute or chronic toxicity value with evidence to show a log K_{ow} ≥ 4 and/or not rapid biodegradability). For substances that are not acutely toxic but meet the log K_{ow} and or biodegradability criteria, a safety net for chronic classification (Chronic Hazard 4) is incorporated in CLP.

In CLP, a Multiplying (M) factor has been introduced (CLP Annex I) which is a weighting factor for substances which meet the criteria for classification in Acute Category 1 or Chronic Category 1. The M factor is derived from the lowest toxicity value (e.g. LC50 or NOEC) for the substance, and is used for the purposes of calculating the toxicity of mixtures.

With the implementation of the 2nd ATP to CLP, chronic toxicity data are used (if available) to determine chronic classification.

Regarding classification for chronic aquatic toxicity, the following table provides classification cut-off values for environmental classification.

If chronic data are not available:

| | | | | |
|--|---|--|--|--|
| log K_{ow} and biodegradability | < 4 and rapidly biodegradable | | | |
| Eco-toxicity (mg/l) | LL50 ≤ 1 | | | |
| Classification | Aquatic Acute 1 | | | |

| | | | | |
|--|--|--------------------------|---------------------------|--------------------------|
| log K_{ow} and biodegradability | > 4 and/or not rapidly biodegradable | | | |
| Eco-toxicity (mg/l) | LL50 ≤ 1 | 1 < LL50 ≤ 10 | 10 < LL50 ≤ 100 | LL50 > 100 |
| Classification | Aquatic Acute 1 Aquatic Chronic 1 | Aquatic Chronic 2 | Aquatic Chronic 3 | Aquatic Chronic 4 |

If chronic data are available for not rapidly biodegradable substances:

| | | | |
|----------------------------|-------------------------------------|--|-----------------------------------|
| Eco-toxicity (mg/l) | NOEL or EL_x ≤ 0.1 | 0.1 < NOEL or EL_x ≤ 1 | NOEL or EL_x ≤ 1 |
| Classification | Aquatic Chronic 1 | Aquatic Chronic 2 | Aquatic Chronic 3 |

Justification for not classifying in Chronic Category 4 is based on measured BCF data ≤ 500 l/kg or a chronic toxicity value of > 1 mg/l. Since bio-concentration studies for petroleum UVCB substances are not feasible, chronic studies at the limit of water solubility are required to support non-classification.

4. SPECIAL CONSIDERATIONS FOR PETROLEUM SUBSTANCES

Petroleum substances are complex combinations of individual hydrocarbons, which present a number of challenges when applying the methods and legislative criteria developed for the hazard classification of single chemical substances. The petroleum industry has developed approaches and methodologies to characterise the hazard potential of petroleum substances. These are described below along with other important considerations from CLP relating to the petroleum industry.

4.1. GROUPING/CATEGORY APPROACH

Crude oil (Petroleum, CAS Registry Number 8002-05-9) is a complex combination of hydrocarbons extracted from the ground in its natural state. Petroleum substances are derived from crude petroleum, using one or more refinery processes, but due to their method of production, and complex composition, it is not possible to characterise petroleum substances in terms of exact chemical composition, molecular formula or structure. From a regulatory perspective, petroleum substances are recognised as UVCB substances (Substances of Unknown or Variable composition, Complex reaction products or Biological materials).

Under CLP and REACH, it is possible to group substances together into categories where their physical hazards, human and environmental toxicological properties and environmental fate properties are likely to be similar or follow a regular pattern as a result of structural similarities. Petroleum substances can be grouped together according to the processes by which they are manufactured and basic physical properties.

In this report, the category approach has been applied to physical, toxicological and ecotoxicological endpoints for the purposes of hazard classification. To take account of the variable composition of petroleum UVCBs, hazard properties of the category are determined, and a precautionary approach is used to assign the most severe potential hazard classification appropriate for the category, unless specific derogation conditions (designated by Notes or classification criteria) are met.

4.2. CLASSIFICATION AND LABELLING OF PETROLEUM SUBSTANCES - 'SPECIAL TESTING CONSIDERATIONS'

The inherent compositional variability of petroleum UVCBs means that use of conventional testing methodologies may not provide the most reliable data from which to derive hazard classification. This is particularly true for physical/chemical properties which are better characterized as ranges than single point values and for environmental endpoints, which are difficult due to the complex compositions of the substances and the variable water solubility of individual constituents. In contrast, the conventional toxicological testing methodologies can normally be used without modification.

For health and environmental testing of petroleum substances, the outcome depends upon the nature and concentration of the substance to which the organism or test system is exposed. Testing methodologies have been modified to take these factors into account (e.g., the modified Ames test and Water Accommodated Fraction approach to aquatic toxicity testing). For the environment, models to predict aquatic toxicity of hydrocarbon UVCBs, based on Quantitative Structure Activity Relationships (QSARs), have recently become available. However, only experimental data are used to determine the classification of petroleum substance categories following a worst-case approach.

4.3. ASPIRATION HAZARD

‘Aspiration’ means the entry of a liquid substance directly into the trachea and lower respiratory tract. Aspiration of certain petroleum substances may result in severe acute effects, such as chemical pneumonitis, varying degrees of pulmonary injury or death. This property relates to the potential for low viscosity material to spread quickly into the deep lung and cause severe pulmonary tissue damage.

Classification of a hydrocarbon substance for aspiration hazard is based on reliable animal test data, human evidence or physical properties, specifically if it has a kinematic viscosity of 20.5 mm²/s or less, measured at 40°C. Substances, which meet these criteria, are classified in Category 1 for aspiration hazard. It is important to note that classification is mandatory for substances, which meet the physical/chemical property criteria, and does not require confirmation in standard toxicology studies in animals.

The classification of a substance which exists as an aerosol or mist, for example as found in pressurised cylinders, is made on the basis of whether or not the substance has the potential to form a pool of liquid in the mouth, and thereby be aspirated. A fine aerosol or mist may not form a pool of liquid and is therefore unlikely to present an aspiration hazard.

Aspiration of a substance can occur during ingestion and also if it is vomited following ingestion. Safe handling information, for example on labels or in safety data sheets, should reflect this potential hazard.

4.4. HARMONISED CLASSIFICATIONS

The EU harmonised classification of petroleum substances, where these are established, are included in Table 3 of Annex VI to CLP, which indicate the minimum mandatory classification of substances, for the specified endpoints, according to CLP criteria. The harmonised classifications must be used, except where a regulatory Note applies (Annex VI, 1.1.3).

In addition, for hazard endpoints where no EU harmonised classification exists, this report provides proposals for the self-classification of petroleum substances in the EU/EEA. This is in line with the provisions of Article 4 (3) of CLP.

4.5. SELECTION OF PRECAUTIONARY STATEMENTS

CLP requires the allocation of selected precautionary statements (P-statements) for use on labels. These are standardised phrases describing the recommended handling measures required to minimise or prevent adverse environmental, health or physical effects resulting from exposure to a hazardous substance or mixture during its use or disposal.

Container labels should include relevant P-statements (as defined in CLP, Article 22). The complete set of P-statements associated with each specific hazard classification, can be found in CLP Annex I, as amended, parts 2 to 5.

The hazard classification of the substance determines the applicable P-statements. Normally, no more than six P-statements should appear on the label, unless necessary to reflect the nature and the severity of the hazards. Guidance on the selection of P-statements has been published by ECHA (2019). This guidance identifies each P-statement for each hazard class and category as either: Highly Recommended, Recommended or Optional, and indicates that suppliers need to allocate statements based on knowledge of substance use and hazard profile.

When a hazardous substance is supplied to the general public, one P-statement addressing the disposal of that substance or mixture as well as the disposal of packaging shall appear on the label. However, a P-statement addressing disposal shall not be required, when it is clear that the disposal of the substance or the packaging does not present a hazard to human health or the environment.

CLP (Annex IV) lists the correct wording of the P-statements, as they should appear on the label. H- and P-statements should be grouped together on the label.

In the Category specific recommendations in this report, all associated P-statements are shown for completeness. Those statements shown in bold have been selected and recommended by Concawe for the label, and are applicable for the default, most severe hazard classification.

Please note that several P-statements (e.g., P210, P241, P264, P321, P501, etc.) are incomplete and require the manufacturer/supplier to supplement the phrase with the required information.

4.6. REGULATORY AND OIL INDUSTRY NOTES

The preferred method for hazard classification of petroleum substances is to use data on the UVCB substance itself, where available (see example in **Appendix 4**). For certain human health hazard endpoints classification is driven by the presence of specific hazardous constituents that are themselves classified, and for which general or specific concentration limits exist. An example is the classification of naphtha petroleum streams as carcinogens on the basis of their benzene content.

For some categories of petroleum substances, ‘markers’ have been identified which take into account the variable compositions of petroleum substances; for these substances, human health hazard classification is addressed by the use of “Notes”. The regulatory Notes, as laid down in Annex VI to CLP, are applicable to the classification of certain petroleum substances as described in **Appendix 2**.

It is important to recognise that these regulatory Notes only apply to specific petroleum substances in Annex VI to CLP. In addition to the regulatory Notes, Concawe has developed a series of Oil Industry Notes (OIN), which also deal with hazardous properties, which may be associated with petroleum substances and need to be considered when determining the hazard classifications. As a worst-case, the most severe hazard classifications must be applied, unless the conditions of the OIN have been met. This is consistent with the approach used with the regulatory Notes. The OINs are also listed in **Appendix 2**.

For example, regulatory Note P applies to most of the CAS RNs in the Low Boiling Point Naphthas (Gasoline) Category that appear in Annex VI. OIN P was developed for the remaining CAS RNs in the Low Boiling Point Naphthas (Gasoline) Category not covered by the regulatory Note P.

4.7. SUPPLY AND TRANSPORT LABELLING

4.7.1. Content of the label

A hazardous substance supplied in packaging must be labelled according to CLP rules. Anyone placing a substance on the market shall make sure that it is correctly labelled. The label should be written in the official language(s) of the Member State(s) in which the product is sold. The overall label sizes vary according to the capacity of the container, as described in section 1.2.1 of CLP Annex I. The label shall include specific information, namely; Supplier name, address, telephone

number, together with product identifier. For substances, the product identifier should be the same as that used in the SDS, as described in CLP Article 18.

In addition, the label should include hazard pictograms; the pictograms are a square set at a point (diamond) with a black symbol on a white background with a red border. Each pictogram should cover at least 1/15 of the surface area of the label but not be smaller than 1 cm². Associated hazard statements are also included, along with the most suitable (normally not more than six) precautionary statements. The principles of precedence for pictograms, hazard and precautionary statements are described in CLP Articles 26-28.

Specific label requirements for transported gas cylinders, gas containers intended for propane, butane or liquefied petroleum gas; aerosols and containers fitted with a sealed spray attachment and containing substances classified as hazardous if aspirated are described in section 1.3 of CLP Annex I.

Under certain circumstances, there may be a need to include additional or supplemental information on the label or container. This report does not provide a comprehensive inventory of the additional information that may be needed. Companies are encouraged to review relevant legislation for their products to identify any supplemental information requirements.

Specific examples, which appear in REACH Annex XVII, and are directly relevant to petroleum substances, are as follows:

- The packaging of substances that are subject to EU harmonised classifications for germ cell mutagenicity, carcinogenicity or reproductive toxicity (CLP Category 1A or 1B, that are used for non-fuel purposes "must be marked visibly, legibly and indelibly as follows: Restricted to professional users".
- Petroleum substances, such as kerosines, classified for aspiration hazard (H304) and sold as lamp oils for use by the general public must be "visibly, legibly and indelibly marked as follows: Keep lamps filled with this liquid out of the reach of children. Just a sip of lamp oil – or even sucking the wick of lamps – may lead to life-threatening lung damage".
- Petroleum substances, such as kerosines, classified for aspiration hazard (H304) and sold as grill lighter fluids for use by the general public must be "visibly, legibly and indelibly marked as follows: Just a sip of grill lighter may lead to life-threatening lung damage".

4.7.2. Interaction with transport labelling

A provision included in CLP is the possibility to combine the supply label with the transport label. Transportation of dangerous goods requires a pictogram sized at least 10x10 cm, which in many cases may not be fulfilled by the CLP pictogram. The transport pictogram can be used to replace the equivalent CLP pictogram, or both (transport and CLP) can be presented on the outer or single packaging. For substances that are classified as hazardous under CLP, but not classified as dangerous goods (for transport), both the inner (and any intermediate) and the outer packaging must have only a CLP label.

For dangerous goods transported in limited/excepted quantities, the respective marks are considered as transport labelling. Therefore, a CLP label is not required when those marks are attached on the outer packaging, but still may be used if desired.

For substances classified as dangerous goods for transport, class 9, due to the aquatic toxicity of the product, class 9 transport label and environmentally

hazardous substance mark are needed on the transport label, the latter replacing the CLP pictogram GHS09.

4.8. SAFETY DATA SHEET - IMPACT OF CLP

The EU requirements for Safety Data Sheets (SDS) are included in Annex II of REACH.

CLP requires all substances and mixtures must be classified according to its criteria.

The CLP classifications that appear on the SDS need to be consistent with the information that is included in the C&L Inventory notification and/or REACH registration dossiers and with the classification on the actual label.

4.9. DOWNSTREAM LEGISLATIVE IMPACT OF CLP ON OPERATIONS

Changes to the hazard classification of substances under CLP may have consequential impact via other EU legislation (downstream legislation). Therefore, further legislative proposals have been adopted, or are being prepared, which will adapt classification-based provisions to reflect the new criteria and hazard classifications under CLP. These combined legislative changes will impact petroleum industry operations throughout the supply chain.

CLP modifies and introduces new hazard classifications for petroleum substances. These changes require review of existing workplace health and environmental risk assessments and result in the introduction of new risk reduction measures for health or environmental protection. Container labels need to show new hazard information, workplace hazard signs need to be updated and revised SDSs need to be taken into account by operational staff.

The European Commission concluded that effects of introducing CLP can be minimised by appropriate changes to particular downstream legislation. The necessary changes to REACH have been implemented by CLP. However, for Council Directive 2012/18 on the control of major-accident hazards involving dangerous substances (Seveso III Directive), the implementation of CLP is expected to have a more substantial impact. Therefore, this Directive has been amended separately.

Separate amendments to other EU downstream legislation, reflecting the introduction of CLP, were part of further Commission proposals for seven other pieces of EU downstream legislation (see Appendix 3).

4.10. CLASSIFICATION AND LABELLING INVENTORY

The European Chemicals Agency (ECHA) was established for the purpose of managing the introduction and implementation of REACH and CLP. In addition to providing industry and Member States with guidance and tools on how to comply with the obligations of CLP, ECHA is required to:

- establish and maintain a classification and labelling inventory in the form of a database called the 'classification and labelling inventory (C&L Inventory),
- receive notifications to the C&L Inventory,
- receive proposals for the harmonised classification of a substance from Member State Competent Authorities and suppliers, and submit an opinion on such proposals for classification to the Commission,
- receive, evaluate and decide upon the acceptability of requests to use an alternative chemical name,
- prepare and submit to the Commission draft exemptions from the labelling and packaging requirements.

Hazardous substances that are not subject to REACH registration and are placed on the market must also be notified. This includes hazardous petroleum substances that are manufactured / imported in quantities less than 1 tonne per annum / legal entity, or are exempt from the obligation to register according to REACH; the latter includes Crude Oil, Natural Gas and, if certain conditions are met, Liquefied Petroleum Gas. Since petroleum coke is not classified as hazardous and exempt from REACH registration, there is no requirement to make a notification to the C&L Inventory.

4.10.1. Obligation to notify the Agency

All of the requirements for notification to the C&L Inventory are provided in CLP (Articles 39 - 42). The obligation to notify applies to 'manufacturers' or 'importers', or a member of a group of manufacturers or importers, who place a substance on the market if that substance is:

- subject to registration under REACH (≥ 1 tonne/year) and placed on the market,
- classified as hazardous under CLP and placed on the market, irrespective of the tonnage,
- classified as hazardous under CLP and present in a mixture above the concentration limits specified in CLP, which results in the classification of the mixture as hazardous, and the mixture is placed on the market.

The following information is required for it to be included in the C&L Inventory:

- (a) the identity of the notifier(s) responsible for placing the substance on the market;
- (b) the identity and composition of the substance;
- (c) the classification of the substance in accordance with CLP;
- (d) where a substance has been classified in some but not all hazard classes, an indication of whether this is due to lack of data, inconclusive data, or data which are conclusive although insufficient for classification;
- (e) specific concentration limits or *M*-factors, where applicable;
- (f) the label elements (hazard pictograms, signal words and hazard statements together with any supplemental hazard statements).

The information listed above, must be updated and notified to ECHA when new information becomes available that leads to a change in the classification and labelling of the substance.

4.10.2. Format for notification

The C&L Inventory notification can be provided either online using the REACH-IT tool or it can be created using latest version of IUCLID (International Uniform Chemical Information Database) and submitted via REACH-IT.

CLP Notification files in IUCLID format for Petroleum Substances can be downloaded from the Concawe website (www.concawe.eu).

4.10.3. Agreed entries

The notifiers and registrants of the same substance must make every effort to come to an agreed entry to be included in the C&L Inventory.

4.10.4. Timing - notification deadline

For those substances placed on the market, the C&L Inventory notification must be submitted within one month.

4.11. CLP UPDATING PROCESS

The work on GHS started with the aim of providing a single, globally harmonized system to address hazard classification of chemicals, development of warning labels, and safety data sheets. It was recognised however that because of the diversity of classification schemes in different countries this was not an instantly achievable goal and hence global harmonisation will be promoted over time.

The current UN GHS scheme includes the technical output from a number of working groups:

- The International Labour Organization (ILO) for the hazard communication.
- The Organization for Economic Cooperation and Development (OECD) for the classification of health and environmental hazards.
- The United Nations Sub-Committee of Experts on the Global Harmonized System (UNSCEGHS).
- The United Nations Sub-Committee of Experts on the Transport of Dangerous Goods (UNSCETDG) and the ILO for the physical hazards.

The first edition of GHS was published in 2003, having been adopted in December 2002. GHS documentation published by the United Nations is regarded as a living document with revision and improvements being published on a two yearly cycle.

Since the GHS text comes from the United Nations and is the product of international negotiations, future amendments to the UN GHS 'Purple Book' will require amendment of CLP. The European Commission has committed to maintain alignment of CLP with the 'Purple Book' so regular updates are anticipated.

In addition, the European Commission will publish amendments to Annex VI (the list of harmonised classifications) through the ATP process. New or revised harmonised classifications will be subject to formal adoption dates for compliance, as published in the ATP.

This Concawe report will be reviewed and updated periodically as changes to GHS are implemented in CLP.

5. REFERENCES FOR BODY OF REPORT

Blackburn, G.R. et al (1986) Predicting carcinogenicity of petroleum distillation fractions using a modified Salmonella mutagenicity assay. *Cell Biology and Toxicology*, 2, 63-84

CONCAWE (2017) Hazard classification and labelling of petroleum substances in the European Economic Area - 2017. Report No. 13/17. Brussels: CONCAWE

ECHA (2017) Guidance on the application of the CLP criteria. Guidance to Regulation (EC) No 1272/2008 on classification, labelling and packaging (CLP) of substances and mixtures. Version 5.0 July 2017

ECHA (2019) Guidance on labelling and packaging in accordance with Regulation (EC) No 1272/2008". Version 4.0 March 2019

EU (2006) Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No. 793/93 and Commission Regulation (EC) No. 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC. Official Journal of the European Union No. L396, 30.12.2006, as corrected by Official Journal of the European Union No. L136, 29.05.2007 and as further amended

EU (2008) Regulation (EC) No. 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No. 1907/2006. Official Journal of the European Union No. L353, 31.12.2008

EU (2009) Commission Regulation (EC) No. 790/2009 of 10 August 2009 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures. Official Journal of the European Union No. L235, 05.09.2009

EU (2011) Commission Regulation (EU) No. 286/2011 of 10 March 2011 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures. Official Journal of the European Union No. L83, 30.03.2011 (1st ATP)

EU (2012) Commission Regulation (EU) No. 618/2012 of 10 July 2012 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures. Official Journal of the European Union No. L179, 11.07.2012 (2nd ATP)

EU (2013a) Commission Regulation (EU) No. 487/2013 of 8 May 2013 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on classification,

labelling and packaging of substances and mixtures. Official Journal of the European Union No. L149, 01.06.2013 (3rd ATP)

EU (2013b) Commission Regulation (EU) No. 944/2013 of 2 October 2013 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures. Official Journal of the European Union No. L261, 03.10.2013 (4th ATP)

EU (2013c) Commission Regulation (EU) No. 758/2013 of 7 August 2013 correcting Annex VI to Regulation (EC) No. 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures. Official Journal of the European Union No. L216, 10.08.2013

EU (2013d) Commission Regulation (EU) No 944/2013 of 2 October 2013 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures. Official Journal of the European Union No. L261, 03.10.2013 (5th ATP)

EU (2014) Commission Regulation (EU) No 605/2014 of 5 June 2014 amending, for the purposes of introducing hazard and precautionary statements in the Croatian language and its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures. Official Journal of the European Union No. L167, 05.06.2014 (6th ATP)

EU (2015) Commission Regulation (EU) 2015/1221 of 24 July 2015 amending Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures, for the purposes of its adaptation to technical and scientific progress. Official Journal of the European Union No. L197, 25.07.2015 (7th ATP)

EU (2016a) Commission Regulation (EU) 2016/918 of 19 May 2016 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures. Official Journal of the European Union No. L156, 14.06.2016 (8th ATP)

EU (2016b) Commission Regulation (EU) 2016/1179 of 19 July 2016 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures. Official Journal of the European Union No. L195, 20.07.2016 (9th ATP)

EU (2017) Commission Regulation (EU) 2017/776 of 4 May 2017 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures. Official Journal of the European Union No. L116, 5.05.2017 (10th ATP)

EU (2018a) Commission Regulation (EU) 2018/669 of 16 April 2018 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling

and packaging of substances and mixtures. Official Journal of the European Union No. L115, 4.05.2018 (11th ATP)

EU (2018b) Commission Regulation (EU) 2018/1480 of 4 October 2018 amending, for the purposes of its adaptation to technical and scientific progress, Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures and correcting Commission Regulation (EU) 2017/776; Official Journal of the European Union No. L 251, 5.10.2018 (13th ATP)

EU (2019) COMMISSION REGULATION (EU) 2019/521 of 27 March 2019 amending, for the purposes of its adaptation to technical and scientific progress Regulation (EC) No 1272/2008 of the European Parliament and of the Council on classification, labelling and packaging of substances and mixtures; Official Journal of the European Union No. L 26, 28.3.2018 (12th ATP)

IP (1993) Polycyclic aromatics in petroleum fractions by dimethyl sulphoxide - refractive index method, test method designation IP 346/80. In: IP Standards for Petroleum and its Products. Part I: Methods of Analysis and Testing. Volume 2. 53rd Annual Edition. London: Institute of Petroleum

UN (2019) Globally harmonized system of classification and labelling of chemicals (GHS). Eighth revised edition, 2019. New York and Geneva: United Nations; http://www.unece.org/trans/danger/publi/ghs/ghs_rev08/08files_e.html

6. CLASSIFICATION AND LABELLING RECOMMENDATIONS

The classification and labelling recommendations found in the following sections reflect the 'default' hazard classifications that are recommended for all substances in the category. Concawe has decided to define the default as the most severe classification for the category based on the identified hazards. In order to 'downgrade' to a less severe classification, it is necessary to ensure that the appropriate classification criteria and/or conditions specified in the applicable regulatory Notes and Oil Industry Notes have been satisfied. If a less severe classification is applied, this will reduce the number of H- and P-Statements, which will change the information that needs to appear in the safety data sheets and on the labels.

This report provides a framework to achieve an industry harmonised hazard classification for petroleum substances in the EU, where appropriate. Concawe recommends that Companies apply the 'default' hazard classifications included in this report and only vary the classification if the conditions of the regulatory and Oil Industry Notes are met.

6.1. CRUDE OILS (CRUDEOIL)

Definition / Domain: Raw petroleum extracted in its natural state from the ground is a complex combination of hydrocarbons containing predominantly aliphatic, alicyclic, and aromatic hydrocarbons within carbon number range from C4 to C60+. It may also contain small amounts of nitrogen, oxygen, and sulphur compounds. It may also contain parts-per-million of organometallic complexes, especially of nickel and vanadium, and dissolved gases, such as hydrogen sulfide.

Similar constituents are present in all crude oils but their proportions can vary widely depending on the source.

As shown in **Appendix 1**, in spite of the complex composition, Crude oil is assigned a single EC number (232-298-5); if not chemically modified, it is exempt from REACH registration but still subject to CLP notification.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - Crudeoil is liquid.

Flammable Aerosol: Not relevant - Crudeoil is liquid.

Flammable Liquid: Crudeoil is liquid, with flash point < 23°C and initial boiling point ≤ 35°C as well as spanning the range to flashpoints >60°C.

Flammable Solid: Not relevant - Crudeoil is liquid.

Oxidising Gas: Not relevant - Crudeoil is liquid.

Oxidising Liquid: Crudeoil is not considered oxidising based on structural considerations.

Oxidising Solid: Not relevant - Crudeoil is liquid.

Pyrophoric Liquid: Crudeoil does not spontaneously ignite in contact with air.

Pyrophoric Solid: Not relevant - Crudeoil is liquid.

Self-reactive Substance: Crudeoil is not self-reactive. It does not undergo exothermic decomposition when heated.

Self-heating Substance: Crudeoil does not react exothermically.

Gas under Pressure: Not relevant - Crudeoil is liquid.

Organic Peroxide: Crudeoil does not meet the definition of a peroxide.

Corrosive to Metal: Crudeoil does not meet the criteria for corrosion of metal.

Substance, which in contact with water emits flammable gas: Crudeoil does not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of Crudeoil have been tested in acute oral and dermal studies. Results indicate the following (Mobil 1984a,b,c,d,e,f; Mobil 1985a,b,c,d,e,f; Mobil 1990a,b):

| | |
|---------------|---|
| Rat oral | LD ₅₀ > 5000 mg/kg _{bw} |
| Rabbit dermal | LD ₅₀ > 2000 mg/kg _{bw} |

The acute inhalation hazard of crude oil is most likely from hydrogen sulfide. The acute toxicity of hydrogen sulfide assessed in rats, resulted in a calculated LC₅₀ for a 4-hour inhalation exposure of 444 ppm. Volatile organic compounds from crude oil are similar to the hydrocarbons found in gasoline blending streams; for these, testing results indicate no acute toxicity by inhalation exposure route (API, 2011):

| | |
|----------------|--|
| Rat inhalation | LC ₅₀ > 5000 mg/m ³ (in the absence of hydrogen sulfide) |
|----------------|--|

Skin Corrosion / Irritation: Skin irritation was tested in rabbits and showed no evidence of skin irritation or corrosion. Upon repeated exposure Crudeoil may cause skin dryness or cracking (Mobil 1984a,b,c,d,e,f; Mobil 1985a,b,c,d,e,f; Mobil 1990a,b).

Serious Eye Damage / Irritation: Data indicate Crudeoil has the potential to cause eye irritation, as evidenced in rabbit studies by the presence of redness of the conjunctiva at 24 hours with a score of 3.7 (Mobil 1985a,b,c,d,e,f; Mobil 1990a,b).

Respiratory or Skin Sensitization: Evaluation of Crudeoil for dermal sensitization in the guinea pig, using the Buehler method, indicates that it was unlikely to cause sensitization (Mobil 1991a, b).

Germ Cell Mutagenicity: The mutagenic potential of Crudeoil has been tested with *in vitro* and *in vivo* assays. *In vitro* tests showed some mutagenic activity. *In vivo* results in the micronucleus assay did not demonstrate cytogenetic activity. Testing for sister chromatid exchanges did show a slight increase in genetic activity. Based on the available data, Crudeoil is not considered to be germ cell mutagens (Mackerer *et al.*, 2003; Mobil 1984g, h, i; Mobil 1990c; Mobil 1991c, d, e; Lockard *et al.*, 1982).

Carcinogenicity: The carcinogenicity of Crudeoil has been tested in mouse skin painting studies. Based on the available data Crudeoil is considered to be carcinogenic. (Lewis *et al.*, 1984; Clark *et al.*, 1988; Renne *et al.*, 1981).

Reproductive Toxicity: Crudeoil is not expected to produce significant reproductive toxicity since long-term repeated dermal exposures have not produced adverse effects in the sperm or the reproductive organs of the rats (Mobil, 1992a, b; Feuston *et al.*, 1997).

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies show no evidence of systemic toxicity, other than a potential to cause narcosis / CNS depression at higher exposure concentrations (Mobil 1984a,b,c,d,e,f; Mobil 1985a,b,c,d,e,f; Mobil, 1990a,b).

Repeated Exposure: Repeated exposure to Crudeoil by the oral or dermal routes has demonstrated systemic toxicity. Target tissues were blood, liver, spleen and thymus (Leighton, 1990; Feuston *et al.*, 1994, 1997; Mobil, 1992a, b).

Aspiration: Crudeoil is liquid with viscosity values $\leq 20.5 \text{ mm}^2/\text{s}$ or $> 20.5 \text{ mm}^2/\text{s}$ at 40°C .

1.3 Environmental Hazards

Short-term (acute) Aquatic Hazard: Acute aquatic toxicity studies in fish, invertebrates and algae on samples of Crudeoil show acute toxicity values greater than 1 mg/l and mostly in the range of 2 - >100 mg/l. These tests were carried out on the water accommodated fraction (EMBSI 2002 a,b; CONCAWE 2001).

Long-term (chronic) Aquatic Hazard: There are no chronic toxicity studies available for Crudeoil, and QSAR toxicity predictions are not used to determine environmental classification.

Environmental fate (biodegradation / bioaccumulation): Crudeoil is a hydrocarbon UVCB. Standard tests for this endpoint are intended for single substances and are not appropriate for this complex substance. Crudeoil is not expected to meet the criteria for ready degradability but are inherently biodegradable. Constituents of Crudeoil show predicted values for log Kow ranging from less than 4 to greater than 6 and are considered potentially bioaccumulative.

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the 'worst-case' C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers). Appendix 6 lists all alternative C&L recommendations (C&L permutations).

Due to the variability of crude oil composition, the environmental toxicity may differ from that given below; therefore, crude oils can be classified using specific experimental data on the actual type of crude oil under consideration.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|---|
| Flammable liquids: | Flam. Liquid 1 | H224: Extremely flammable liquid and vapour. |
| Serious damage / eye irritation: | Eye Irrit. 2 | H319: Causes serious eye irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, liver, spleen, thymus | H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H224: Extremely flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H319: Causes serious eye irritation.

H336: May cause drowsiness or dizziness.

H350: May cause cancer.

H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer/supplier to specify type of equipment.)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P331: Do NOT induce vomiting.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*... Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

P337 + P313: If eye irritation persists: Get medical advice/attention.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

REFERENCES

API (2011) Crude Oil Category Assessment Document. Submitted to the US EPA; Petroleum HPV Testing Group, Consortium Registration # 1100997. Washington DC: American Petroleum Institute

Clark, C.R. et al (1988) Comparative dermal carcinogenesis of shale and petroleum-derived distillates. *Toxicol Ind Health* 4, 1, 11-22

CONCAWE (2001) Environmental classification of petroleum substances - summary data and rationale. Report No. 01/54. Brussels: CONCAWE

EMBSI (2002a) Mysid, acute toxicity test - Chayvo. Study performed for ExxonNeftegas Ltd. Report No.101160. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2002b) Mysid, acute toxicity test - Odoptu. Study performed for ExxonNeftegas Ltd. Report No.121260. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

Feuston, M.H. et al (1994) Correlation of systemic and developmental toxicities with chemical component classes of refinery streams. *Fund Appl Toxicol* 22, 622-630

Feuston, M.H. et al (1997) Systemic toxicity of dermally applied crude oils in rats. *J Toxicol Environ Health* 51, 387-399

Leighton, F.A. (1990) The systemic toxicity of Prudhoe Bay crude and other petroleum oils to CD-1 mice. *Arch Environ Contam Toxicol* 19, 256-262

Lewis, S.C. et al (1984) Skin carcinogenic potential of petroleum hydrocarbons: crude oil, distillate fractions and chemical class subfractions. In: Mehlman, M.A. et al (Eds). *Advances in modern environmental toxicology*. Volume VI: Applied toxicology of petroleum hydrocarbons, p. 139-150. Princeton NJ: Princeton Scientific

Lockard, J.M. et al (1982) Comparative study of the genotoxic properties of Eastern and Western US shale oils, crude petroleum and coal-derived oil. *Mutation Research* 102, 221-235

Mackerer, C.R. et al (2003) Petroleum mineral oil refining and evaluation of cancer hazard. *Appl Occup Environ Hyg* 18, (11), 890-901

Mobil (1984a) The acute dermal toxicity of Arab light crude in albino rabbits. Mobil Environ. and Health Sci. Lab. Study No.40962. Princeton NJ: Mobil Oil Corporation

Mobil (1984b) The acute dermal toxicity of Beryl crude in albino rats. Mobil Environ. and Health Sci. Lab. Study No. 40952. Princeton NJ: Mobil Oil Corporation

Mobil (1984c) The acute dermal toxicity of MCSL crude (Midcontinent) in albino rabbits. Mobil Environ. and Health Sci. Lab. Study No. 40972. Princeton NJ: Mobil Oil Corporation

Mobil (1984d) The acute oral toxicity of Arab light crude in albino rats. Mobil Environ. and Health Sci. Lab. Study No. 40961. Princeton NJ: Mobil Oil Corporation

Mobil (1984e) The acute oral toxicity of Beryl crude in albino rats. Mobil Environ. and Health Sci. Lab. Study No. 40951. Princeton NJ: Mobil Oil Corporation

Mobil (1984f) The acute oral toxicity of MCSL crude (Midcontinent) in albino rats. Mobil Environ. and Health Sci. Lab. Study No. 40971. Princeton NJ: Mobil Oil Corporation

Mobil (1984g) A modified Ames pre-incubation mutagenesis assay for determination of specific mutagenicity of the DMSO extract of Arab light crude. Mobil Environ. and Health Sci. Lab. Study No. 40965. Princeton NJ: Mobil Oil Corporation

Mobil (1984h) A modified Ames pre-incubation mutagenesis assay for determination of specific mutagenicity of the DMSO extract of MCSL crude (Midcontinent). Mobil Environ. and Health Sci. Lab. Study No. 40975. Princeton NJ: Mobil Oil Corporation

Mobil (1984i) A modified Ames pre-incubation mutagenesis assay for determination of specific mutagenicity of the DMSO extract of Beryl crude. Mobil Environ. and Health Sci. Lab. Study No. 40955. Princeton NJ: Mobil Oil Corporation

Mobil (1985a) Primary eye irritation of Arab light crude in albino rabbits. Mobil Environ. and Health Sci. Lab. Study No. 40963. Princeton NJ: Mobil Oil Corporation

Mobil (1985b) Primary eye irritation of Beryl crude in albino rabbits. Mobil Environ. and Health Sci. Lab. Study No. 40953. Princeton NJ: Mobil Oil Corporation

Mobil (1985c) Primary eye irritation of MCSL crude (Midcontinent) in albino rabbits. Mobil Environ. and Health Sci. Lab. Study No. 40973. Princeton NJ: Mobil Oil Corporation

Mobil (1985d) Skin irritation by Arab light crude after single applications, occluded and non-occluded, on albino rabbits. Mobil Environ. and Health Sci. Lab. Study No. 40964. Princeton NJ: Mobil Oil Corporation

Mobil (1985e) Skin irritation by Beryl crude after single applications, occluded and non-occluded, on albino rabbits. Mobil Environ. and Health Sci. Lab. Study No. 40954. Princeton NJ: Mobil Oil Corporation

Mobil (1985f) Skin irritation by MCSL crude (Midcontinent) after single applications, occluded and non-occluded, on albino rabbits. Mobil Environ. and Health Sci. Lab. Study No. 40974. Princeton NJ: Mobil Oil Corporation

Mobil (1990a) Consolidated acute test report on Belridge heavy. Mobil Environ. and Health Sci. Lab. Study No. 63842, 63843, 63844, 63845. Princeton NJ: Mobil Oil Corporation

Mobil (1990b) Consolidated acute test report on Lost Hills light. Mobil Environ. and Health Sci. Lab. Study No. 63830, 63831, 63832, 63833. Princeton NJ: Mobil Oil Corporation

Mobil (1990c) Micronucleus assay of bone marrow red blood cells from rats treated via dermal administration of Lost Hills light. Mobil Environ. and Health Sci. Lab. Study No. 63835. Princeton NJ: Mobil Oil Corporation

Mobil (1991a) Delayed contact hypersensitivity study in guinea pigs (Buehler sensitization test) of Lost Hills light crude oil. Mobil Environ. and Health Sci. Lab. Study No. 63841. Princeton NJ: Mobil Oil Corporation

Mobil (1991b) Delayed contact hypersensitivity study in guinea pigs (Buehler sensitization test) of Belridge heavy crude oil. Mobil Environ. and Health Sci. Lab. Study No. 63853. Princeton NJ: Mobil Oil Corporation

Mobil (1991c) A modified Ames pre-incubation mutagenesis assay for determination of specific mutagenicity of the DMSO extract of Belridge heavy. Mobil Environ. and Health Sci. Lab. Study No. 63850. Princeton NJ: Mobil Oil Corporation

Mobil (1991d) A modified Ames pre-incubation mutagenesis assay for determination of specific mutagenicity of the DMSO extract of Lost Hills light. Mobil Environ. and Health Sci. Lab. Study No. 63838. Princeton NJ: Mobil Oil Corporation

Mobil (1991e) Micronucleus assay of bone marrow red blood cells from rats treated via dermal administration of Belridge heavy. Mobil Environ. and Health Sci. Lab. Study No. 63847. Princeton NJ: Mobil Oil Corporation

Mobil (1992a) Thirteen-week dermal administration of Belridge heavy to rats. Mobil Environ. and Health Sci. Lab. Study No. 63846. Princeton NJ: Mobil Oil Corporation

Mobil (1992b) Thirteen-week dermal administration of Lost Hills light to rats. Mobil Environ. and Health Sci. Lab. Study No. 63834. Princeton NJ: Mobil Oil Corporation

Renne, R.A. et al (1981) Epidermal carcinogenicity of some crude fossil fuels in mice: a preliminary report. In: Mahlum, D.D. et al (Eds). Coal conversion and the environment, p. 471-481. US Dept.of Energy

6.2. PETROLEUM GASES

Definition / Domain: The petroleum gases category covers mono-constituent C₁-C₄ alkanes. Members of this category include LPGs and are products of hydrocarbon refining operations, such as catalytic cracking, catalytic reforming and steam-cracking, or are produced in association with natural gas processing as well as processing in chemical plants.

The majority of the substances in this category are likely to contain <0.1% 1,3-butadiene. However for the purposes of this report the classification and labelling recommendations reflect the worst-case classification based on ≥ 0.1% 1,3-butadiene.

N.B.: Concentration limits for gases are expressed as v/v % percentage.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Petroleum gases have flash points which range from -104 to -60.0°C. Flammability data for the petroleum gases have maximum lower and upper explosion limits from 5-15 %.

Flammable Aerosol: Not relevant - petroleum gases are not in aerosol form.

Flammable Liquid: Not relevant - petroleum gases are not liquids.

Flammable Solid: Not relevant - petroleum gases are not solids.

Oxidising Gas: Petroleum gases are not considered oxidising based on structural considerations.

Oxidising Liquid: Not relevant - petroleum gases are not liquids.

Oxidising Solid: Not relevant - petroleum gases are not solids.

Pyrophoric Liquid: Not relevant - petroleum gases are not liquids.

Pyrophoric Solid: Not relevant - petroleum gases are not solids.

Self-reactive Substance: Petroleum gases are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: Petroleum gases do not react exothermically.

Gas under Pressure: Petroleum gases are stored under pressure.

Organic Peroxide: Petroleum gases do not meet the definition of a peroxide.

Corrosive to Metal: Petroleum gases do not meet the criteria for corrosion of metal.

Substance, which in contact with water emits flammable gas: Petroleum gases do not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of petroleum gases have been tested in acute inhalation studies. Results indicate the following:

Rat inhalation LC₅₀> 20 mg/l (Clark, D.G. and Tinston, D.J., 1982)

Skin Corrosion / Irritation: Petroleum gases are highly flammable at room temperature. No studies have been conducted on skin corrosion/irritation. There are no indications from the published literature that petroleum gases cause skin corrosion/irritation. Direct skin contact with liquid forms of petroleum gases may cause burns/frostbite due to rapid evaporation and lowering of skin temperature (Cavender F, 1994).

Serious Eye Damage / Irritation: Petroleum gases are highly flammable at room temperature. No studies have been conducted to assess eye irritation. There are no indications from the published literature that petroleum gases cause eye damage or irritation. Direct eye contact with liquid forms of petroleum gases may cause burns/frostbite due to rapid evaporation and lowering of mucous membrane temperature (Cavender F, 1994).

Respiratory or Skin Sensitization: Petroleum gases are highly flammable at room temperature. No studies have been conducted on respiratory or skin sensitization. There are no indications from the published literature that petroleum gases cause skin sensitization.

Germ Cell Mutagenicity: The mutagenic potential of petroleum gases has been extensively studied in a range of *in vivo* and *in vitro* assays. These studies showed no evidence of mutagenic activity. Some C4 petroleum gases may contain 1,3-butadiene, a constituent that is classified as a germ cell mutagen (NTP, 1993; Kirwin CJ *et al.*, 1980; NTP, 2005; SafePharm Laboratories, 2008; API, 2010).

Carcinogenicity: There are no carcinogenicity studies available for any of the C1-C4 alkane gases which comprise the petroleum gases category. Based on weight of evidence, taking into account evidence from sub-chronic tests, consideration of their chemical structures (which show no alerts for carcinogenic activity), together with evidence that C1-C4 alkanes are not genotoxic, it is concluded that these gases are unlikely to show carcinogenic activity. Some C4 petroleum gases may contain 1,3-butadiene, a constituent that is classified as a human carcinogen.

Reproductive Toxicity: The weight of evidence from studies on petroleum gases indicates no evidence of reproductive or developmental toxicity (Hoffman, G.M., 2008; Hoffman, G.M., 2010a, b, c, d; API, 2010).

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies show no evidence of systemic toxicity, other than a potential to cause narcosis / CNS depression at higher exposure concentrations (Clark, D.G. and Tinston, D.J., 1982).

Repeated Exposure: The repeat dose toxicity of petroleum gases has been studied in rats and humans, following repeated inhalation exposure for periods up to 13 weeks. No significant exposure-related target organ toxicity has been observed (Hoffman, G.M., 2008; Hoffman, G.M., 2010a, b, d; API, 2010; Stewart RD *et al.*, 1977; Stewart RD *et al.*, 1978).

Aspiration: Not relevant - petroleum gases are not liquids at ambient temperatures.

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: No experimental data are available on the short-term aquatic toxicity of petroleum gas category members. Due to the high volatility of the petroleum gases, effects on aquatic species are not expected (CONCAWE, 2001).

Chronic (long-term) Aquatic Hazard: No experimental data are available on the chronic aquatic toxicity of petroleum gas category members. Due to the high volatility of the petroleum gases, effects on aquatic species are not expected (CONCAWE, 2001).

Environmental fate (biodegradation / bioaccumulation): Petroleum gases partition predominantly to the atmosphere and so experimental data for their biodegradation are not appropriate. In the absence of experimental data the potential biodegradation rates in water of representative members of the category were estimated using QSAR calculations. These estimates predict that the members of the category are readily biodegradable. Petroleum gases have a low potential for bioaccumulation with log K_{ow} values <4.

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the 'worst-case' C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers).

Hazard Classification

Physical:

H220 Flammable Gas Category 1

H280 Gases under Pressure: Compressed Gas / Refrigerated Liquefied Gas / Dissolved Gas

Health:

H350 Carcinogenic Category 1A

H340 Mutagenic Category 1B

Environment:

No classification required

Labelling

Pictograms:

GHS02, GHS04, GHS08

Signal Words:

Danger

Hazard Statements:

H220: Extremely flammable gas

H280: Contains gas under pressure; may explode if heated

H340: May cause genetic defects

H350: May cause cancer

Precautionary Statements:

[P102] (Only if sold to the general public): Keep out of reach of children

P202: Do not handle until all safety precautions have been read and understood

P280: Wear protective gloves/protective clothing/eye protection/face protection

P281: Use personal protective equipment as required

P210: Keep away from heat, sparks, open flames, hot surfaces. No smoking

P243: Take precautionary measures against static discharge

P410+P403: Protect from sunlight. Store in a well-ventilated place

P201: Obtain special instructions before use

P308+P313: IF exposed or concerned: Get medical advice/attention

P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely

P381: Eliminate all ignition sources if safe to do so

P405: Store locked up

P501: Dispose of contents/container to....in accordance with local/regional /national/international regulations (to be specified)

Supplemental Hazard Information:

Consult CLP legislation as appropriate

Additional Considerations for Labelling:

- Restricted to professional users when classified as a Category 1A or 1B carcinogen, mutagen and used for non-fuel purposes.
- If the worst-case classification does not apply, it will be necessary to identify the pictograms, signal words, H-statements and P-Statements that apply. If in doubt, contact the LOA REACH consortium (www.loa-reach.com) for further advice on possible permutations, which may exist (CLP notes, etc.)

The classification and labelling information in this category has been compiled from information and data provided by LOA REACH Consortium who remains responsible for these data.

REFERENCES

- API (2010) Liquified petroleum gas: a 13-week whole-body inhalation toxicity study in the rats with neurotoxicity assessments and *in vivo* genotoxicity assessments. Study conducted by Huntingdon Life Sciences. Report No. 03-6141. Washington DC: American Petroleum Institute
- Cavender, F. et al (1994) Aliphatic hydrocarbons. In: Clayton, G.D. et al (Eds). Patty's Industrial Hygiene and Toxicology, 4th ed., vol. 2, part B, p. 1221-1266. Chichester: John Wiley & Sons
- Clark, D.G. and Tinston, D.J. (1982) Acute inhalation toxicity of some halogenated and non-halogenated hydrocarbons. *Human Toxicol* 1, 239-247
- CONCAWE (2001) Environmental classification of petroleum substances - summary data and rationale. Report No. 01/54. Brussels: CONCAWE
- Hoffman, G.M. (2008) Butane: combined repeated-exposure toxicity, reproduction and neurotoxicity screening in rats via whole-body inhalation exposures. Study conducted by Huntingdon Life Sciences. Study No. 03-4242. Washington DC: American Petroleum Institute
- Hoffman, G.M. (2010a) Ethane: combined repeated-exposure toxicity with reproduction/developmental toxicity and neurotoxicity screening in rats via whole-body inhalation exposures. Study conducted by Huntingdon Life Sciences. Report No. 03-4243. Washington DC: American Petroleum Institute
- Hoffman, G.M. (2010b) Isobutane: combined repeated-exposure toxicity with reproduction/developmental toxicity and neurotoxicity screening in rats via whole-body inhalation exposures. Study conducted by Huntingdon Life Sciences. Report No. 03-4244. Washington DC: American Petroleum Institute
- Hoffman, G.M. (2010c) Liquified petroleum gas: embryo-fetal toxicity study in rats by inhalation exposure. Study conducted by Huntingdon Life Sciences. Study No. 03-4253. Washington DC: American Petroleum Institute
- Hoffman, G.M. (2010d) Propane: combined repeated-exposure toxicity with reproduction/developmental toxicity and neurotoxicity screening in rats via whole-body inhalation exposures. Study conducted by Huntingdon Life Sciences. Study No. 03-4245. Washington DC: American Petroleum Institute
- Kirwin, C.J. et al (1980) *In vitro* microbiological mutagenicity studies of hydrocarbon propellants. *J Soc Cosmet Chem* 31, 7, 367-370
- NTP (1993) Genetic toxicology - *Salmonella* (297396). Research Triangle Park NC: National Toxicology Program
- NTP (2005) Butane. Research Triangle Park NC: National Toxicology Program <http://ntp.niehs.nih.gov/ntp/roc/elevnth/profiles/s025buta.pdf>
- SafePharm Laboratories (2008) n-Butane; chromosome aberration test in human lymphocytes *in vitro*. Study conducted for Evonik Oxeno GmbH. Study No. 1571/0015. Derbyshire UK: SafePharm Laboratories Ltd
- Stewart, R.D. et al (1977) Acute and repetitive human exposure to isobutene and propane. Prepared for cosmetic, toiletry and fragrance association/Washington DC. *Scand J Work Environ Health* 3, 4, 234-243
- Stewart, R.D. et al (1978) Physiological response to aerosol propellants. *Environ Health Perspect* 26, 275-285

6.3. OTHER PETROLEUM GASES

Definition / Domain: The ‘Other Petroleum Gases’ category covers hydrocarbon streams containing petroleum gases (alkanes/alkenes) predominantly in the C₁-C₅ range (with some carbon numbers present at levels up to C₁₀) and includes some LPGs. Members of this category are products of refining for example distillation of crude oil, catalytic cracking and catalytic reforming, sometimes in association with steam-crackers, or they are produced in association with natural gas processing.

It should be noted that some members of this category may contain 1,3-butadiene ($\geq 0.1\%$ up to 2%), benzene ($\geq 0.1\%$ but 2%) and carbon monoxide (<20%) %. The presence of these marker compounds at these levels will impact the hazard classification of the stream.

N.B.: Concentration limits for gases are expressed as v/v%

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Other Petroleum Gases have flash points which range from -104 to -60.0°C. Flammability data for the petroleum gases have maximum lower and upper explosion limits from 1.8-15 %.

Flammable Aerosol: Not relevant - Other Petroleum Gases are not in aerosol form.

Flammable Liquid: Not relevant - Other Petroleum Gases are not liquids.

Flammable Solid: Not relevant - Other Petroleum Gases are not solids.

Oxidising Gas: Other Petroleum Gases are not considered oxidising based on structural considerations.

Oxidising Liquid: Not relevant - Other Petroleum Gases are not liquids.

Oxidising Solid: Not relevant - Other Petroleum Gases are not solids.

Pyrophoric Liquid: Not relevant - Other Petroleum Gases are not liquids.

Pyrophoric Solid: Not relevant - Other Petroleum Gases are not solids.

Self-reactive Substance: Other Petroleum Gases are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: Other Petroleum Gases do not react exothermically.

Gas under Pressure: Other Petroleum Gases are stored under pressure.

Organic Peroxide: Other Petroleum Gases do not meet the definition of a peroxide.

Corrosive to Metal: Other Petroleum Gases do not meet the criteria for corrosion of metal.

Substance, which in contact with water emits flammable gas: Other Petroleum Gases do not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of the main components and mixtures of Other Petroleum Gases have been tested in acute inhalation studies. Results indicate the following:

Rat inhalation: $LC_{50} > 20$ mg/l (Clark, DG and Tinston, DJ, 1982; Aviado DM *et al.*, 1977a; Aviado DM *et al.*, 1977b)

Some members of the Other Petroleum Gases category may contain carbon monoxide and/or hydrogen sulphide, which are known to present an acute toxicity hazard.

Skin Corrosion / Irritation: Other Petroleum Gases are highly flammable at room temperature. No studies have been conducted on skin corrosion/irritation. There are no indications from the published literature that other petroleum gases are likely to cause skin corrosion/irritation. Direct skin contact with liquid forms of Other Petroleum Gases may cause burns/frostbite due to rapid evaporation and lowering of skin temperature (Cavender F, 1994).

Serious Eye Damage / Irritation: Other Petroleum Gases are highly flammable at room temperature. No studies have been conducted on eye irritation. There are no indications from the published literature that Other Petroleum Gases are likely to cause eye damage or irritation. Direct eye contact with liquid forms of Other Petroleum Gases may cause burns/frostbite due to rapid evaporation and lowering of mucous membrane temperature (Cavender F, 1994).

Respiratory or Skin Sensitization: Other Petroleum Gases are highly flammable at room temperature. No studies have been conducted on respiratory or skin sensitization. There are no indications from the published literature that Other Petroleum Gases are likely to cause skin sensitization.

Germ Cell Mutagenicity: The mutagenic potential of the main components and mixtures of Other Petroleum Gases has been extensively studied in a range of *in vivo* and *in vitro* assays. These studies showed no evidence of mutagenic activity (NTP, 1993; Kirwin CJ *et al.*, 1980; NTP, 2005; SafePharm Laboratories, 2008; API, 2010; Inveresk Research, 2003; McGregor D *et al.*, 1991; Walker DM *et al.*, 2004; Pottenger LH *et al.*, 2007).

Some members of the Other Petroleum Gases category may contain 1,3-butadiene or benzene, constituents classified as germ cell mutagens.

Carcinogenicity: There are no carcinogenicity studies available for Other Petroleum Gases. Based on weight of evidence, taking into account evidence from sub-chronic tests, consideration of their chemical structures (which do not show any alerts for genotoxic carcinogenic activity) together with evidence that Other Petroleum Gases are not genotoxic, it is concluded that these gases are unlikely to show carcinogenic activity. The above reasoning leads to the conclusion that Other Petroleum Gases are considered to have low concern for human carcinogenicity (NTP, 1985).

Some members of the Other Petroleum Gases category may contain 1,3-butadiene or benzene, constituents classified as human carcinogens.

Reproductive Toxicity: The weight of evidence from studies on Other Petroleum Gases indicates no evidence of reproductive or developmental toxicity (Hoffman GM, 2008; Hoffman GM, 2010a, b, c, d; API, 2010; BASF, 2002).

Some members of the Other Petroleum Gases category may contain carbon monoxide, which is known to present a reproductive toxicity hazard.

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies show no evidence of systemic toxicity, other than a potential to cause narcosis / CNS depression at higher exposure concentrations (Clark DG and Tinston DJ, 1982).

Repeated Exposure: The repeat dose toxicity of Other Petroleum Gases has been studied in rats and humans, following repeated inhalation exposures for periods up to 13 weeks. No significant exposure-related target organ toxicity has been observed in inhalation studies for the main components of Other Petroleum Gases (Hoffman GM, 2008; Hoffman GM, 2010a, b, d; API, 2010; NTP 1985; Stewart RD et al, 1977; Stewart RD et al, 1978).

Some members of the Other Petroleum Gases category may contain carbon monoxide, which due to its effect on the blood, may present a hazard upon repeated exposure.

Aspiration: Not relevant - Other Petroleum Gases are not liquids at ambient temperatures.

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: No experimental data were available on the short-term aquatic toxicity of Other Petroleum Gas category members. Due to the high volatility of the Other Petroleum Gases, effects on aquatic species are not expected. (CONCAWE, 2001)

Chronic (long-term) Aquatic Hazard: No experimental data were available on the chronic aquatic toxicity of other petroleum gas category members. Due to the high volatility of the Other Petroleum Gases, effects on aquatic species are not expected. (CONCAWE, 2001)

Environmental fate (biodegradation / bioaccumulation): Other Petroleum Gases partition predominantly to the atmosphere and so experimental data for their biodegradation are not appropriate. In the absence of experimental data the potential biodegradation rates in water of representative members of the category were estimated using QSAR calculations. These estimates predict that the members of the category are readily biodegradable. Other Petroleum Gases have a low potential for bioaccumulation with log K_{ow} values <4.

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the 'worst-case' C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers) and take into consideration the possible presence of the above classification markers at the following levels; benzene or 1,3-butadiene $\geq 0.1\%$, and carbon monoxide $>1\%$ but $<20\%$.

Hazard Classification

Physical:

H220 Flammable Gas Category 1

H280 Gases under Pressure: Compressed Gas / Refrigerated Liquefied Gas / Dissolved Gas

Health:

H350 Carcinogenic Category 1A

H340 Mutagenic Category 1B

H332 Acute toxicity (inhalation) Category 3

H373 Specific Target Organ Toxicity (repeated exposure) Category 2

H360D Reproductive toxicity Category 1A

Environment:

No classification required

Labelling

Pictograms:

GHS02, GHS04, GHS08, GHS06

Signal Word:

Danger

Hazard Statements:

H220: Extremely flammable gas

H280: Contains gas under pressure; may explode if heated

H340: May cause genetic defects

H350: May cause cancer

H360D: May damage the unborn child

H332: Harmful if inhaled

H373: May cause damage to organs through prolonged or repeated exposure

Precautionary Statements:

[P102] (Only if sold to the general public): Keep out of reach of children

P202: Do not handle until all safety precautions have been read and understood

P210: Keep away from heat, sparks, open flames, hot surfaces. No smoking

P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

P311: Call a POISON CENTER/doctor/...

P410+P403: Protect from sunlight. Store in a well-ventilated place

P201: Obtain special instructions before use

P243: Take precautionary measures against static discharge

P260: Do not breathe dust/fume/gas/mist/vapours/spray

P261: Avoid breathing dust/fume/gas/mist/vapours/spray

P264: Wash ... thoroughly after handling.

P270: Do not eat, drink or smoke when using this product.

P271: Use only outdoors or in a well-ventilated area

P308+P313: IF exposed or concerned: Get medical advice/attention

P312: Call a POISON CENTER/doctor/.../ if you feel unwell.

P314: Get medical advice/attention if you feel unwell

P321: Specific treatment (see ... on this label)

P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely

P381: Eliminate all ignition sources if safe to do so

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P405: Store locked up

P501: Dispose of contents/container to...in accordance with local/regional /national/international regulations (to be specified)

Supplemental Hazard Information:

Consult CLP legislation as appropriate

Additional Considerations for Labelling:

- Restricted to professional users (when classified as a Category 1A or 1B carcinogen, mutagen or reproductive toxicant and used for non-fuel purposes).
- If the above classification does not apply it will be necessary to identify the pictograms, signal words, H-statements and P-Statements that apply. If in doubt, contact the LOA REACH consortium (www.loa-reach.com) for further advice on possible permutations which may exist (CLP notes, etc.). Note: Application of CLP Note K is based on w/w % not v/v%.

The classification and labelling information in this category has been compiled from information and data provided by LOA REACH Consortium who remains responsible for these data.

REFERENCES

- API (2010) Liquefied petroleum gas: A 13-week whole-body inhalation toxicity study in the rats with neurotoxicity assessments and *in vivo* genotoxicity assessments. Report No. 03-6141. Washington DC: American Petroleum Institute
- Aviado, D.M. et al (1977a) Hydrocarbon mixture: propane, butane and isobutane. In: Non-fluorinated propellants and solvents for aerosols. Chapter 7, p. 75-81. Cleveland OH: CRC Press
- Aviado, D.M. et al (1977b) Isobutane. In: Non-fluorinated propellants and solvents for aerosols. Chapter 6, p. 61-72. Cleveland OH: CRC Press
- BASF (2002) Propylene - prenatal developmental inhalation toxicity study in Wistar rats; vapor exposure. Project No. 31R0416/01019. Ludwigshafen: BASF AG
- Cavender, F. et al (1994) Aliphatic hydrocarbons. In: Clayton, G.D. et al (Eds). Patty's Industrial Hygiene and Toxicology, 4th ed., vol. 2, part B, p. 1221-1266. Chichester: John Wiley & Sons
- Clark, D.G. and Tinston, D.J. (1982) Acute inhalation toxicity of some halogenated and non-halogenated hydrocarbons. *Hum Exp Toxicol* 1, 3, 239-247
- CONCAWE (2001) Environmental classification of petroleum substances - summary data and rationale. Report No. 01/54. Brussels: CONCAWE
- Hoffman, G.M. (2008) Butane: combined repeated-exposure toxicity, reproduction and neurotoxicity screening in rats via whole-body inhalation exposures. Study conducted by Huntingdon Life Sciences. Study No. 03-4242. Washington DC: American Petroleum Institute
- Hoffman, G.M. (2010a) Ethane: combined repeated-exposure toxicity with reproduction/developmental toxicity and neurotoxicity screening in rats via whole-body inhalation exposures. Study conducted by Huntingdon Life Sciences. Report No. 03-4243. Washington DC: American Petroleum Institute
- Hoffman, G.M. (2010b) Isobutane: combined repeated-exposure toxicity with reproduction/developmental toxicity and neurotoxicity screening in rats via whole-body inhalation exposures. Study conducted by Huntingdon Life Sciences. Report No. 03-4244. Washington DC: American Petroleum Institute
- Hoffman, G.M. (2010c) Liquefied petroleum gas: embryo-fetal toxicity study in rats by inhalation exposure. Study conducted by Huntingdon Life Sciences. Study No. 03-4253. Washington DC: American Petroleum Institute
- Hoffman, G.M. (2010d) Propane: combined repeated-exposure toxicity with reproduction/developmental toxicity and neurotoxicity screening in rats via whole-body inhalation exposures. Study conducted by Huntingdon Life Sciences. Study No. 03-4245. Washington DC: American Petroleum Institute
- Inveresk Research (2003) Propylene testing for mutagenic activity with *Salmonella typhimurium* TA1535, TA1537, TA98 and TA100 and *Escherichia coli* WP2uvrA (pKM101). Report No. 22594. Tranent Scotland: Inveresk Research International Ltd
- Kirwin, C.J. et al (1980) *In vitro* microbiological mutagenicity studies of hydrocarbon propellants. *J Soc Cosmet Chem* 31, 7, 367-370

McGregor, D. et al (1991) Responses of the L5178Y mouse lymphoma forward mutation assay: V. gases and vapors. *Environ Molecular Mutagen* 17, 2, 122-129

NTP (1985) Toxicology and carcinogenesis studies of propylene (CAS No. 115-07-1) in F344/N rats and B6C3F1 mice (inhalation studies). NTP Technical Report No. 272. Research Triangle Park NC: National Toxicology Program

NTP (1993) Genetic toxicology - *Salmonella* (297396). Research Triangle Park NC: National Toxicology Program

NTP (2005) Butane. Research Triangle Park NC: National Toxicology Program

<http://ntp.niehs.nih.gov/ntp/roc/eleventh/profiles/s025buta.pdf>

Pottenger, L.H. et al (2007) Evaluation of effects from repeated inhalation exposure of F344 rats to high concentrations of propylene. *Toxicol Sci* 97, 2, 336-347

SafePharm Laboratories (2008) n-Butane; chromosome aberration test in human lymphocytes *in vitro*. Study conducted for Evonik Oxeno GmbH. Study No. 1571/0015. Derbyshire UK: SafePharm Laboratories Ltd

Stewart, R.D. et al (1977) Acute and repetitive human exposure to isobutane. *Scand J Work Environ Health* 3, 4, 234-243

Stewart, R.D. et al (1978) Physiological response to aerosol propellants. *Environ Health Perspect* 26, 275-285

Walker, D.M. et al (2004) Hprt mutant frequencies in splenic T-cells of male F344 rats exposed by inhalation to propylene. *Environ Molecular Mutagen* 43, 4, 265-272

6.4. LOW BOILING POINT NAPHTHAS (GASOLINES) (Naphtha)

Definition / Domain: The domain of this category is established by the refining processes by which the category members are produced, the predominant hydrocarbon classes present, the boiling point range and the carbon number range as follows:

- Derived from crude petroleum or separated as a liquid from natural gas.
- Refinery processes
 - atmospheric distillation
 - alkylation
 - isomerisation
 - catalytic cracking
 - thermal cracking
 - catalytic reforming
 - catalytic polymerisation
 - hydrotreatment / hydrodesulphurisation
 - hydrocracking
 - coking
- Hydrocarbon types: saturated, olefinic, aromatic
- Typical boiling point range: approximately -88°C to 260°C
- Typical carbon number range: predominantly C4 to C12

Appendix 1 lists only those Naphtha substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - Naphtha substances are liquids.

Flammable Aerosol: Not relevant - Naphtha substances are not in aerosol form.

Flammable Liquid: Naphtha substances are flammable liquids of variable flash point / initial boiling points.

Flammable Solid: Not relevant - Naphtha substances are liquids.

Oxidising Gas: Not relevant - Naphtha substances are liquids.

Oxidising Liquid: Naphtha substances are not considered oxidising based on structural considerations.

Oxidising Solid: Not relevant - Naphtha substances are liquids.

Pyrophoric Liquid: Naphtha substances do not spontaneously ignite in contact with air.

Pyrophoric Solid: Not relevant - Naphtha substances are liquids.

Self-reactive Substance: Naphtha substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: Naphtha substances do not react exothermically.

Gas under Pressure: Not relevant - Naphtha substances are liquids.

Organic Peroxide: Naphtha substances do not meet the definition of a peroxide.

Corrosive to Metal: Naphtha substances are liquids and do not meet the criteria for corrosion of metal.

Substance, which in contact with water emits flammable gas: Naphtha substances do not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of Gasoline and other Naphtha substances have been tested in acute oral, dermal and inhalation studies. Results indicate the following:

| | |
|-------------------------|--|
| Rat oral | LD ₅₀ > 5000 mg/kg _{bw} (UBTL, Inc., 1986b) |
| Rat inhalation (vapour) | LC ₅₀ > 5610 mg/m ³ air (analytical) (UBTL, Inc. 1992) |
| Rabbit dermal | LD ₅₀ > 2000 mg/kg _{bw} (UBTL, Inc, 1986a) |

The data do not meet the criteria for hazard classification for acute, dermal or inhalation toxicity according to EU CLP Regulation; however, warnings for aspiration hazard and potential narcotic effects at high concentrations should be considered.

Skin Corrosion / Irritation: Samples of Gasoline and a number of other naphtha streams have been tested in rabbit skin irritation studies. The majority of the data were derived using a 24 hour occluded exposure protocol. The degree of dermal irritation observed was variable, ranging from slight to moderate/severe, normally persisting for up to 14 days. There was no evidence of skin corrosion when applied to rabbit skin. Heavier, aromatic materials caused more irritation than lighter, paraffinic streams (API, 1995).

The data can be used without restriction for regulatory purposes and support classification of gasoline and naphtha streams as Skin Irritant 2 according to EU CLP Regulation.

Serious Eye Damage / Irritation: The effects of Gasoline and naphtha streams have been investigated into rabbits' eyes using a number of samples. There is some evidence of eye irritation associated with vapor exposure at levels equal to and greater than 200 ppm, but the effects were mild, and the dose-response information was not conclusive. There was very little evidence of irritation when these materials were instilled into rabbit eyes. (UBTL, Inc., 1985d)

Gasoline and naphtha streams do not meet the criteria for classification as an eye irritant according to the EU CLP Regulation.

Respiratory or Skin Sensitization: Tests in guinea pigs with Gasoline and a number of other Naphtha streams showed no evidence of skin sensitization (UBTL, Inc., 1986c). There are no reports available to indicate that Gasoline or other Naphtha streams have the potential to cause respiratory sensitization.

The data can be used without restriction for regulatory purposes and do not support classification as a sensitizer according to EU CLP Regulation.

Germ Cell Mutagenicity: The mutagenic potential of Gasoline and other Naphtha substances has been extensively studied in a range of *in vivo* and *in vitro* assays. Although blended gasoline was not mutagenic, either with or without metabolic activation, in *in vitro* test systems, the naphtha streams produced mixed results in *in vitro* gene mutation assays but negative results *in vivo*. The majority of the studies showed no evidence of mutagenic activity. (API, 1977; API, 2005). Gasoline and other Naphtha streams can contain benzene, a constituent that is classified as a germ cell mutagen. Although the data do not support classification of gasoline *per se* for genotoxic potential according to EU CLP Regulation, there is a regulatory requirement to classify as genotoxic gasoline and naphtha streams containing $\geq 0.1\%$ w/w benzene

Carcinogenicity: The carcinogenic potential of Gasoline has been investigated in rats and mice following inhalation exposure for 2 years. In rats, there was an increased incidence of kidney tumours in males and in mice there was an increased incidence of liver tumours in females (Kitchen D,1984; IRDC,1984). Further work has shown that these tumours are sex and species specific and are not considered relevant to humans (Short BG *et al.*, 1989). Results of 2 year skin painting studies with Gasoline and Naphtha blending streams have shown either no, or weak potential (low incidence and long latent period) for the development of skin tumours. Additional work has shown that where tumours arise they are most likely a result of a non-genotoxic response due to dermal irritation (API, 1983b). Gasoline and other naphtha streams can contain benzene, a constituent that is classified as a human carcinogen. According to EU CLP Regulation, the data do not support classification of gasoline *per se* for carcinogenic potential, although there is a regulatory requirement to classify as carcinogenic gasoline and naphtha streams containing $\geq 0.1\%$ w/w benzene.

Reproductive Toxicity: Results of guideline developmental toxicity studies on Gasoline and OECD developmental toxicity screening studies with other Naphtha substances showed no evidence of developmental toxicity in rats (Roberts L *et al.*, 2001; Mobil,1988). Similarly, studies in rats with Gasoline did not show any effect on fertility performance (McKee RH *et al.*, 2000; Research Pathology Services, Inc.1998). Gasoline and other Naphtha streams can contain amounts of toluene and/or n-hexane, constituents that are classified as reprotoxicants. Although the data do not provide a basis for classification of gasoline *per se* for reproductive toxicity potential according to EU CLP Regulation and there is no need for additional reproductive toxicity studies to be conducted, there is a regulatory requirement to classify as reprotoxic gasoline and naphtha streams containing $\geq 3\%$ w/w toluene and/or n-hexane.

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies show no evidence of systemic toxicity, other than a potential to cause narcosis / Central Nervous System (CNS) depression at higher exposure concentrations (Drinker P *et al.*, 1943; Davis A *et al.* 1960).

Repeated Exposure: The repeat dose toxicity of Gasoline and other Naphtha streams has been studied in rats following oral, inhalation and dermal exposure for periods between 10 days and up to 2 years. The effects of repeated inhalation exposure of primates to Gasoline have also been studied. No adverse effect observed via oral route. Repeated inhalation exposure causes 'light hydrocarbon nephropathy' in male rats, an effect which is considered to be both sex and species specific. In dermal studies, no systemic toxicity has been seen; the only effect observed was moderate to severe dermal irritation (Halder CA *et al.*, 1985; API, 1983a; UBTL, Inc. 1985e; MacFarland *et al.* 1984, API 2005).

The data is sufficient for regulatory purposes, no additional testing is necessary. According to EU CLP regulation (EC No. 1272/2008), the classification for systemic toxicity is only warranted when naphtha streams contain $\geq 10\%$ w/w benzene. See also **Appendix 4**, which provides some additional context relating to the lack of classification of Low Boiling Point Naphthas containing $\geq 1\%$, but $< 10\%$ benzene for STOT Repeated Exposure.

Aspiration: Gasoline and other Naphtha substances are low viscosity, mobile hydrocarbon liquids with a viscosity at 40°C of $< 7\text{ mm}^2/\text{s}$, meeting the classification criteria in CLP Regulation for aspiration hazard.

1.3 Environmental Hazards

Acute (short-term) Hazard: Acute aquatic toxicity studies with fish, invertebrates and algae on samples of Gasoline and other Naphtha substances show acute toxicity values in the range 1-10 mg/l. These tests were carried out on water accommodated fractions, and in closed systems to prevent evaporative loss (EBSI 1995a, b, c; CONCAWE, 1996; Petroleum Product Steward Council, 1995).

Chronic (long-term) Aquatic Hazard: Chronic toxicity studies on fish and Daphnia exposed to Naphtha substances are available, with a lowest NOEL value of 2.6 mg/l (Springborn Laboratories, 1999).

Environmental fate (biodegradation / bioaccumulation): Naphtha substances are hydrocarbon UVCBs. Standard tests for biodegradation / bioaccumulation are intended for single substances and are not appropriate for complex substances. Based on compositional information available and measured or predicted data on key constituents, Gasoline and other Naphtha substances are not expected to meet the criteria for ready degradability but are inherently biodegradable. Constituents of Naphtha substances show measured or predicted values for $\log K_{ow}$ greater than 4 and are considered potentially bio-accumulative.

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the 'worst-case' C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers). **Appendix 6** lists all alternative C&L recommendations (C&L permutations) including OIN and/or CLP Notes, where applicable.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 1 | H224: Extremely flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Fertility and unborn child | H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child. |
| Germ cell mutagenicity: | Muta. 1B | H340: May cause genetic defects. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H224: Extremely flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H340: May cause genetic defects.

H350: May cause cancer.

H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child. H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer/supplier to specify type of equipment.)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*): Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

To provide flexibility in the application of precautionary phrases, combinations or consolidations of precautionary statements are encouraged to save label space and improve readability. The matrix and the Tables in Part 1 of this Annex include a number of combined precautionary statements. However, these are only examples and suppliers may further combine and consolidate phrases where this contributes to clarity and comprehensibility of label information in accordance with Articles 22 and 28(3).

Additional labelling requirements:

Restricted to professional users due to classification as mutagenic Category 1B and carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P321: Specific treatment (see ... on this label). (... Reference to supplemental first aid instruction.)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (...Manufacturer/supplier to specify appropriate media. – if water increases risk.)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

In accordance with Annex VI of the CLP Regulation (inclusion from 5th ATP to CLP), the following additional classification applies only to the substance with CAS EC # 265-185-464742-82-1.

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Central nervous system | H372: Causes damage to central nervous system through prolonged or repeated exposure. |

Note: Additional classification and labelling STOT RE 1 applies case-by-case if Benzene content is >10% in Naphtha category substances.

Additional precautionary statements associated to this additional classification are:

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (Manufacturer/supplier to specify applicable conditions)

P270: Do not eat, drink or smoke when using this product.

P314: Get medical advice/attention if you feel unwell.

REFERENCES

API (1977) Mutagenicity evaluation of unleaded gasoline. Study conducted by Litton Bionetics. API Med. Res. Publ. 28-30173. Washington DC: American Petroleum Institute

API (1983) Carcinogenic potential of key petroleum products. Study conducted by Eppley Institute for Research in Cancer, University of Nebraska Medical School. API Med. Res. Publ. 30-31646. Washington DC: American Petroleum Institute

API (1995) Primary skin irritation study in rabbits of API 91-01 and PS-6. Unleaded test gasolines. Study conducted by Hill Top Biolabs Inc. API Toxicology Report No. 409. Washington DC: American Petroleum Institute

API (2005) Baseline gasoline vapor condensate: a 13-week whole-body inhalation toxicity study in rats with neurotoxicity assessments and 4-week in vivo genotoxicity and immunotoxicity assessments. Study conducted by Huntingdon Life Sciences. Study No. 00-6125. Washington DC: American Petroleum Institute

CONCAWE (1996) Acute aquatic toxicity of gasolines. Report No. 96/57. Brussels: CONCAWE

Davis, A. et al (1960) The effects on human volunteers of exposure to air containing gasoline vapor. *Arch Environ Health* 1, 548-554

Drinker, P. et al (1943) The threshold toxicity of gasoline vapor. *J Ind Hyg Toxicol* 25, 6, 225-232

EBSI (1995a) Alga, growth inhibition test. MRD-95-048 gasoline W94/813, blend. Study performed for CONCAWE. EBSI Study No. 104867. East Millstone NJ: Exxon Biomedical Sciences Inc.

EBSI (1995b) Daphnia, acute toxicity test. MRD-95-044 gasoline W94/809, medium naphtha. Study performed for CONCAWE. EBSI Study No. 104442. East Millstone NJ: Exxon Biomedical Sciences Inc.

EBSI (1995c) Fish, acute toxicity test -rainbow trout. MRD-95-045 gasoline W94/810, isomerate. Study performed for CONCAWE. EBSI Study No. 104558. East Millstone NJ: Exxon Biomedical Sciences Inc.

Halder, C.A. et al (1985) Hydrocarbon nephropathy in male rats: identification of the nephrotoxic components of unleaded gasoline. *Toxicol Ind Health* 1, 3, 67-87

IRDC (1984) Motor fuel chronic inhalation study. Unleaded gasoline. Study conducted by IRDC. Report no. 418-003. Washington DC: American Petroleum Institute

Kitchen, D. (1984) Neoplastic renal effects of unleaded gasoline in Fischer 344 rats. In: Mehlman, M.A. et al (Eds). *Advances in modern environmental toxicology. Volume VII: Renal effects of petroleum hydrocarbons*, p. 65-71. Princeton, NJ: Princeton Scientific

MacFarland, H.N. et al (1984) A chronic inhalation study with unleaded gasoline vapor. *J Am College Toxicol* 3, 4, 231-248

McKee, R.H. et al (2000) Assessment in rats of the reproductive toxicity of gasoline from a gasoline vapor recovery unit. *Reprod Toxicol* 14, 4, 337-353

Mobil (1988) Developmental toxicity screen in rats exposed dermally to light catalytically cracked naphtha (LCCN). Mobil Environ. and Health Sci. Lab. Study No. 50341. Princeton NJ: Mobil Oil Corporation

Petroleum Product Stewardship Council (1995) Static-renewal 96-hour acute toxicity study of the water accommodated fraction (WAF) of whole light alkylate product to fathead minnow. Study conducted by Stonybrook Laboratories Inc. Study No. 65908. Washington DC: Petroleum Product Stewardship Council

Roberts, L. et al (2001) Developmental toxicity evaluation of unleaded gasoline vapor in the rat. *Reprod Toxicol* 15, 5, 487-494

Research Pathology Services (1998) Two generation reproduction study of gasoline vapors in rats with vapour recovery unit condensate. Study performed for CONCAWE. EBSI Study No. 115235. East Millstone NJ: Exxon Biomedical Sciences Inc.

Short, B.G. et al (1989) Promoting effects of unleaded gasoline and 2,2,4-trimethylpentane on the development of atypical cell foci and renal tubular cell tumors in rats exposed to *N*-ethyl-*N*-hydroxy-ethylnitrosamine. *Cancer Research* 49, 22, 6369-6378

Springborn Laboratories (1999) Light alkylate naphtha - full life cycle toxicity test with water fleas, *Daphnia magna*, under static-renewal conditions following OECD Guideline 211. Study No. 13687.0598.6105.130. Wareham MA: Springborn Laboratories Inc.

UBTL (1986a) Acute dermal toxicity study in rabbits administered test article F-64-01 unleaded premium gasoline. UBTL Study No. 60553. Los Angeles CA: ARCO

UBTL (1986b) Acute oral toxicity study in rats administered test article F-64-01 unleaded premium gasoline. UBTL Study No. 60598. Los Angeles CA: ARCO

UBTL (1986c) Dermal sensitization study in guinea pigs administered test article F-64-01 unleaded premium gasoline. UBTL Study No. 60613. Los Angeles CA: ARCO

UBTL (1986d) Primary eye irritation study in rabbits administered test article F-64-01 Watson unleaded premium gasoline. UBTL Study No. 60583. Los Angeles CA: ARCO

UBTL (1986e) Twenty-eight day dermal toxicity study in rats on test article F-64-01 Watson unleaded premium gasoline. UBTL Study No. 60761. Los Angeles CA: ARCO1. Testing laboratory: UBTL, Inc. 520 Wakara Way, Salt Lake City, UT 84108, USA. Report no.: 60761. Owner company: Atlantic Richfield Company. Study number: ATX-85-0182. Report date: 1986-02-14.

UBTL (1992) Acute inhalation toxicity study in rats administered test article #: F-101. Testing laboratory: UBTL, Inc. 520 Wakara Way, Salt Lake City UT 84108 USA. Report no.: 65798. Owner company: Atlantic Richfield Company. Study number: ATX-89-0053. Report date: 1992-12-04.

6.5. KEROSINES (Kerosine)

Definition / Domain: The domain of this category is established by the refining processes by which the category members are produced. The distillation range of Kerosine substances is such that components of specific toxicological concern such as benzene (boiling point 80 °C) and n-hexane (boiling point 69 °C) are typically only present at trace concentrations. The boiling points of 3 to 7 fused-ring polycyclic aromatic hydrocarbons (PAHs) are above the boiling range of Kerosine substances.

- Derived from crude petroleum
- Refinery processes:
 - atmospheric distillation
 - catalytic cracking
 - thermal cracking
 - hydrocracking
 - hydrotreatment / hydrodesulphurisation
 - catalytic reforming
 - coking
- Hydrocarbon types: the major components include branched and straight chain paraffins and naphthenes (cycloparaffins), and aromatic hydrocarbons (alkylbenzenes and alkylnaphthalenes).
- Typical boiling point range: approximately 90 °C to 320 °C
- Typical carbon number range: predominantly C6 to C17

Appendix 1 lists only those Kerosine substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - Kerosine substances are liquids.

Flammable Aerosol: Not relevant - Kerosine substances are not in aerosol form.

Flammable Liquid: Kerosine substances are liquids of variable flash point. Typically with a flash point range of $\geq 23^{\circ}\text{C}$ and $\leq 70^{\circ}\text{C}$.

Flammable Solid: Not relevant - Kerosine substances are liquids.

Oxidising Gas: Not relevant - Kerosine substances are liquids.

Oxidising Liquid: Kerosine substances are not considered oxidising based on structural considerations.

Oxidising Solid: Not relevant - Kerosine substances are liquids.

Pyrophoric Liquid: Kerosine substances do not spontaneously ignite in contact with air.

Pyrophoric Solid: Not relevant - Kerosine substances are liquids.

Self-reactive Substance: Kerosine substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: Kerosine substances do not react exothermically.

Gas under Pressure: Not relevant - Kerosine substances are liquids.

Organic Peroxide: Kerosine substances do not meet the definition of a peroxide.

Corrosive to Metal: Kerosine substances are liquids and do not meet the criteria for corrosion of metal.

Substance which in contact with water emits flammable gas: Kerosine substances do not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of Jet Fuel and other Kerosine substances have been tested in acute oral, dermal and inhalation studies. Results indicate the following:

| | |
|-------------------------|---|
| Rat oral | LD ₅₀ > 5000 mg/kg _{bw} (ARCO; 1992c) |
| Rat inhalation (vapour) | LC ₅₀ > 5.28 mg/l (API; 1987) |
| Rabbit dermal | LD ₅₀ > 2000 mg/kg _{bw} (ARCO; 1992b) |

Skin Corrosion / Irritation: Samples of Jet Fuel and a number of other Kerosine substances have been tested in rabbit skin irritation studies. The degree of irritancy is substance-, dose- and exposure-time dependent. The kerosines and jet fuels range from essentially non-irritating after 4 hours of semi-occlusive exposure to severely irritating after 24 hours of occluded exposure. There was no evidence of skin corrosion (Shell; 1991).

Serious Eye Damage / Irritation: The effects of Jet Fuel and other Kerosine substances on the eye have been investigated in rabbits using a number of samples. None of the samples tested showed more than minimal redness and swelling, which resolved within 48 hrs (ARCO; 1992e).

Respiratory or Skin Sensitization: Tests in guinea pigs with Jet Fuel and a number of other Kerosine substances showed no evidence of skin sensitization (ARCO; 1992d).). There are no reports available to indicate that Jet Fuel or other Kerosine substances have the potential to cause respiratory sensitization.

Germ Cell Mutagenicity: The mutagenic potential of Jet Fuel and other Kerosine substances has been extensively studied in a range of *in vivo* and *in vitro* assays. Because most of the experimental studies were negative and the data on various individual components of kerosines and jet fuels were negative, the weight of evidence from *in vitro* and *in vivo* mutagenic studies indicates that kerosine and jet fuels are likely not mutagens (CONCAWE, 1991; API, 1977; API, 1984; API, 1973; API, 1980; API 1985; API 1988).

Carcinogenicity: Kerosine is not carcinogenic when animals are exposed via the oral or inhalation route. However, chronic skin contact with kerosines and jet fuel may lead to tumour formation as a consequence of repeated cycles of irritation, skin damage and repair. Jet fuels and kerosines were not found to be mutagenic or genotoxic, and the observations from animal studies confirm the non-genotoxic nature of the skin tumour formation. Although dermal irritation alone seems not sufficient to cause dermal tumourigenicity, studies clearly show that dermal irritation and inflammation are prerequisites for dermal carcinogenicity. In studies where dermal irritation and/or inflammation were prevented but other factors, such as dermal uptake of polycyclic aromatic compounds were kept identical, no

skin tumours were observed. Based on this data, kerosines are classified as non-carcinogenic (EBSI, 1996; Freeman JJ et al, 1993; Clark CR et al, 1988; API, 1989a; API, 1989b; NTP, 1986; Blackburn GR et al, 1986; CONCAWE, 1996).

Reproductive Toxicity: Results of guideline developmental toxicity studies on Jet Fuel and other Kerosine substances and OECD developmental toxicity screening studies with Kerosine substances showed no evidence of developmental toxicity in rats. Similarly, studies in rats with Jet Fuel and other Kerosine substances did not show any effect on reproductive performance (Schreiner C et al, 1997; Mattie DR et al, 2000; Cooper JR and Mattie DR, 1996; API, 1979).

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies show no evidence of target organ toxicity (ARCO, 1992c; API, 1987; ARCO, 1992b). Human experience indicates that exposure to high concentrations of Kerosine substances or similar substances in some situations may cause drowsiness and/or dizziness (e.g. ATSDR, 1998).

Repeated Exposure: A number of subacute and subchronic studies with kerosines and jet fuels are available. The repeated inhalation and oral studies of kerosine in rats produced no consistent toxicological effects other than changes in male rat kidneys that are not considered relevant to humans. In dermal studies, no systemic toxicity has been seen; the only effect observed was moderate to severe dermal irritation (API 1986; Mattie DR et al, 1991; Mattie DR et al, 2000; ARCO 1992a; Battelle 1997).

Aspiration: Jet Fuel and other Kerosine substances are low viscosity, mobile hydrocarbon liquids with a viscosity of $< 7 \text{ mm}^2/\text{s}$ at 40°C .

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: Acute aquatic toxicity studies on samples of Kerosine substances show values greater than 1 mg/l and in the range 1-20 mg/l. These tests were carried out on water accommodated fractions, and in closed systems to prevent evaporative loss (Toy R and Gray A, 1994; EBSI, 1995).

Chronic (long-term) Aquatic Hazard: A chronic toxicity study on *Daphnia magna* exposed to a Kerosine substance using WAF methodology gave a NOEL value of 0.48 mg/l based on reproduction (EMBSI, 2010).

Environmental fate (biodegradation / bioaccumulation): Kerosine substances are hydrocarbon UVCBs. Standard tests for biodegradation / bioaccumulation are intended for single substances and are not appropriate for complex substances. Based on compositional information available and measured or predicted data on key constituents, Jet Fuel and other Kerosine substances are not expected to meet the criteria for ready degradability but are inherently biodegradable. Constituents of Kerosine substances show measured or predicted values for $\log K_{ow}$ greater than 4 and are considered potentially bio-accumulative.

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the 'worst-case' C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers). Appendix 6 lists all alternative C&L recommendations (C&L permutations).

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 3 | H226: Flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

Additional labelling requirements:

Where the substance is sold to the general public (Consumers) for use in grill lighters or lamp oils, then container labels should be visibly, legibly and indelibly marked as follows, in accordance with REACH Annex XVII:

Lamp oils

- Keep lamps filled with this liquid out of the reach of children.
- Just a sip of lamp oil - or even sucking the wick of lamps may lead to life-threatening lung damage.

Grill lighter fluids

- Just a sip of grill lighter may lead to life-threatening lung damage.

Full list of Precautionary statements

General:

P102: Keep out of reach of children. (In case of consumer use P102 should be added on the label)

Prevention:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

REFERENCES

API (1973) Mutagenicity study of thirteen petroleum fractions - report no. 4. Study conducted by Hine Laboratories Inc. API Health Environ. Sci. Dep. Rep. 26-60098. Washington DC: American Petroleum Institute

API (1977) Mutagenicity evaluation of kerosene. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 26-60017. Washington DC: American Petroleum Institute

API (1979) Teratology study in rats - kerosene. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 27-32175. Washington DC: American Petroleum Institute

API (1980) Mutagenicity evaluation of jet fuel A in the mouse dominant lethal assay. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 28-31345. Washington DC: American Petroleum Institute

API (1984) Mutagenicity evaluation studies in the rat bone marrow cytogenetic assay, in the mouse lymphoma forward mutation assay. API 81-07 hydrodesulfurized kerosene. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 32-30240. Washington DC: American Petroleum Institute

API (1985) The acute in-vivo cytogenetics assay in male and female rats of API 83-09 straight-run kerosine (CAS 8008-20-6). Study conducted by Microbiological Associates Inc. API Med. Res. Publ. 32-31769. Washington DC: American Petroleum Institute

API (1986) Four week subchronic inhalation toxicity study in rats with API 81-07 hydrodesulfurized kerosine (petroleum) (CAS 64742-81-0), API 81-09 hydrodesulfurized middle distillate (petroleum) (CAS 64742-80-9), API 81-10 hydrodesulfurized middle distillate (petroleum) (CAS 64742-80-9). Study conducted by International Research and Development Corp. API Health Environ. Sci. Dep. Rep. 33-32724. Washington DC: American Petroleum Institute

API (1987) Acute inhalation toxicity evaluation of a petroleum derived hydrocarbon in rats. API 83-09 straight-run kerosine (CAS 8008-20-6). Study conducted by Hazleton Laboratories America Inc. API Health Environ. Sci. Dep. Rep. 34-30634. Washington DC: American Petroleum Institute

API (1988) In vivo sister chromatid exchange assay with API 81-07 hydrodesulfurized kerosine. Study conducted by Microbiological Associates Inc. API Med. Res. Publ. 36-30043. Washington DC: American Petroleum Institute

API (1989a) Lifetime dermal carcinogenesis/chronic toxicity screening bioassay of refinery streams in C3H/HeJ mice. Study conducted by Primate Research Institute. API Health Environ. Sci. Dep. Rep. 36-31364. Washington DC: American Petroleum Institute

API (1989b) Twenty-four month dermal carcinogenesis/chronic toxicity screening bioassay of refinery streams in C3H/HeJ mice. Study conducted by Primate Research Institute. API Health Environ. Sci. Dep. Rep. 36-33220. Washington DC: American Petroleum Institute

ARCO (1992a) 28-day dermal toxicity study in rats administered test article F-133 thermocracked kerosene. UBTL Study No. 65895. Los Angeles CA: ARCO

ARCO (1992b) Acute dermal toxicity study in rabbits administered test article F-133 thermocracked kerosene. UBTL Study No. 65986. Los Angeles CA: ARCO

ARCO (1992c) Acute oral toxicity study in rats administered test article F-133 thermocracked kerosene. UBTL Study No. 65978. Los Angeles CA: ARCO

ARCO (1992d) Dermal sensitization study in guinea pigs administered test article F-133 thermocracked kerosene. UBTL Study No. 66010. Los Angeles CA: ARCO

ARCO (1992e) Primary eye irritation study in rabbits administered test article F-133 thermocracked kerosene. UBTL Study No. 65994. Los Angeles CA: ARCO

ATSDR (1998) Toxicological profile for jet fuels (JP-5 and JP-8). Study conducted by Research Triangle Institute. NTIS Report No. PB 99-102550. Atlanta GA: Agency for Toxic Substances and Disease Registry

Battelle (1997) 13-week subchronic dermal study with neurotoxicology evaluations of hydrodesulfurized kerosine in Sprague-Dawley rats. Study conducted by Battelle. Study No. N001450A. Washington DC: Petroleum Product Stewardship Council

Blackburn, G.R. et al (1986) Predicting carcinogenicity of petroleum distillation fractions using a modified Salmonella mutagenicity assay. *Cell Biology and Toxicology* 2, 1, 63-84

Clark, C.R. et al (1988) Comparative dermal carcinogenesis of shale and petroleum-derived distillates. *Toxicol Ind Health* 4, 1, 11-22

CONCAWE (1991) Middle distillates - a review of the results of a CONCAWE programme of short-term biological studies. Report No. 91/51. Brussels: CONCAWE

CONCAWE (1996) Overview of the CONCAWE middle distillate programme. Report No. 96/62. Brussels: CONCAWE

Cooper, J.R. and Mattie, D.R. (1996) Developmental toxicity of JP-8 jet fuel in the rat. *J Appl Toxicol* 16, 3, 197-200

EBSI (1995) Daphnia, acute toxicity test. Test substance MRD-94-885. Study No. 188542. East Millstone NJ: Exxon Biomedical Sciences Inc.

EBSI (1996) Two year dermal carcinogenicity study of middle distillates in mice Report No. 117811A. East Millstone NJ: Exxon Biomedical Sciences Inc.

EMBSI (2010) Daphnia magna, reproduction test on kerosene. Report No. 10TP2. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

Freeman, J.J. et al (1993) Evaluation of the contribution of chronic skin irritation and selected compositional parameters to the tumorigenicity of petroleum middle distillates in mouse skin. *Toxicology* 81, 103-112

Mattie, D.R. et al (1991) A 90-day continuous vapor inhalation toxicity study of JP-8 jet fuel followed by 20 or 21 months of recovery in Fischer 344 rats and C57BL/6 mice. *Toxicologic Pathology* 19, 2, 77-87

Mattie, D.R. et al (2000) Reproductive effects of JP-8 jet fuel on male and female Sprague-Dawley rats after exposure by oral gavage. Study conducted by ManTech-Geo Centers Joint Venture. Report No. AFRL-HE-WP-TR-2000-0067. Wright Patterson Air Force Base OH: US Air Force Research Laboratory

NTP (1986) Toxicology and carcinogenesis studies of marine diesel fuel and JP-5 navy fuel (CAS No. 8008-20-6) in B6C3F1 mice (dermal studies). NTP Technical Report No. 310. Research Triangle Park NC: National Toxicology Program

Redman, A. and Yadav, B. (2010) Aquatic toxicity predictions using the PETROTOX model for petroleum substance categories. Report prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

Schreiner, C. et al (1997) Toxicity evaluation of petroleum blending streams: reproductive and developmental effects of hydrodesulfurized kerosine. *J Toxicol Environ Health* 52, 211-229

Shell (1991) Toxicology of petroleum products: the skin irritancy of odourless kerosine (white spirit). Report No. SBER.91.001. Sittingbourne: Shell Research Ltd

Toy, R. and Gray, A. (1994) SHELLSOL AD: acute toxicity of aqueous extracts to *Oncorhynchus mykiss*, *Daphnia magna* and *Raphidocelis subcapitata*. Report No. SBGR.93.175. Sittingbourne: Shell Research Ltd

6.6. MK1 DIESEL FUEL (MK1)

Definition / Domain: MK1 is a light petroleum distillate derived from crude petroleum, manufactured by treatment of a petroleum fraction with hydrogen in the presence of a catalyst. Given the similarity in carbon number distribution and distillation temperature range to kerosine, MK1 is often described as a kerosine rather than a gas oil. MK1 properties are defined by the predominant hydrocarbon classes present, the boiling point range and the carbon number range as follows:

- Derived from crude petroleum
- Refinery processes:
 - atmospheric distillation
 - catalytic cracking
 - thermal cracking
 - hydrocracking
 - hydrotreatment / hydrodesulphurisation
 - catalytic reforming
 - coking
- Hydrocarbon types: Branched and straight chain paraffins and cycloparaffins
- Typical boiling point range: approximately 180°C to 295°C
- Typical carbon number range: predominantly C₁₀ to C₁₈

As shown in **Appendix 1**, MK1 is defined by a single list number (931-250-7).

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - MK1 is a liquid.

Flammable Aerosol: Not relevant - MK1 is not in aerosol form.

Flammable Liquid: MK1 is a liquid of variable flash point / initial boiling points. Flash point is ≈ 67°C and initial boiling point ≈ 180°C.

Flammable Solid: Not relevant - MK1 is a liquid.

Oxidising Gas: Not relevant - MK1 is a liquid.

Oxidising Liquid: MK1 is not considered oxidising based on structural considerations.

Oxidising Solid: Not relevant - MK1 is a liquid.

Pyrophoric Liquid: MK1 does not spontaneously ignite in contact with air.

Pyrophoric Solid: Not relevant - MK1 is a liquid.

Self-reactive Substance: MK1 is not self-reactive. It does not undergo exothermic decomposition when heated.

Self-heating Substance: MK1 does not react exothermically.

Gas under Pressure: Not relevant - MK1 is a liquid.

Organic Peroxide: MK1 does not meet the definition of a peroxide.

Corrosive to Metal: MK1 does not meet the criteria for corrosion of metal.

Substance which in contact with water emits flammable gas: MK1 does not react with water.

1.2 Health Hazards

For MK1 there is no specific experimental data available. Compositional and physical-chemical data show that MK1 is very similar to Kerosine substances. It is considered appropriate, therefore, to read-across from the Kerosine substances data to MK1.

Acute Toxicity: Samples of Jet Fuel and a number of other Kerosine substances have been tested in acute oral, dermal and inhalation studies. Results indicate the following:

| | |
|-------------------------|---|
| Rat oral | LD ₅₀ > 5000 mg/kg _{bw} (ARCO; 1992c) |
| Rat inhalation (vapour) | LC ₅₀ > 5.28 mg/l (API; 1987) |
| Rabbit dermal | LD ₅₀ > 2000 mg/kg _{bw} (ARCO; 1992b) |

Skin Corrosion / Irritation: Samples of Jet Fuel and other Kerosine substances have been tested in rabbit skin irritation studies. The degree of irritancy is substance-, dose- exposure-time and methodology dependent. Based on weight of evidence kerosines are considered irritating There was no evidence of skin corrosion (Shell; 1991).

Serious Eye Damage / Irritation: The effects of Jet Fuel and other Kerosine substances on the eye have been investigated in rabbits using a number of samples. None of the samples tested showed more than minimal redness and swelling, which resolved within 48 hrs (ARCO; 1992e).

Respiratory or Skin Sensitization: Tests in guinea pigs with Jet Fuel and a number of other Kerosine substances showed no evidence of skin sensitization (ARCO; 1992d).). There are no reports available to indicate that Jet Fuel or other Kerosine substances have the potential to cause respiratory sensitization.

Germ Cell Mutagenicity: The mutagenic potential of Jet Fuel and other Kerosine substances has been extensively studied in a range of *in vivo* and *in vitro* assays. Because most of the experimental studies were negative and the data on various individual components of kerosines and jet fuels were negative, the weight of evidence from *in vitro* and *in vivo* mutagenic studies indicates that kerosine and jet fuels are likely not mutagens. (CONCAWE, 1991; API, 1977; API, 1984; API, 1973; API, 1980; API, 1985; API, 1988).

Carcinogenicity: Kerosine is not carcinogenic when animals are exposed via the oral or inhalation route. However, chronic skin contact with kerosines and jet fuel may lead to tumour formation as a consequence of repeated cycles of irritation, skin damage and repair. Jet fuels and kerosines were not found to be mutagenic or genotoxic, and the observations from animal studies confirm the non-genotoxic nature of the skin tumour formation. Although dermal irritation alone seems not sufficient to cause dermal tumourigenicity, studies clearly show that dermal irritation and inflammation are prerequisites for dermal carcinogenicity. In studies where dermal irritation and/or inflammation were prevented but other factors, such as dermal uptake of polycyclic aromatic compounds were kept identical, no skin tumours were observed. Based on this data, kerosines are not classified as carcinogenic (EBSI, 1996; Freeman JJ et al, 1993; Clark CR et al, 1988; API, 1989a; API, 1989b; NTP, 1986; Blackburn GR et al, 1986; CONCAWE, 1996).

Reproductive Toxicity: Results of guideline developmental toxicity studies on Jet Fuel and other Kerosine substances and OECD developmental toxicity screening studies with Kerosine substances showed no evidence of developmental toxicity in rats. Similarly, studies in rats with Jet Fuel and other Kerosine substances did not show any effect on reproductive performance (Schreiner C et al, 1997; Mattie DR et al, 2000; Cooper JR and Mattie DR, 1996; API, 1979).

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies show no evidence of target organ toxicity (ARCO 1992a; API 1987a; ARCO 1992g). Human experience indicates that exposure to high concentrations of Kerosine substances or similar substances in some situations may cause drowsiness and/or dizziness (e.g. ATSDR, 1998).

Repeated Exposure: A number of subacute and subchronic studies with kerosines and jet fuels are available. The repeated inhalation and oral studies of kerosine in rats produced no consistent toxicological effects other than changes in male rat kidneys that are not considered relevant to humans. In dermal studies, no systemic toxicity has been seen; the only effect observed was moderate to severe dermal irritation. (API, 1986; Mattie DR et al, 1991; Mattie DR et al, 2000; ARCO, 1992a; Battelle 1997).

Aspiration: MK1 is a low viscosity, mobile hydrocarbon liquid with a viscosity at 40°C of < 7 mm²/s.

1.3 Environmental Hazards

There are no specific experimental data available for MK1. Compositional and physical chemical data show that MK1 is very similar to Kerosine substances. It is considered appropriate, therefore, to read-across from the Kerosine substances data to MK1. Further discussion on ecological toxicity will concern Kerosine substances, and data endpoints that are waived for Kerosine substances will be waived for MK1.

Acute (short-term) Aquatic Hazard: Acute aquatic toxicity studies on samples of Kerosine substances show values greater than 1 mg/l and in the range 1-20 mg/l. These tests were carried out on water accommodated fractions, and in closed systems to prevent evaporative loss (Toy R and Gray A, 1994; EBSI, 1995). Results for Kerosine substances are consistent with the predicted aquatic toxicity of MK1 based on its hydrocarbon composition (Redman A et al, 2010).

Chronic (long-term) Aquatic Hazard: A chronic toxicity study on *Daphnia magna* exposed to a Kerosine substance using WAF methodology, gave a NOEL value of 0.48 mg/l based on reproduction (EMBSI, 2010). Results for Kerosine substances are consistent with the predicted aquatic toxicity of MK1 based on its hydrocarbon composition (Redman A et al, 2010).

Environmental fate (biodegradation / bioaccumulation): MK1 is a hydrocarbon UVCB. Standard tests for biodegradation/ bioaccumulation are intended for single substances and are not appropriate for complex substances. Based on compositional information available and measured or predicted data on key constituents, Jet Fuel and other Kerosine substances are not expected to meet the criteria for ready degradability but are inherently biodegradable. Constituents of Kerosine substances show measured or predicted values for log K_{ow} greater than 4 and are considered potentially bioaccumulative.

Part 2 - Summary of Classification and Labelling Recommendations

There is one single C&L permutation for MK1.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection.
(*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/...
(*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Full list of Precautionary statements

Prevention:

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

REFERENCES

API (1973) Mutagenicity study of thirteen petroleum fractions - report no. 4. Study conducted by Hine Laboratories Inc. API Health Environ. Sci. Dep. Rep. 26-60098. Washington DC: American Petroleum Institute

API (1977) Mutagenicity evaluation of kerosene. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 26-60017. Washington DC: American Petroleum Institute

API (1979) Teratology study in rats - kerosene. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 27-32175. Washington DC: American Petroleum Institute

API (1980) Mutagenicity evaluation of jet fuel A in the mouse dominant lethal assay. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 28-31345. Washington DC: American Petroleum Institute

API (1984) Mutagenicity evaluation studies in the rat bone marrow cytogenetic assay, in the mouse lymphoma forward mutation assay. API 81-07 hydrodesulfurized kerosene. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 32-30240. Washington DC: American Petroleum Institute

API (1985) The acute *in-vivo* cytogenetics assay in male and female rats of API 83-09 straight run kerosene. Study conducted by Microbiological Associates Inc. API Med. Res. Publ. 32-31769. Washington DC: American Petroleum Institute

API (1986) Four week subchronic inhalation toxicity study in rats with API 81-07 (CAS 64742-81-0), API 81-09 (CAS 64742-80-9), API 81-10 (CAS 64742-80-9). Study conducted by International Research and Development Corp. API Health Environ. Sci. Dep. Rep. 33-32724. Washington DC: American Petroleum Institute

API (1987) Acute inhalation toxicity evaluation of a petroleum derived hydrocarbon in rats. API 83-09 straight-run kerosene (CAS 8008-20-6). Study conducted by Hazleton Laboratories America Inc. API Health Environ. Sci. Dep. Rep. 34-30634. Washington DC: American Petroleum Institute

API (1988) *In vivo* sister chromatid exchange assay with API 81-07 hydrodesulfurized kerosene. Study conducted by Microbiological Associates Inc. API Med. Res. Publ. 36-30043. Washington DC: American Petroleum Institute

API (1989a) Lifetime dermal carcinogenesis/chronic toxicity screening bioassay of refinery streams in C₃H/HeJ mice. Study conducted by Primate Research Institute. API Health Environ. Sci. Dep. Rep. 36-31364. Washington DC: American Petroleum Institute

API (1989b) Twenty-four month dermal carcinogenesis/chronic toxicity screening bioassay of refinery streams in C₃H/HeJ mice. Study conducted by Primate Research Institute. API Health Environ. Sci. Dep. Rep. 36-33220. Washington DC: American Petroleum Institute

ARCO (1992a) 28-day dermal toxicity study in rats administered test article F-133 thermocracked kerosene. UBTL Study No. 65895. Los Angeles CA: ARCO

ARCO (1992b) Acute dermal toxicity study in rabbits administered test article F-131 (straight run kerosene). Testing laboratory: UBTL Inc., Salt Lake City, Utah. Report no.: 65825. Owner company: ARCO, Los Angeles, California. Study number: ATX-90-0052. Report date: 1992-03-23.

ARCO (1992c) Acute oral toxicity study in rats administered test article F-155 (Straight run kerosene). Testing laboratory: UBTL, Salt Lake City, Utah. Owner company: ARCO, Los Angeles, California. Study number: ATX-900209. Report date: 1992-05-20.

ARCO (1992d) Dermal sensitization study in guinea pigs administered test article F-133 thermocracked kerosene. UBTL Study No. 66010. Los Angeles CA: ARCO

ARCO (1992e) Primary eye irritation study in rabbits administered test article F-133 thermocracked kerosene. UBTL Study No. 65994. Los Angeles CA: ARCO

ATSDR (1998) Toxicological profile for jet fuels (JP-5 and JP-8). Study conducted by Research Triangle Institute. NTIS Report No. PB 99-102550. Atlanta GA: Agency for Toxic Substances and Disease Registry

Battelle (1997) 13-week subchronic dermal study with neurotoxicology evaluations of hydrodesulfurized kerosine in Sprague-Dawley rats. Study conducted by Battelle. Study No. N001450A. Washington DC: Petroleum Product Stewardship Council

Blackburn, G.R. et al (1986) Predicting carcinogenicity of petroleum distillation fractions using a modified *Salmonella* mutagenicity assay. *Cell Biology and Toxicology* 2, 1, 63-84

Clark, C.R. et al (1988) Comparative dermal carcinogenesis of shale and petroleum-derived distillates. *Toxicol Ind Health* 4, 1, 11-22

CONCAWE (1991) Middle distillates - a review of the results of a CONCAWE programme of short-term biological studies. Report No. 91/51. Brussels: CONCAWE

CONCAWE (1996) Overview of the CONCAWE middle distillate programme. Report No. 96/62. Brussels: CONCAWE

Cooper, J.R. and Mattie, D.R. (1996) Developmental toxicity of JP-8 jet fuel in the rat. *J Appl Toxicol* 16, 3, 197-200

EBSI (1995) Daphnia, acute toxicity test. Test substance MRD-94-885. Study No. 188542. East Millstone NJ: Exxon Biomedical Sciences Inc.

EBSI (1996) Two year dermal carcinogenicity study of middle distillates in mice Report No. 117811A. East Millstone NJ: Exxon Biomedical Sciences Inc.

EMBSI (2010) *Daphnia magna*, reproduction test on kerosene. Report No. 10TP2. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

Freeman, J.J. et al (1993) Evaluation of the contribution of chronic skin irritation and selected compositional parameters to the tumorigenicity of petroleum middle distillates in mouse skin. *Toxicology* 81, 103-112

Mattie, D.R. et al (1991) A 90-day continuous vapor inhalation toxicity study of JP-8 jet fuel followed by 20 or 21 months of recovery in Fischer 344 rats and C57BL/6 mice. *Toxicologic Pathology* 19, 2, 77-87

Mattie, D.R. et al (2000) Reproductive effects of JP-8 jet fuel on male and female Sprague-Dawley rats after exposure by oral gavage. Study conducted by ManTech-Geo Centers Joint Venture. Report No. AFRL-HE-WP-TR-2000-0067. Wright Patterson Air Force Base OH: US Air Force Research Laboratory

NTP (1986) Toxicology and carcinogenesis studies of marine diesel fuel and JP-5 navy fuel (CAS No. 8008-20-6) in B6C3F1 mice (dermal studies). NTP Technical Report No. 310. Research Triangle Park NC: National Toxicology Program

Redman, A. and Yadav, B. (2010) Aquatic toxicity predictions using the PETROTOX model for petroleum substance categories. Report prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

Schreiner, C. et al (1997) Toxicity evaluation of petroleum blending streams: reproductive and developmental effects of hydrodesulfurized kerosine. *J Toxicol Environ Health* 52, 211-229

Shell (1991) Toxicology of petroleum products: the skin irritancy of odourless kerosine (white spirit). Report No. SBER.91.001. Sittingbourne: Shell Research Ltd

Toy, R. and Gray, A. (1994) SHELLSOL AD: acute toxicity of aqueous extracts to *Oncorhynchus mykiss*, *Daphnia magna* and *Raphidocelis subcapitata*. Report No. SBGR.93.175. Sittingbourne: Shell Research Ltd

6.7. STRAIGHT-RUN GAS OILS (SRGO)

Definition / Domain: The domain of this category is established by the refining process by which the category members are produced and the boiling point and the carbon number ranges, as follows:

- Derived from crude petroleum
- Refinery process
 - Atmospheric distillation
- Hydrocarbon types: straight and branched alkanes and alkenes, cycloalkanes and cycloalkenes, aromatics and mixed aromatic cycloalkanes.
- Boiling point range: 150 - 471 °C
- Carbon number range: predominantly C₉ to C₂₅

Appendix 1 lists only those SRGO substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - SRGO substances are liquids.

Flammable Aerosol: Not relevant - SRGO substances are liquids.

Flammable Liquid: SRGO substances are liquids of variable flash points with typical values > 56 °C.

Flammable Solid: Not relevant - SRGO substances are liquids.

Oxidising Gas: Not relevant - SRGO substances are liquids.

Oxidising Liquid: SRGO substances are not considered oxidising based on structural considerations.

Oxidising Solid: Not relevant - SRGO substances are liquids.

Pyrophoric Liquid: SRGO substances do not spontaneously ignite in contact with air.

Pyrophoric Solid: Not relevant - SRGO substances are liquids.

Self-reactive Substance: SRGO substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: SRGO substances do not react exothermically.

Gas under Pressure: Not relevant - SRGO substances are liquids.

Organic Peroxide: SRGO substances do not meet the definition of a peroxide.

Corrosive to Metal: SRGO substances do not meet the criteria for corrosion of metal.

Substance which in contact with water emits flammable gas: SRGO substances do not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of SRGO substances have been tested in acute oral, dermal and inhalation studies. Results indicate the following:

| | |
|--------------------------|--|
| Rat oral | LD ₅₀ > 5000 mg/kg _{bw} (API, 1985a) |
| Rat inhalation (aerosol) | LC ₅₀ (4hr)>2.53 mg/l (EBSI,1991)) |
| Rabbit dermal | LD ₅₀ > 2000 mg/kg _{bw} (API, 1985a) |

Based on evaluation of all the acute toxicity data, straight run gas oils do not meet the criteria for classification as an acute oral or dermal toxicant under the EU CLP Regulation (EC No. 1272/2008), because the LD50 values are greater than the limits for classification defined in the legislation.

Skin Corrosion / Irritation: Samples of SRGO substances have been tested in rabbit skin irritation studies. Data was derived from studies in which 24 hour occluded exposure was employed instead of semi-occluded conditions for 4 hours. The degree of dermal irritation was variable but they are not expected to be irritating when animals are exposed for only 4 hours (API, 1985a). Upon repeated exposure SRGO substances may cause skin dryness or cracking. Straight run gas oils do not meet the criteria for classification as a skin irritant according to EU CLP (EC No. 1272/2008).

Serious Eye Damage / Irritation: The ability of SRGO substances to elicit eye irritation in rabbits has been investigated. None of the samples resulted in more than temporary redness or swelling (API, 1985a). Straight run gas oils do not meet the criteria for classification as an eye irritant according to EU CLP (EC No. 1272/2008).

Respiratory or Skin Sensitization: No relevant information available for respiratory sensitization. For skin sensitization, SRGO substances tested in a Beuhler assay showed no evidence of skin sensitization to guinea pigs. (API, 1985a).

Germ Cell Mutagenicity: The mutagenic potential of SRGO substances has been extensively tested in both *in vivo* and *in vitro* tests. Bacterial mutation assay (modified) with straight-run gas oils were predominantly negative and *in vivo* chromosome aberration assays were negative. Based on the evidence, straight run gas oils are unlikely to be mutagenic in humans and do not meet the criteria for classification and labelling as described in EU CLP Regulation (EC No. 1272/2008) criteria. (May K,2013, API, 1985d; API, 1985e; Blackburn et al., 1984; Blackburn et al., 1986; CONCAWE, 1991; Jungen et al., 1995; Nessel et al., 1998, Deininger G. et al, 1991; API, 1985f).

Carcinogenicity: Prolonged exposure to straight run gas oil can result in severe dermal irritation. This repeated dermal damage can result in the development of dermal tumours. In the absence of any irritation, tumours are not observed. Therefore, straight run gas oils do not meet the requirements for classification as a carcinogen as laid down in the EU CLP Regulation (API, 1989; CONCAWE, 1991, Broddle et al (1996).

Reproductive Toxicity:

Effects on fertility

No guideline or near-guideline studies were located that have examined the potential impact of SRGO substances on reproductive function. Some indication of the likely effect of a test substance on reproductive organs can be gained from the results of repeated-dose toxicity studies with members of this category, which did not show any treatment related effects on reproductive organs or sperm parameters (ARCO 1994a) Based on the available data, SRGO substances are not considered to be reproductive toxicants. Nevertheless, a testing proposal for reproductive toxicity has been included in the registration dossiers submitted to ECHA.

Developmental toxicity

The key dermal study on rats, reported a NOAEL of 50 mg/kg body weight/day based on significant decrease in pup body weight and increase in external, visceral, and skeletal malformation following repeated dermal application of straight-run petroleum gas oil. The maternal LOAEL was 50 mg/kg/day, based on dermal effects (ARCO 1993a). Additional data support that straight run gasoils are not developmental toxicants. (ARCO 1994b, 1993b, UBTL, 1994).

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies do not indicate any specific organ toxicity following single exposure to SRGO substances (API, 1985a; API, 1987).

Repeated Exposure: The repeated dose toxicity of SRGO substances has been studied in rabbits through dermal exposure and in rats by both dermal and inhalation exposure. Results from dermal exposure indicate irritation at the application site in addition to systemic effects observed in rats at 125 mg/(kg/bw/day). Effects observed include increased liver and spleen weights, altered bone marrow function, and liver histopathology (API 1985b). Repeated dose inhalation studies show hydrocarbon nephropathy in male rats which is considered to be both sex and species specific which is not relevant to man (ORNL, 1984; Feuston MH et al, 1994; API, 1985a). Straight run gas oils meet the criteria for classification for Specific Target Organ Toxicity (repeated exposure) Category 2 (H373) under the EU CLP Regulation (EC No. 1272/2008).

Aspiration: As members of this category may exist as low viscosity liquids that meet these criteria, substances in this category are classified for aspiration hazard unless the viscosity at 40°C is greater than the regulatory thresholds. Straight run gas oils with kinematic viscosities ≤ 20.5 mm²/sec are classified as aspiration hazards (H304) according to the EU CLP Regulation (EC No. 1272/2008). (CSR 5.2.3).

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: Acute aquatic toxicity studies on samples of SRGO substances are not available; however suitable read-across information from VHGO substances is available (Girling A. and Cann B, 1996a,b). These studies, carried out using the WAF methodology, show acute toxicity values for fish, crustaceans and algae greater than 1 mg/l and mostly in the range of 2-100 mg/l. Results are consistent with the predicted aquatic toxicity of these substances based on their hydrocarbon composition (Redman A et al, 2010).

Chronic (long-term) Aquatic Hazard: There are no chronic toxicity studies available for SRGO substances, and QSAR toxicity predictions are not used to determine environmental classification.

Environmental fate (biodegradation / bioaccumulation): SRGO substances are hydrocarbon UVCBs. Based on the known or expected properties of individual constituents, SRGO substances are not predicted to be readily biodegradable but are inherently biodegradable (Lee C, 1993; The Petroleum HPV Testing Group, 2003; Mobil, 1999). Hydrocarbon constituents of SRGO substances are likely to bioaccumulate (log K_{ow} values \geq than 4).

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the ‘worst-case’ C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers). Appendix 6 lists all alternative C&L recommendations (C&L permutations).

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Flammable liquids: | Flam. Liquid 3 * | H226: Flammable liquid and vapour. |
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Liver, spleen, bone marrow | H373: May cause damage to liver, spleen and bone marrow through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

* For the purpose of CLP gas oils, diesel and light heating oils having a flash point between $\geq 55^{\circ}\text{C}$ and $\leq 75^{\circ}\text{C}$ may be regarded as Category 3.

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H332: Harmful if inhaled.

H373: May cause damage to liver, spleen and bone marrow through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)
P273: Avoid release to the environment.
P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)
P331: Do NOT induce vomiting.

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Full list of Precautionary statements**Prevention:**

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233: Keep container tightly closed.
P240: Ground and bond container and receiving equipment.
P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)
P242: Use non-sparking tools.
P243: Take action to prevent static discharges.
P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)
P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)
P271: Use only outdoors or in a well-ventilated area.
P273: Avoid release to the environment.
P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)
P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)
P314: Get medical advice/attention if you feel unwell.
P331: Do NOT induce vomiting.
P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)
P391: Collect spillage.

Storage:

P403 + P235: Store in a well-ventilated place. Keep cool.
P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

REFERENCES

API (1985a) Acute oral toxicity study in rats. Acute dermal toxicity study in rabbits. Primary dermal irritation study in rabbits. Primary eye irritation study in rabbits. Dermal sensitisation study in guinea pigs. API 83-11 straight run middle distillate (CAS 64741-44-2). Study conducted by Hazleton Laboratories America Inc. API Health Environ. Sci. Dep. Rep. 32-32857. Washington DC: American Petroleum Institute

API (1985b) 28-day dermal toxicity study in the rabbit of API 83-11. Straight run middle distillate (CAS 64741-44-2). Study conducted by Tegeris Laboratories Inc. API Med. Res. Publ. 32-32747. Washington DC: American Petroleum Institute

API (1985c) 28-day dermal toxicity study in the rabbit of API 83-09. Study conducted by Tegeris Laboratories, Inc. API Med. Res. Publ. 33-30443. Washington DC: American Petroleum Institute

API (1985d) L5178Y TK+/- mouse lymphoma mutagenesis assay of API 83-11. Study conducted by Microbiological Associates, Inc. API Med. Res. Publ. 32-31768. Washington DC: American Petroleum Institute

API (1985e) Mutagenicity evaluation of API 83-11 in the mouse lymphoma forward mutation assay. Study conducted by Litton Bionetics, Inc. API Med. Res. Publ. 32-32166. Washington DC: American Petroleum Institute

API (1985f) Acute *in vivo* cytogenetics assay in male and female rats of API 83-11. Study conducted by Microbiological Associates Inc. API Med. Res. Publ. 32-32408. Washington DC: American Petroleum Institute

API (1987) Acute inhalation toxicity evaluation of a petroleum derived hydrocarbon in rats. API 83-11 straight run middle distillate (CAS 64741-44-2). Study conducted by Hazleton Laboratories America Inc. API Med. Res. Publ. 34-30635. Washington DC: American Petroleum Institute

API (1989) Twenty-four month dermal carcinogenesis/chronic toxicity screening bioassay of refinery streams in C₃H/HeJ mice. Study conducted by Primate Research Institute. API Health Environ. Sci. Dep. Rep. 36-33220. Washington DC: American Petroleum Institute

ARCO (1993a) Developmental toxicity (embryo-fetal toxicity and teratogenic potential) study of F-193 administered percutaneously to CrI:CD[®]BR VAF/Plus[®] presumed pregnant rats. Argus Study No. 1001-005. Los Angeles CA: ARCO

ARCO (1993b) Developmental toxicity (embryo-fetal toxicity and teratogenic potential) study of F-215 administered percutaneously to CrI:CD[®]BR VAF/Plus[®] presumed pregnant rats. Argus Study No. 1001-010. Los Angeles CA: ARCO

ARCO (1994a) A developmental toxicity screen in female Sprague-Dawley rats administered F-193 dermally during gestation days -7 to 20. UBTL Study No. 66353. Los Angeles CA: ARCO

ARCO (1994b) A developmental toxicity screen in female rats administered F-215 dermally during gestation days 0 to 20. UBTL Study No. 66476. Los Angeles CA: ARCO

Blackburn, G.R. et al (1984) Estimation of the dermal carcinogenic activity of petroleum fractions using a modified Ames assay. *Cell Biology and Toxicology* 1, 1, 67-80

Blackburn, G.R. et al (1986) Predicting carcinogenicity of petroleum distillation fractions using a modified *Salmonella* mutagenicity assay. *Cell Biology and Toxicology* 2, 1, 63-84

CONCAWE (1996) Overview of the CONCAWE middle distillate programme. Report No. 96/62. Brussels: CONCAWE

Deininger, G. et al (1991) Middle distillates: analytical investigations and mutagenicity studies. Report No. 412-1. Hamburg: DGMK

EBSI (1991) Acute inhalation toxicity study in rats. Study performed for The Canadian Petroleum Products Institute. EBSI Study No. 196016. East Millstone NJ: Exxon Biomedical Sciences Inc.

Feuston, M.H. et al (1994) Correlation of systemic and developmental toxicities with chemical component classes of refinery streams. *Fund Applied Toxicol* 22, 622-630

Girling, A.E. and Cann, B.J. (1996a) Gasoil sample 1: acute toxicity of water accommodated fractions to *Oncorhynchus mykiss*, *Daphnia magna* and *Raphidocelis subcapitata*. Report No. OT.96.40017. Thornton: Shell Research Ltd

Girling, A.E. and Cann, B.J. (1996b) Gasoil sample 2: acute toxicity of water accommodated fractions to *Oncorhynchus mykiss*, *Daphnia magna* and *Raphidocelis subcapitata*. Report No. OT.96.40018. Thornton: Shell Research Ltd

Jungen, H. et al (1993) Middle distillates: dermal initiation/promotion study. Report No. 412-2. Hamburg: DGMK

Lee, C. (1993) Water insoluble biodegradation test report. Method development using CONCAWE reference gas oil: Phase III. East Millstone NJ: Exxon Biomedical Sciences Inc.

May, K. (2013) 14 gas oils: bacterial reverse mutation test (ASTM E 1687). Study conducted for CONCAWE. Report No. PIM0002. Cambridgeshire: Huntingdon Life Sciences

Mobil (1989) Thirteen-week dermal administration of vacuum tower overheads to rats (CAS 64741-49-7). Mobil Environ. and Health Sci. Lab. Study No. 62326. Princeton NJ: Mobil Oil Corporation

Mobil (1999) Determination of the aerobic ready biodegradability of Nigerian diesel fuel using the OECD 301F manometric respirometry test method. Study conducted by Ecotoxicology Laboratory. Mobil Business Resources Corp. Study No. 68246. Paulsboro NJ: Mobil Business Resources Corp.

Nessel, C.S. et al (1998) A comprehensive evaluation of the mechanism of skin tumorigenesis by straight-run and cracked petroleum middle distillates. *Toxicol Sci* 44, 1, 22-31

ORNL (1984) Inhalation toxicology of diesel fuel obscurant aerosol in Sprague-Dawley rats. Phase 3: subchronic exposures. Report No. TM-9403. Oak Ridge TN: Oak Ridge National Laboratory

Redman, A. and Yadav, B. (2010) Aquatic toxicity predictions using the PETROTOX model for petroleum substance categories. Report prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

The Petroleum HPV Testing Group (2003) High production volume (HPV) chemical challenge program. Test plan gas oils category. HPV Consortium No. 1100997. Administered by API. Washington DC: American Petroleum Institute

6.8. CRACKED GAS OILS (CrackedGO)

Definition / Domain: The domain of this category is established by the refining processes by which the category members are produced and the boiling point and the carbon number range as follows:

- Derived from crude petroleum
- Refinery processes
 - atmospheric distillation
 - vacuum distillation
 - catalytic cracking
- Hydrocarbon types: aromatics, alkylated aromatics, mixed aromatic cycloalkanes, straight and branched alkanes and alkenes, cycloalkanes and cycloalkenes.
- Boiling point range: 150 - 450 °C
- Carbon number range: predominantly C₉ to C₃₀

Appendix 1 lists only those CrackedGO substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - CrackedGO substances are liquids.

Flammable Aerosol: Not relevant - CrackedGO substances are liquids.

Flammable Liquid: CrackedGO substances are liquids of variable flash points typically > 56°C. For liquids, only flash point data are required to characterise flammability.

Flammable Solid: Not relevant - CrackedGO substances are liquids.

Oxidising Gas: Not relevant - CrackedGO substances are liquids.

Oxidising Liquid: CrackedGO substances are not considered oxidising based on structural considerations.

Oxidising Solid: Not relevant - CrackedGO substances are liquids.

Pyrophoric Liquid: CrackedGO substances do not spontaneously ignite in contact with air.

Pyrophoric Solid: Not relevant - CrackedGO substances are liquids.

Self-reactive Substance: CrackedGO substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: CrackedGO substances do not react exothermically.

Gas under Pressure: Not relevant - CrackedGO substances are liquids.

Organic Peroxide: CrackedGO substances do not meet the definition of a peroxide.

Corrosive to Metal: CrackedGO substances do not meet the criteria for corrosion of metal.

Substance which in contact with water emits flammable gas: CrackedGO substances do not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of CrackedGO substances have been tested in acute oral, dermal and inhalation studies. Results indicate the following:

| | |
|----------------|--|
| Rat oral | LD ₅₀ > 3200 mg/kg _{bw} (API, 1985a) |
| Rat inhalation | LC ₅₀ ≥ 4.65 mg/l (API, 1986) |
| Rabbit dermal | LD ₅₀ > 2000 mg/kg _{bw} (API, 1985a) |

Skin Corrosion / Irritation: Samples of CrackedGO substances were tested in rabbit skin irritation studies. Results obtained indicate that exposure to CrackedGO substances results in skin irritation. There was no evidence of skin corrosion (EBSI, 1996a).

Serious Eye Damage / Irritation: The ability of CrackedGO substances to elicit eye irritation in rabbits has been investigated. None of the samples were irritating to the eye (API, 1985c).

Respiratory or Skin Sensitization: No studies were located for respiratory sensitization. For skin sensitization CrackedGO substances were tested and showed no evidence of skin sensitization (API, 1985c).

Germ Cell Mutagenicity: The mutagenic potential of CrackedGO substances has been extensively tested in both *in vivo* and *in vitro* tests. The results of the studies were ambiguous *in vitro* and showed no evidence of *in vivo* mutagenic activity (Deininger G et al, 1991; API, 1985b). Based on the available data, CrackedGO substances are not considered to be germ cell mutagens.

Carcinogenicity: Repeated dermal application of CrackedGO substances to animals resulted in tumour formation. Based on data from the experiments conducted with CrackedGO substances they are considered to be carcinogens (EBSI, 1996b).

Reproductive Toxicity: No guideline or near-guideline studies were located that have examined the potential impact of CrackedGO substances on fertility, however gonadal histopathology and/or sperm parameters (counts; morphology) were among endpoints routinely included in sub-chronic dermal evaluations of some CrackedGO substances. There was evidence of developmental effects in animals but these were considered minor and were observed in the presence of maternal toxicity which is a confounding factor in determining toxicity (ARCO, 1994a; ARCO, 1994b; Mobil, 1990; ARCO, 1994c; Mobil, 1994; ARCO, 1993; Mobil, 1989; Mobil, 1987). Based on the available data CrackedGO substances are not considered to be developmental toxicants.

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies do not indicate any specific organ toxicity following single exposure to CrackedGO substances (API, 1985c; API, 1986).

Repeated Exposure: The repeat dose toxicity of CrackedGO substances has been studied. Target organ toxicity has been observed in blood, thymus, and liver (ORNL, 1984; Cruzan G, 1985; Mobil, 1990; API, 1985d)

Aspiration: CrackedGO substances span a range of viscosities with values reported as 1.1 - 4.5 mm²/s at 40 °C.

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: Acute aquatic toxicity studies on samples of CrackedGO substances show LL50 values ranging from 0.22 mg/l for crustaceans to 8.82 mg/l for algae (EMBSI, 2011a-d; EMBSI, 2012a-d; EMBSI, 2012f-h).

Chronic (long-term) Aquatic Hazard: Chronic aquatic toxicity: Chronic aquatic toxicity studies on samples of CrackedGO substances show NOELR vales ranging from 0.05 mg/l for crustaceans and algae to 0.93 mg/l for algae (EMBSI, 2012e-h).

Environmental fate (biodegradation / bioaccumulation): CrackedGO substances are hydrocarbon UVCBs. Based on the known or expected properties of individual constituents, category members are not predicted to be readily biodegradable but are inherently biodegradable. Components of cracked gas oils are likely to bioaccumulate (log K_{ow} ≥4).

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the ‘worst-case’ C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers). Appendix 6 lists all alternative C&L recommendations (C&L permutations).

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Flammable liquids: | Flam. Liquid 3 * | H226: Flammable liquid and vapour. |
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, thymus, liver | H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure. |
| Hazards to the aquatic environment (acute/short-term): | Aquatic Acute 1 | H400: Very toxic to aquatic life (M-Factor =1). |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 1 | H410: Very toxic to aquatic life with long lasting effects (M-Factor =1). |

* For the purpose of CLP gas oils, diesel and light heating oils having a flash point between ≥ 55 °C and ≤ 75 °C may be regarded as Category 3.

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H332: Harmful if inhaled.

H350: May cause cancer.

H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure.

H410: Very toxic to aquatic life with long lasting effects (M-Factor =1).

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

Additional labelling requirements:

Restricted to professional users due to classification as carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

REFERENCES

API (1985a). Acute oral toxicity study in rats; acute dermal toxicity study in rabbits; primary dermal irritation study in rabbits; primary eye irritation study in rabbits; dermal sensitization study in guinea pigs; API 83-07 light catalytically cracked distillate. Wisconsin. Report no.: 33-30162. Owner company: American Petroleum Institute, Washington DC.

API (1985b) Acute *in vivo* cytogenetics assay in male and female rats of API 83-11. Study conducted by Microbiological Associates Inc. API Med. Res. Publ. 32-32408. Washington DC: American Petroleum Institute

API (1985c) Acute oral toxicity study in rats. Acute dermal toxicity study in rabbits. Primary dermal irritation study in rabbits. Primary eye irritation study in rabbits. Dermal sensitization study in guinea pigs. API 83-08 light catalytically reformed distillate (CAS 64741-59-9). Study conducted by Hazleton Laboratories America Inc. API Health Environ. Sci. Dep. Rep. 32-32859. Washington DC: American Petroleum Institute

API (1985d) 28-day dermal toxicity study in the rabbit of API 83-07. Light catalytically cracked distillate (CAS 64741-59-9). Study conducted by Tegeris Laboratories Inc. API Med. Res. Publ. 32-32751. Washington DC: American Petroleum Institute

API (1986) Acute inhalation toxicity evaluation in rats. API 83-08 light catalytically cracked distillate (CAS 64741-59-9). Study conducted by Hazleton Laboratories America Inc. API Health Environ. Sci. Dep. Rep. 33-30444. Washington DC: American Petroleum Institute

ARCO (1993) Dose-range developmental toxicity (embryo-fetal toxicity and teratogenic potential) study of F-199 administered percutaneously to CrI:CD[®]BR VAF/Plus[®] rats. Study conducted by Argus Research Laboratories Inc. Los Angeles CA: ARCO

ARCO (1994a) A developmental toxicity screen in female rats administered F-277 dermally during gestation days -7 to 20 (CAS 64741-82-8). UBTL Study No. 67008. Los Angeles CA: ARCO

ARCO (1994b) A developmental toxicity screen in female Sprague-Dawley rats administered F-199 dermally during gestation days -7 to 20 (CAS 64741-82-8). UBTL Study No. 66359. Los Angeles CA: ARCO

ARCO (1994c) A developmental toxicity screen in female rats administered F-213 dermally during gestation days 0 to 20 (CAS 64741-59-9). UBTL Study No. 66475. Los Angeles CA: ARCO

Cruzan, G. (1985) Thirteen week dermal administration of light cycle oil to rats (CAS 64741-59-9). Mobil Environ. and Health Sci. Lab. Study No. 20535. Princeton NJ: Mobil Oil Corporation

Deininger, G. et al (1991) Middle distillates: analytical investigations and mutagenicity studies. Report No. 412-1. Hamburg: DGMK

EBSI (1996a). Primary dermal irritation study in the rabbit. Study performed for CONCAWE. EBSI Study No. 117904A. East Millstone NJ: Exxon Biomedical Sciences, Inc.

EBSI (1996b) Two year dermal carcinogenicity study of middle distillates in mice. Report No. 117811A. East Millstone NJ: Exxon Biomedical Sciences Inc.

EMBSI (2011a) *Oncorhynchus mykiss*, fish acute toxicity test on water accommodated fractions of a light catalytic cracked gas oil. Study performed for API. EMBSI Study No. 1057658. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2011b) *Daphnia magna*, acute immobilisation test on water accommodated fractions of a light catalytic cracked gas oil. Study performed for API. EMBSI Study No. 1057642. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2011c) Alga, growth inhibition test on light cracked gas oil. Study performed for CONCAWE. EMBSI Study No. 1057867. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2011d) Alga, growth inhibition test on water accommodated fractions of a light catalytic cracked gas oil. Study performed for API. EMBSI Study No. 1057667. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2012a) *Daphnia sp.*, acute immobilisation test. Study performed for CONCAWE. EMBSI Study No. 1057942. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2012b) *Daphnia sp.*, acute immobilisation test. Study performed for CONCAWE. EMBSI Study No. 1059542. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2012c) *Daphnia sp.*, acute immobilisation test. Study performed for CONCAWE. EMBSI Study No. 1057842. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2012d) *Daphnia sp.*, acute immobilisation test. Study performed for CONCAWE. EMBSI Study No. 1060442. Annandale, NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2012e) *Daphnia magna*, reproduction test on water accommodated fractions of a light catalytic cracked gas oil. Study performed for API. EMBSI Study No. 1057646. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2012f) Alga, growth inhibition test on heavy cracked diesel oil. Study performed for CONCAWE. EMBSI Study No. 1057967. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2012g) Alga, growth inhibition test on light cracked gas oil. Study performed for CONCAWE. EMBSI Study No. 1059567. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2012h) Alga, growth inhibition test on thermally cracked gas oil. Study performed for CONCAWE. EMBSI Study No. 1060467. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

HydroQual (2010) PETRORISK Model. Prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

Mobil (1987) Light cycle oil developmental toxicity screen in rats. Mobil Environ. and Health Sci. Lab. Study No. 50511. Princeton NJ: Mobil Oil Corporation

Mobil (1989) Developmental toxicity study in rats exposed dermally to Coker light gas oil (CLGO). Mobil Environ. and Health Sci. Lab. Study No. 61998. Princeton NJ: Mobil Oil Corporation

Mobil (1990) Thirteen-week dermal administration of Beaumont Coker light gas oil to rats (CAS 64741-82-8). Mobil Environ. and Health Sci. Lab. Study No. 61996. Princeton NJ: Mobil Oil Corporation

Mobil (1994) Teratogenicity study in rats exposed orally to a single dose of a refinery stream. Mobil Environ. and Health Sci. Lab. Study No. 65371. Princeton NJ: Mobil Oil Corporation

ORNL (1984) Inhalation toxicology of diesel fuel obscurant aerosol in Sprague-Dawley rats. Phase 3: subchronic exposures. Report No. TM-9403. Oak Ridge TN: Oak Ridge National Laboratory

Redman, A. and Yadav, B. (2010) Aquatic toxicity predictions using the PETROTOX model for petroleum substance categories. Report prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

6.9. VACUUM GAS OILS, HYDROCRACKED GAS OILS & DISTILLATE FUELS (VHGO)

Definition / Domain: The domain of this category is established by the refining processes by which the category members are produced and the boiling point and the carbon number range as follows:

- Derived from crude petroleum
- Refinery processes
 - Atmospheric distillation
 - Vacuum distillation
 - Hydrocracking
 - Blending of petroleum substances to produce the following CAS RNs
 - 68334-30-5 Fuels, Diesel
 - 68476-30-2 Fuel Oil No. 2
 - 68476-31-3 Fuel Oil No 4
 - 68476-34-6 Fuels Diesel No 2
- Hydrocarbon types: straight and branched alkanes and alkenes, cycloalkanes and cycloalkenes, aromatics and mixed aromatic cycloalkanes.
- Boiling point range: 141- 500° C
- Carbon number range: predominantly C₉ to C₃₀

Appendix 1 lists only those VHGO substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - VHGO substances are liquids.

Flammable Aerosol: Not relevant - VHGO substances are liquids.

Flammable Liquid: VHGO substances are liquids of variable flash points with values > 56°C. For liquids, only flash point data are required to characterise flammability.

Flammable Solid: Not relevant - VHGO substances are liquids.

Oxidising Gas: Not relevant - VHGO substances are liquids.

Oxidising Liquid: VHGO substances are not considered oxidising based on structural considerations.

Oxidising Solid: Not relevant - VHGO substances are liquids.

Pyrophoric Liquid: VHGO substances do not spontaneously ignite in contact with air.

Pyrophoric Solid: Not relevant - VHGO substances are liquids.

Self-reactive Substance: VHGO substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: VHGO substances do not react exothermically.

Gas under Pressure: Not relevant - VHGO substances are liquids.

Organic Peroxide: VHGO substances do not meet the definition of a peroxide.

Corrosive to Metal: VHGO substances do not meet the criteria for corrosion of metal.

Substance which in contact with water emits flammable gas: VHGO substances do not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of VHGO substances have been tested in acute oral, dermal and inhalation studies. Results indicate the following:

Rat oral $LD_{50} > 5000\text{mg/kg}_{\text{bw}}$ (API, 1980a, b,)

Rat inhalation $LC_{50} \geq 4.1\text{ mg/l}$ (ARCO, 1988)

Rabbit dermal $LD_{50} > 5\text{ ml/kg}_{\text{bw}}$ (approx. 4300 mg/kg_{bw}) (API, 1980a, b)

Skin Corrosion / Irritation: Samples of VHGO substances were tested in rabbit skin irritation studies (24 hour occluded). These data indicate that exposure to VHGO substances can cause skin irritation (API, 1980a; API, 1980b). There was no evidence of skin corrosion.

Serious Eye Damage / Irritation: The ability of VHGO substances to elicit eye irritation in rabbits has been investigated. None of the samples were irritating to the eye (API, 1980a; API, 1980b).

Respiratory or Skin Sensitization: No studies were located for respiratory sensitization. For skin sensitization VHGO samples were tested and showed no evidence of skin sensitization (API, 1980a; API, 1980b).

Germ Cell Mutagenicity: The mutagenic potential of VHGO substances have been extensively tested in both *in vivo* and *in vitro* tests. The *in vitro* results were ambiguous while the *in vivo* studies showed a lack of mutagenic activity. Based on the data available VHGO substances are not considered to be germ cell mutagens (Deininger, G, et al, 1991; McKee, RH et al, 1994; API, 1985).

Carcinogenicity: Samples of VHGO substances show variable activity in skin painting bioassays. Skin irritation has been shown to contribute to the development of tumours. Based on the data available VHGO substances are considered as potentially carcinogenic (Biles RW et al, 1988).

Reproductive Toxicity: No guideline or near-guideline studies were located that have examined the potential impact of VHGO substances on reproductive function, however gonadal histopathology and/or sperm parameters (counts; morphology) were among endpoints routinely included in sub-chronic dermal evaluations of some VHGO substances. The data indicate these substances are not reproductive toxicants (Mobil, 1989a; API, 1979a; API, 1979b). Nevertheless, a testing proposal for reproductive toxicity has been included in the registration dossiers submitted to ECHA.

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies do not indicate any specific organ toxicity following single exposure to VHGO substances (API, 1980a; API, 1980b; ARCO, 1988).

Repeated Exposure: The repeat dose toxicity of VHGO substances has been tested. Following 13 week dermal exposure in Sprague-Dawley rats, thymus, liver, and bone marrow changes were noted in a dose dependent manner (ARCO, 1992; Mobil, 1989b, ORNL,1984).

Aspiration: VHGO substances span a range of viscosities with values reported as $\geq 1.5 \text{ mm}^2/\text{s}$ at 40°C .

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: Acute aquatic toxicity studies on samples of VHGO substances, carried out using the WAF methodology, report acute toxicity values for fish, crustaceans and algae greater than 1 mg/l and mostly in the range of 2-100 mg/l (Girling A. and Cann B, 1996a,b). The lowest LL50 was 2 mg/l for *Daphnia magna* (Febbo E, 2007).

Chronic (long-term) Aquatic Hazard: There are no chronic toxicity studies available for VHGO substances, and QSAR toxicity predictions are not used to determine environmental classification.

Environmental fate (biodegradation / bioaccumulation): VHGO substances are hydrocarbon UVCBs. Based on the known or expected properties of individual constituents, VHGO substances are not predicted to be readily biodegradable but they are inherently biodegradable (The Petroleum HPV Testing Group, 2003; Mobil, 1999; Lee C, 1993). Hydrocarbon constituents of VHGO substances are predicted to bio-accumulate (log K_{ow} values above 4.0).

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the 'worst-case' C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers). Appendix 6 lists all alternative C&L recommendations (C&L permutations).

Although Part 3 of Annex VI of CLP includes Note N ("The classification as a carcinogen need not apply if the full refining history is known and it can be shown that the substance from which it is produced is not a carcinogen. This note applies only to certain complex oil-derived substances in Part 3.") for the VHGO substance with EC 269-822-7, this Note is not applied in any of the C&L permutations and, therefore, all VHGO substances are classified as Carcinogenic Cat. 2.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Flammable liquids: | Flam. Liquid 3 * | H226: Flammable liquid and vapour. |
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Carcinogenicity: | Carc. 2 | H351: Suspected of causing cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Thymus, liver, bone marrow | H373: May cause damage to thymus, liver and bone marrow through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

* For the purpose of CLP gas oils, diesel and light heating oils having a flash point between $\geq 55^{\circ}\text{C}$ and $\leq 75^{\circ}\text{C}$ may be regarded as Category 3.

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H332: Harmful if inhaled.

H351: Suspected of causing cancer.

H373: May cause damage to thymus, liver and bone marrow through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/...
(...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (...Manufacturer/supplier may specify a
cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if
water is clearly inappropriate.)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse
skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...Manufacturer/supplier to specify
the appropriate source of emergency medical advice.)

P314: Get medical advice/attention if you feel unwell.

P321: Specific treatment (see ... on this label). (... Reference to supplemental first aid
instruction.)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (...Manufacturer/supplier to specify
appropriate media. – if water increases risk.)

P391: Collect spillage.

Storage:

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... in accordance with
local/regional/national/international regulation (to be specified).)

REFERENCES

- API (1979a) Inhalation/teratology study in rats - fuel oil. Study conducted by Litton Bionetics Inc. API Health Environ. Sci. Dep. Rep. 27-30483. Washington DC: American Petroleum Institute
- API (1979b) Teratology study in rats - diesel fuel. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 27-32174. Washington DC: American Petroleum Institute
- API (1980a) Acute toxicity tests API #78-4 #2 home heating oil (50% cat). Study conducted by Elars Bioresearch Laboratories Inc. API Health Environ. Sci. Dep. Rep. 27-32068. Washington DC: American Petroleum Institute
- API (1980b) Acute toxicity tests API #79-6 diesel fuel (marketplace sample). Study conducted by Elars Bioresearch Laboratories Inc. API Med. Res. Publ. 27-32817. Washington DC: American Petroleum Institute
- API (1985) Acute *in vivo* cytogenetics assay in male and female rats of API 83-11. Study conducted by Microbiological Associates Inc. API Med. Res. Publ. 32-32408. Washington DC: American Petroleum Institute
- ARCO (1987a) Acute oral toxicity in rats administered test article F-91-01. Study No. 62762. Los Angeles CA: ARCO
- ARCO (1987b) Acute oral toxicity study in rats administered F-71-01 Watson diesel fuel No 2. Study No. 60605. Los Angeles CA: ARCO
- ARCO (1987c) Acute oral toxicity study in rats administered F-75-01 Cherry point diesel fuel No 2. Study No. 60609. Los Angeles CA: ARCO
- ARCO (1987d) Acute oral toxicity study in rats administered test article F-55-01. Study No. 55936. Los Angeles CA: ARCO
- ARCO (1988) Acute inhalation toxicity study in rats administered F-72-01 naval distillate. Study conducted by Bio/dynamics Inc. Study No. 85-7867A. Los Angeles CA: ARCO
- ARCO (1992) 28-day dermal toxicity study in rats - F-102-01 naval distillate. UBTL Study No. 65365. Los Angeles CA: ARCO
- ARCO (1993a) Acute oral toxicity study in rats administered test article F-188 (Sweet distillates). Study No. 66291. Los Angeles CA: ARCO
- ARCO (1993b) Acute oral toxicity study in rats administered test article F-235 (Hydrodesulfurized Middle Distillate). Study No. 66505. Los Angeles CA: ARCO
- Biles, R.W. et al (1988) Dermal carcinogenic activity of petroleum-derived middle distillate fuels. *Toxicology* 53, 301-314
- Deininger, G. et al (1991) Middle distillates: analytical investigations and mutagenicity studies. Report No. 412-1. Hamburg: DGMK
- Febbo, E (2007) Fish, acute toxicity test with fathead minnows. Owner company: ExxonMobil Chemicals, Intermediates. Laboratory report 142940FHM. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

Girling, A.E. and Cann, B.J. (1996a) Gasoil sample 1: acute toxicity of water accommodated fractions to *Oncorhynchus mykiss*, *Daphnia magna* and *Raphidocelis subcapitata*. Report No. OT.96.40017. Thornton: Shell Research Ltd

Girling, A.E. and Cann, B.J. (1996b) Gasoil sample 2: acute toxicity of water accommodated fractions to *Oncorhynchus mykiss*, *Daphnia magna* and *Raphidocelis subcapitata*. Report No. OT.96.40018. Thornton: Shell Research Ltd

Lee, C. (1993) Water insoluble biodegradation test report. Method development using CONCAWE reference gas oil: Phase III. East Millstone NJ: Exxon Biomedical Sciences Inc.

McKee, R.H. et al (1994) Evaluation of the genetic toxicity of middle distillate fuels. *Environmental and Molecular Mutagenesis* 23, 234-238

Mobil (1989a) Developmental toxicity study in rats exposed dermally to vacuum tower overheads (VTO) (CAS 64741-49-7). Mobil Environ. and Health Sci. Lab. Study No. 62328. Princeton NJ: Mobil Oil Corporation

Mobil (1989b) Thirteen-week dermal administration of vacuum tower overheads to rats (CAS 64741-49-7). Mobil Environ. and Health Sci. Lab. Study No. 62326. Princeton NJ: Mobil Oil Corporation

Mobil (1999) Determination of the aerobic ready biodegradability of Nigerian diesel fuel using the OECD 301F manometric respirometry test method. Study conducted by Ecotoxicology Laboratory. Mobil Business Resources Corp. Study No. 68246. Paulsboro NJ: Mobil Business Resources Corp.

ORNL (1984) Inhalation toxicology of diesel fuel obscurant aerosol in Sprague-Dawley rats. Phase 3: subchronic exposures. Report No. TM-9403. Oak Ridge TN: Oak Ridge National Laboratory

Redman, A. and Yadav, B. (2010) Aquatic toxicity predictions using the PETROTOX model for petroleum substance categories. Report prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

The Petroleum HPV Testing Group (2003) High production volume (HPV) chemical challenge program. Test plan gas oils category. HPV Consortium No. 1100997. Administered by API. Washington DC: American Petroleum Institute

6.10. OTHER GAS OILS (OtherGO)

Definition / Domain: The domain of this category is established by the refining process by which the category members are produced and the boiling point and the carbon number range as follows:

- Derived from crude petroleum
- Refinery processes
 - atmospheric distillation
 - vacuum distillation
 - catalytic cracking
 - thermal cracking
 - hydrotreating
- Hydrocarbon types: aromatics, alkylated aromatics, mixed aromatic cycloalkanes, straight and branched alkanes and alkenes, cycloalkanes and cycloalkenes.
- Boiling point range: 150°C - 400°C
- Carbon number range: predominantly C₉ to C₃₆

Appendix 1 lists only those OtherGO substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - OtherGO substances are liquids.

Flammable Aerosol: Not relevant - OtherGO substances are liquids.

Flammable Liquid: OtherGO substances are liquids of variable flash points with values > 56°C. For liquids, only flash point data are required to characterise flammability.

Flammable Solid: Not relevant - OtherGO substances are liquids.

Oxidising Gas: Not relevant - OtherGO substances are liquids.

Oxidising Liquid: OtherGO substances are not considered oxidising based on structural considerations.

Oxidising Solid: Not relevant - OtherGO substances are liquids.

Pyrophoric Liquid: OtherGO substances do not spontaneously ignite in contact with air.

Pyrophoric Solid: Not relevant - OtherGO substances are liquids.

Self-reactive Substance: OtherGO substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: OtherGO substances do not react exothermically.

Gas under Pressure: Not relevant - OtherGO substances are liquids.

Organic Peroxide: OtherGO substances do not meet the definition of a peroxide.

Corrosive to Metal: OtherGO substances do not meet the criteria for corrosion of metal.

Substance, which in contact with water emits flammable gas: OtherGO substances do not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of OtherGO substances have been tested in acute oral, dermal and inhalation studies. Results indicate the following:

| | |
|----------------|--|
| Rat oral | LD ₅₀ > 5000 mg/kg _{bw} (API, 1982a; API, 1982b) |
| Rat inhalation | LC ₅₀ 4,6 mg/l (API, 1983c), |
| Rabbit dermal | LD ₅₀ > 2000 mg/kg _{bw} (API, 1982a; API, 1982b) |

Skin Corrosion / Irritation: Samples of OtherGO substances were tested in rabbit skin irritation studies. Results obtained were from 24h occlusion tests, and indicate that exposure to OtherGO substances results in skin irritation that when extrapolated to a 4 hour exposure is expected to be irritating (API, 1982a; API, 1982b) There was no evidence of skin corrosion.

Serious Eye Damage / Irritation: The ability of OtherGO substances to elicit eye irritation in rabbits has been investigated. None of the samples resulted in lasting irritation to the eye (API, 1982a; API, 1982b).

Respiratory or Skin Sensitization: No studies were located for respiratory sensitization. For skin sensitization samples were tested and showed no evidence of skin sensitization (API, 1984a; API, 1984b).

Germ Cell Mutagenicity: The mutagenic potential of OtherGO substances has been extensively tested in both *in vivo* and *in vitro* tests. The *in vitro* results were ambiguous while the *in vivo* studies showed a lack of mutagenic activity. Based on the data available, OtherGO substances are not considered to be germ cell mutagens (Deininger G, et al, 1991; API, 1985).

Carcinogenicity: Based on data available, OtherGO substances may be considered carcinogenic dependent upon refining process (EBSI, 1996; CONCAWE, 1996).

Reproductive Toxicity: No guideline studies were located that have examined the potential impact of OtherGO substances on reproductive function. A testing proposal for reproductive toxicity has been included in the registration dossiers submitted to ECHA.

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies do not indicate any specific organ toxicity following single exposure to OtherGO substances (API, 1982a; API, 1982b; API, 1983; API, 1987).

Repeated Exposure: The repeat dose toxicity of OtherGO substances has been studied. Target organ toxicity has been observed in blood, thymus, and liver (API, 1986; ORNL, 1984; Mobil, 1990; Cruzan G, 1985; API, 1983a; API, 1983b).

Aspiration: OtherGO substances span a range of viscosities with values reported as 2.0 - 8.1mm²/s at 40°C.

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: Acute aquatic toxicity studies on samples of OtherGO substances are unavailable; however suitable read-across information from VHGO substances is available (Girling A. and Cann B, 1996a,b). These studies, carried out using the WAF methodology, show acute toxicity values for fish, crustaceans and algae greater than 1 mg/l and mostly in the range of 2-100 mg/l. Results are consistent with the predicted aquatic toxicity of OtherGO substances based on their hydrocarbon composition (Redman A et al, 2010).

Chronic (long-term) Aquatic Hazard: There are no chronic toxicity studies available for OtherGO substances, and QSAR toxicity predictions are not used to determine environmental classification.

Environmental fate (biodegradation / bioaccumulation): OtherGO substances are hydrocarbon UVCBs. Based on the known or expected properties of individual constituents, category members are not predicted to be readily biodegradable but are inherently biodegradable (Lee C, 1993; The Petroleum HPV Testing Group, 2003; Mobil, 1999). Components of OtherGO substances are likely to bioaccumulate (log K_{ow} values ≥ 4.0).

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the ‘worst-case’ C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers). Appendix 6 lists all alternative C&L recommendations (C&L permutations) including OIN and/or CLP Notes, where applicable.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Flammable liquids: | Flam. Liquid 3 * | H226: Flammable liquid and vapour. |
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, thymus, liver | H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

* For the purpose of CLP gas oils, diesel and light heating oils having a flash point between ≥ 55°C and ≤ 75°C may be regarded as Category 3.

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H332: Harmful if inhaled.

H350: May cause cancer.

H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

Additional labelling requirements:

Restricted to professional users due to classification as carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

REFERENCES

- API (1982a) Acute toxicity studies of hydrodesulfurized middle distillate. API 81-09. Study conducted by Hazleton Raltech Inc. API Med. Res. Publ. 30-32347. Washington DC: American Petroleum Institute
- API (1982b) Acute toxicity studies of hydrodesulfurized middle distillate. API 81-10. Study conducted by Hazleton Raltech Inc. API Med. Res. Publ. 30-32348. Washington DC: American Petroleum Institute
- API (1983a) 28-day dermal toxicity study in the rabbit. API 81-09 hydrodesulfurized middle distillate. Study conducted by Borrison Laboratories Inc. API Med. Res. Publ. 30-32298. Washington DC: American Petroleum Institute
- API (1983b) 28-day dermal toxicity study in the rabbit. API 81-10 hydrodesulfurized middle distillate. Study conducted by Borrison Laboratories Inc. API Med. Res. Publ. 30-32296. Washington DC: American Petroleum Institute
- API (1983c) LC₅₀ acute inhalation toxicity evaluation of a petroleum derived hydrocarbon in rats. API 81-09 hydrodesulfurized middle distillate. Study conducted by International Research and Development Corporation. API Med. Res. Publ. 30-32856. Washington DC: American Petroleum Institute
- API (1984a) Dermal sensitization study in guinea pigs -closed patch technique. API 81-10 hydrodesulfurized middle distillate. Study conducted by Hazleton Laboratories America Inc. API Med. Res. Publ. 31-31414. Washington DC: American Petroleum Institute
- API (1984b) Dermal sensitization study in guinea pigs -closed patch technique. API 81-09 hydrodesulfurized middle distillate. Study conducted by Hazleton Laboratories America Inc. API Med. Res. Publ. 31-31352. Washington DC: American Petroleum Institute
- API (1985) Acute *in vivo* cytogenetics assay in male and female rats of API 83-11. Study conducted by Microbiological Associates Inc. API Med. Res. Publ. 32-32408. Washington DC: American Petroleum Institute
- API (1986) Four week subchronic inhalation toxicity study in rats with API 81-07 hydrodesulfurized kerosine (petroleum) (CAS 64742-81-0), API 81-09 hydrodesulfurized middle distillate (petroleum) (CAS 64742-80-9), API 81-10 hydrodesulfurized middle distillate (petroleum) (CAS 64742-80-9). Study conducted by International Research and Development Corp. API Health Environ. Sci. Dep. Rep. 33-32724. Washington DC: American Petroleum Institute
- API (1987) Acute inhalation toxicity evaluation of a petroleum derived hydrocarbon in rats. API 83-11 straight run middle distillate (CAS 64741-44-2). Study conducted by Hazleton Laboratories America Inc. API Med. Res. Publ. 34-30635. Washington DC: American Petroleum Institute
- CONCAWE (1996) Overview of the CONCAWE middle distillate programme. Report No. 96/62. Brussels: CONCAWE
- Cruzan, G. (1985) Thirteen week dermal administration of light cycle oil to rats (CAS 64741-59-9). Mobil Environ. and Health Sci. Lab. Study No. 20535. Princeton NJ: Mobil Oil Corporation
- Deiningner, G. et al (1991) Middle distillates: analytical investigations and mutagenicity studies. Report No. 412-1. Hamburg: DGMK

EBSI (1996) Two year dermal carcinogenicity study of middle distillates in mice. Report No. 117811A. East Millstone NJ: Exxon Biomedical Sciences Inc.

Girling, A.E. and Cann, B.J. (1996a) Gasoil sample 1: acute toxicity of water accommodated fractions to *Oncorhynchus mykiss*, *Daphnia magna* and *Raphidocelis subcapitata*. Report No. OT.96.40017. Thornton: Shell Research Ltd

Girling, A.E. and Cann, B.J. (1996b) Gasoil sample 2: acute toxicity of water accommodated fractions to *Oncorhynchus mykiss*, *Daphnia magna* and *Raphidocelis subcapitata*. Report No. OT.96.40018. Thornton: Shell Research Ltd

Lee, C. (1993) Water insoluble biodegradation test report. Method development using CONCAWE reference gas oil: Phase III. East Millstone NJ: Exxon Biomedical Sciences Inc

Mobil (1990) Thirteen-week dermal administration of Beaumont Coker Light Gas Oil to rats (CAS 64741-82-8). Mobil Environ. and Health Sci. Lab. Study No. 61996. Princeton NJ: Mobil Oil Corporation

Mobil (1999) Determination of the aerobic ready biodegradability of Nigerian diesel fuel using the OECD 301F manometric respirometry test method. Study conducted by Ecotoxicology Laboratory. Mobil Business Resources Corp. Study No. 68246. Paulsboro NJ: Mobil Business Resources Corp.

ORNL (1984) Inhalation toxicology of diesel fuel obscurant aerosol in Sprague-Dawley rats. Phase 3: subchronic exposures. Report No. TM-9403. Oak Ridge TN: Oak Ridge National Laboratory

Redman, A. and Yadav, B. (2010) Aquatic toxicity predictions using the PETROTOX model for petroleum substance categories. Report prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

The Petroleum HPV Testing Group (2003) High production volume (HPV) chemical challenge program. Test plan gas oils category. HPV Consortium No. 1100997. Administered by API. Washington DC: American Petroleum Institute

6.11. HEAVY FUEL OIL COMPONENTS (HFO)

Definition / Domain: The domain of this category is defined as streams obtained as either distillates or residues from distillation and cracking processes and containing saturated, aromatic and olefinic hydrocarbons, with carbon numbers $>C_8$ and boiling point range of 150 to $>750^{\circ}C$.

HFO substances are produced using various refinery distillation and cracking processes. The most common components are:

- Long residue: the residue from the atmospheric distillation of crude oil.
- Short residue: the residue from the vacuum distillation of crude oil.
- Thermal cracker or visbreaker residue: the residue from thermal cracking processes.
- Cat cracker slurry oil (clarified oil): a heavy fraction from a catalytic cracking.
- Thermally cracked or visbreaker gas oil: a middle distillate fraction from thermal cracker or visbreaker units.
- Vacuum gas oil: a heavy gas oil fraction (vacuum distillate) from the vacuum column.
- Cat cracker cycle oil: a middle distillate fraction from the catalytic cracking unit.
- Gas oil: a heavier middle distillate fraction from the atmospheric column.

Appendix 1 lists only those HFO substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - HFO substances are liquids at ambient temperature.

Flammable Aerosol: Not relevant - HFO substances are not in aerosol form.

Flammable Liquid: HFO substances are liquids of variable flash point. Typical values reported are $> 60^{\circ}C$.

Flammable Solid: Not relevant - HFO substances are liquids at ambient temperature.

Oxidising Gas: Not relevant - HFO substances are liquids at ambient temperature.

Oxidising Liquid: HFO substances are not considered oxidising based on structural considerations.

Oxidising Solid: Not relevant - HFO substances are liquids at ambient temperature.

Pyrophoric Liquid: HFO substances do not spontaneously ignite in contact with air.

Pyrophoric Solid: Not relevant - HFO substances are liquids at ambient temperature.

Self-reactive Substance: HFO substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: HFO substances do not react exothermically.

Gas under Pressure: Not relevant - HFO substances are liquids at ambient temperature.

Organic Peroxide: HFO substances do not meet the definition of a peroxide.

Corrosive to Metal: HFO substances do not meet the criteria for corrosion of metal.

Substance which in contact with water emits flammable gas: HFO substances do not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of HFO substances have been tested in acute oral, dermal and inhalation studies. Results indicate the following:

| | |
|----------------|---|
| Rat oral | LD ₅₀ > 5000 mg/kg _{bw} (API, 1982) |
| Rat inhalation | LC ₅₀ = 4.1 mg/l (ARCO, 1987) |
| Rabbit dermal | LD ₅₀ > 2000 mg/kg _{bw} (API, 1982) |

Skin Corrosion / Irritation: Samples of HFO substances have been tested in rabbit skin irritation studies. The majority of the data were derived using a 24 hour occluded exposure protocol. Based on these studies HFO substances cause no more than moderate irritation. Upon repeated exposure some HFO substances may cause skin dryness or cracking. There was no evidence of skin corrosion in these studies. (API 1980)

Serious Eye Damage / Irritation: The effects of HFO substances on the eye have been investigated in rabbits using a number of samples. None of the samples tested showed more than transient, fully reversible eye irritation (API, 1980).

Respiratory or Skin Sensitization: Samples of HFO substances have been tested in the guinea pig using a closed patch technique (Buehler method). These data show no evidence of skin sensitization (API, 1980). There are no reports available to indicate a potential to cause respiratory sensitization.

Germ Cell Mutagenicity: The mutagenic potential of HFO substances has been extensively studied in a range of *in vivo* and *in vitro* assays. (API 1985a; API 1985b; API 1986; Przygoda, R. T et al, 1999). In general, the *in vitro* studies showed evidence of mutagenic activity whereas *in vivo* studies showed no activity. Based on the available data, HFO substances are not considered to be germ cell mutagens.

Carcinogenicity: The carcinogenic potential of HFO substances has been investigated in animals following dermal exposure. These data indicate that HFO substances are carcinogenic (API 1989).

Reproductive Toxicity: Results of developmental and reproductive toxicity studies on HFO substances showed evidence of developmental toxicity (Hoberman AM et al, 1995, ARCO 1994).

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies show no evidence of systemic toxicity (API, 1980, ARCO, 1987).

Repeated Exposure: The repeat dose toxicity of HFO substances has been investigated following dermal exposure (ARCO 1993a, ARCO 1993b). These data indicate a potential to cause systemic injury, with the blood, thymus and liver being key target tissues.

Aspiration: HFO substances are hydrocarbon liquids of variable viscosity. Reported values for some HFO substances are $<20.5 \text{ mm}^2/\text{s}$ at 40°C , while others may be above $20.5 \text{ mm}^2/\text{s}$ at 40°C .

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: Acute aquatic toxicity studies with fish, invertebrates and algae on samples of HFO substances show variable acute toxicity, with the most sensitive species (algae) giving values less than 1 mg/l. These tests were carried out on water accommodated fractions (EMBSI 2008a, 2008b, 2008c).

Chronic (long-term) Aquatic Hazard: Chronic aquatic toxicity studies on *Daphnia magna* exposed to samples of HFO substances show variable chronic toxicity, with a lowest NOEL value of 0.1 mg/l (EMBSI 2012).

Environmental fate (biodegradation / bioaccumulation): HFO substances are hydrocarbon UVCBs. Based on compositional information available and measured or predicted data, key constituents are not expected to meet the criteria for ready degradability but are inherently biodegradable. Constituents of HFO substances show measured or predicted values for $\log K_{ow}$ ranging from 4 to greater than 6 and are thus considered potentially bioaccumulative.

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the 'worst-case' C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers). Appendix 6 lists all alternative C&L recommendations (C&L permutations).

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, thymus, liver | H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure. |
| Hazards to the aquatic environment (acute/short-term): | Aquatic Acute 1 | H400: Very toxic to aquatic life (M-Factor =1). |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 1 | H410: Very toxic to aquatic life with long lasting effects (M-Factor =1). |

Labelling

Signal word: Danger

Hazard pictogram:

GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H332: Harmful if inhaled.

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure.

H410: Very toxic to aquatic life with long lasting effects (M-Factor =1).

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements**Prevention:**

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

P391: Collect spillage.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

REFERENCES

API (1980) Acute toxicity tests API 78-6 #6 heavy fuel oil. Primary skin irritation study in rabbits. Primary eye irritation study in rabbits. Skin sensitization study in guinea pigs. Acute dermal toxicity study in rabbits. Acute oral toxicity study in rats. Sub-acute dermal toxicity study in rabbits. Study conducted by Elars Bioresearch Laboratories, Inc. API Med. Res. Publ. 27-32814. Washington DC: American Petroleum Institute

API (1982) Acute toxicity studies of catalytically cracked clarified oil. API 81-15. Study conducted by Hazleton Raltech Inc. API Med. Res. Publ. 30-31854. Washington DC: American Petroleum Institute

API (1985a) Mutagenicity evaluation studies in the rat bone marrow cytogenetic assay and in the mouse lymphoma forward mutation assay API 81-15 (catalytic cracked clarified oil). Study conducted by Litton Bionetics, Inc. API Med. Res. Publ. 32-30534. Washington DC: American Petroleum Institute

API (1985b) CHO/HGPRT mammalian cell forward gene mutation assay of API 81-15. Study conducted by Pharmakon Research International, Inc. API Med. Res. Publ. 32-32118. Washington DC: American Petroleum Institute

API (1986) *Salmonella*/mammalian-microsome plate incorporation mutagenicity assay (Ames test). Study conducted by Microbiological Associates Inc. API Med. Res. Publ. 33-30599. Washington DC: American Petroleum Institute

API (1989) Lifetime dermal carcinogenesis/chronic toxicity screening bioassay of refinery streams in C₃H/HeJ mice. Study conducted by Primate Research Institute. API Health Environ. Sci. Dep. Rep. 36-31364. Washington DC: American Petroleum Institute

ARCO (1987) Acute dermal toxicity study in rabbits administered F-74-01 heavy fuel oil. UBTL Study No. 60563. Los Angeles CA: ARCO

ARCO (1993a) 28-day dermal toxicity study in rats administered test article F-115-01 FCCU clarified oil. UBTL Study No. 65508. Los Angeles CA: ARCO

ARCO (1993b) Ninety (90) day dermal toxicity study in rats administered test article F-179. UBTL Study No. 66152. Los Angeles CA: ARCO

ARCO (1994) A developmental toxicity screen in female rats administered F-228 dermally during gestation days 0 to 20. UBTL Study No. 66479. Los Angeles CA: ARCO

EMBSI (2008a) Alga, growth inhibition test. MRD-07-913 heavy fuel oil #7 and MRD-07-915 heavy fuel oil #9. Study performed for CONCAWE. EMBSI Study No. 0791367. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2008b) *Daphnia sp.*, acute immobilization test. MRD-07-909 heavy fuel oil #3. Study performed for CONCAWE. EMBSI Study No. 0790942. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2008c) Fish acute toxicity test. MRD-07-911 heavy fuel oil #5. Study performed for CONCAWE. EMBSI Study No. 0791158. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2012) *Daphnia magna*, reproduction test. MRD-11-113 heavy fuel oil #586. Study performed for CONCAWE. EMBSI Study No. 1111346. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

Hoberman, A.M. et al (1995) Developmental toxicity study of clarified slurry oil (CSO) in the rat. *Fund Applied Toxicol* 28, 38-40

Przygoda, R.T. et al (1999) Assessment of the utility of the micronucleus test for petroleum-derived materials. *Mutation Research* 438, 145-153

Redman, A. and Yadav, B. (2010) Aquatic toxicity predictions using the PETROTOX model for petroleum substance categories. Report prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

6.12. UNREFINED / ACID TREATED OILS (UATO)

Definition / Domain: The unrefined base oils, or vacuum distillate fractions, are complex aliphatic and aromatic hydrocarbon substances. They mostly comprise highly alkylated multi-ring structures and branched alkane constituents, along with some heteroatom (nitrogen, oxygen, sulphur) - containing species, including some gums and resins. The unrefined base oil fractions are subject to further refinery process (chemical or physical) steps to convert them into lubricating oils for commercial use. Treatment with sulphuric acid partially removes aromatics and sulphur-containing species, precipitate asphaltenes and gums, and improve colour and stability.

The UATO category domain is established by the refining processes by which the category members are produced, the predominant hydrocarbon classes present, the boiling point range and the carbon number ranges as follows.

- Derived from crude petroleum
- Refinery process
 - Produced by vacuum distillation of the residuum from atmospheric distillation
 - Vacuum distillation fractions with no further treatment (unrefined oils)
 - Vacuum distillate fractions with slight to moderate treatment with sulphuric acid to partially remove aromatics (acid treated oils)
 - Further treatment with sodium hydroxide to neutralize acid residues
- Hydrocarbon types: highly alkylated multi ring structures, branched alkanes, aromatic hydrocarbons.
- Typical boiling range: 210°C to 800°C
- Typical carbon number range: C₁₅ to C₅₀

Appendix 1 lists only those UATO substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - UATO substances are liquids.

Flammable Aerosol: Not relevant - UATO substances are not in aerosol form.

Flammable Liquid: Non-flammable - UATO substances have flash point >98°C.

Flammable Solid: Not relevant - UATO substances are liquids.

Oxidising Gas: Not relevant - UATO substances are liquids.

Oxidising Liquid: UATO substances are not considered oxidising based on structural considerations.

Oxidising Solid: Not relevant - UATO substances are liquids.

Pyrophoric Liquid: UATO substances do not spontaneously ignite in contact with air.

Pyrophoric Solid: Not relevant - UATO substances are liquids.

Self-reactive Substance: UATO substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: UATO substances do not react exothermically.

Gas under Pressure: Not relevant - UATO substances are liquids.

Organic Peroxide: UATO substances do not meet the definition of a peroxide.

Corrosive to Metal: UATO substances are liquids and do not meet the criteria for corrosion of metal.

Substance, which in contact with water emits flammable gas: UATO substances do not react with water.

1.2 Health Hazards

Acute Toxicity: UATO substances have been tested in acute oral, dermal studies. Results indicate the following:

| | |
|-----------------------|---|
| Rat oral | LD ₅₀ > 5000 mg/kg _{bw} (API 1986a) |
| Rat inhalation (mist) | LC ₅₀ > 5000 mg/m ³ (ARCO 1983) |
| Rabbit dermal | LD ₅₀ > 2000 mg/kg _{bw} (API 1986a) |

Skin Corrosion / Irritation: Samples of UATO substances have been tested in rabbit skin irritation non-guideline tests (24h exposure, occluded), which over predicted irritation due to occluded conditions. Only slight irritation would be expected if tested under guideline conditions. Upon repeated exposure some UATO substances may cause skin dryness or cracking (API 1986a).

Serious Eye Damage / Irritation: A sample of an UATO substance tested in rabbits showed minimal redness which resolved quickly (API 1986a).

Respiratory or Skin Sensitization: A sample of an UATO substance showed no evidence of skin sensitization in guinea pigs. There are no reports available to indicate that UATO substances have the potential to cause respiratory sensitization (API 1986a).

Germ Cell Mutagenicity: The mutagenic potential of UATO substances has been extensively studied in a range of *in vivo* and *in vitro* assays (Blackburn GR et al, 1984, 1986; API 1986c; ARCO 1987; Przygoda RT et al, 1999). Based on the available data, UATO substances are not considered to be germ cell mutagens.

Carcinogenicity: The carcinogenic potential of UATO substances has been investigated in mouse skin painting studies. Results show that UATO substances are carcinogenic (Chasey KL and McKee RH, 1993).

Reproductive Toxicity: There are no developmental toxicity data for UATO substances, but their hazards are assumed to be similar to those of UDAE substances. In a read-across developmental study from UDAE substances, heavy paraffinic distillate furfural extract produced maternal, reproductive, and foetal toxicity in Sprague-Dawley rats (Mobil 1990b). There are no data on fertility but based on evidence from repeated dose toxicity studies, no effects on reproductive organs are expected (Mobil, 1990a).

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies show no evidence of systemic toxicity (API 1986a, ARCO 1983).

Repeated Exposure: The repeat dose toxicity of UATO substances has been studied in a 28-day sub-acute study. No effects were observed (API 1986b). Read-across subchronic studies performed on UDAE substances resulted in specific target organ toxicity in the following tissues: adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus (Mobil, 1990a, Chasey KL and McKee RH, 1993).

Aspiration: UATO substances span a range of viscosities with values reported as $>2 \text{ mm}^2/\text{s}$ at 40°C .

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: No acute toxicity studies are available for UATO substances, but suitable read-across data is available for UDAE substances. Read-across studies on acute aquatic toxicity with samples of UDAE substances show acute toxicity values greater than 1000 mg/l to fish (BP, 1994), 35.9 mg/l to *Daphnia* (EMBSI, 2010b) and for 18.8 mg/l for algae (EMBSI, 2010a). Tests were carried out on the water accommodated fraction. Results are consistent with the predicted aquatic toxicity of UATO substances based on their hydrocarbon composition (Redman A et al, 2010).

Chronic (long-term) Aquatic Hazard: Chronic aquatic toxicity studies on *Daphnia magna* exposed to samples of UATO substances show variable chronic toxicity, with NOEL values between 0.1 and 1 mg/l (EMBSI 2012j and 2012k).

Environmental fate (biodegradation / bioaccumulation): UATO substances are hydrocarbon UVCBs. Based on the known or expected properties of individual constituents, category members are not predicted to be readily biodegradable, but are inherently biodegradable. Constituents of UATO substances show measured or predicted values for $\log K_{ow}$ greater than 4 and are considered potentially bioaccumulative.

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the 'worst-case' C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers). Appendix 6 lists all alternative C&L recommendations (C&L permutations).

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|--|
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Carcinogenicity: | Carc. 1A | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, liver, lymph nodes, kidney, stomach, thymus Route of exposure: Oral and dermal | H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by oral and dermal routes. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard



GHS09: environment


Hazard statements:

H304: May be fatal if swallowed and enters airways.

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by oral and dermal routes.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

 P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

 P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

 P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1A.

Full list of Precautionary statements**Prevention:**

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

P391: Collect spillage.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

REFERENCES

- API (1986a) Acute oral toxicity study in rats. Acute dermal toxicity study in rabbits. Primary dermal irritation study in rabbits. Primary eye irritation study in rabbits. Dermal sensitization study in guinea pigs. API 84-01 light paraffinic distillate (CAS 64741-50-0). Study conducted by Hazleton Laboratories America Inc. API Med. Res. Publ. 33-30595. Washington DC: American Petroleum Institute
- API (1986b) 28-day dermal toxicity study in the rabbit of API 84-01. Light paraffinic distillate (CAS 64741-50-0). Study conducted by Tegeris Laboratories Inc. API Med. Res. Publ. 33-31642. Washington DC: American Petroleum Institute
- API (1986c) Mutagenicity of API 84-01, light paraffinic distillate (CAS 64741-50-0), in a mouse lymphoma mutation assay. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 33-32801. Washington DC: American Petroleum Institute
- ARCO (1983) Acute inhalation toxicity study in rats administered test article F-30-02. Study conducted by Bio-Research Laboratories Ltd. Study No. 83-0030. Los Angeles CA: ARCO
- ARCO (1987) Evaluation of chromosome aberrations in Chinese hamster ovary (CHO) cells. Study conducted by Microbiological Associates Inc. ARCO Study No. ATX-85-00610061. Los Angeles CA: ARCO
- Blackburn, G.R. et al (1984) Estimation of the dermal carcinogenic activity of petroleum fractions using a modified Ames assay. *Cell Biology and Toxicology* 1, 1, 67-80
- Blackburn, G.R. et al (1986) Predicting carcinogenicity of petroleum distillation fractions using a modified *Salmonella* mutagenicity assay. *Cell Biology and Toxicology* 2, 1, 63-84
- BP (1994) The acute toxicity of PSG 1860 to rainbow trout (*Oncorhynchus mykiss*). Study conducted by Safeparm Laboratories Ltd. Report No. 692/11. Brussels: BP Oil Europe
- BP (1995) Assessment of the effect of PSG 1860 on the reproduction of *Daphnia magna*. Study conducted by Safeparm Laboratories Ltd. Report No. 692/12. Brussels: BP Oil Europe
- Chasey, K.L. and McKee, R.H. (1993) Evaluation of the dermal carcinogenicity of lubricant base oils by the mouse skin painting bioassay and other proposed methods. *J Appl Toxicol* 13, 1, 57-65
- EMBSI (2010a) Alga - growth inhibition test. Study performed for CONCAWE. EMBSI Study No. 0834667. Annandale NJ: ExxonMobil Biomedical Sciences Inc.
- EMBSI (2010b) Daphnia - acute toxicity test. Study performed for CONCAWE. EMBSI Study No. 0834642A. Annandale NJ: ExxonMobil Biomedical Sciences Inc.
- EMBSI (2012j) Daphnia sp, reproduction test. MRD-08-346 DAE #2 and MRD-08-385 UATO. Study performed for CONCAWE. EMBSI Study No. 0834646. Annandale NJ. ExxonMobil Biomedical Sciences Inc.
- EMBSI (2012k) Daphnia sp, reproduction test. MRD-08-346 DAE #2 and MRD-08-385 UATO. Study performed for CONCAWE. EMBSI Study No. 0834646A. Annandale NJ. ExxonMobil Biomedical Sciences Inc.

Mobil (1990a) Thirteen-week administration of 318 isthmus furfural extract to rats. Mobil Environ. and Health Sci. Lab. Study No. 61737. Princeton NJ: Mobil Oil Corporation

Mobil (1990b) Developmental toxicity study in rats exposed dermally to 318 isthmus furfural extract. Mobil Environ. and Health Sci. Lab. Study No. 62884. Princeton NJ: Mobil Oil Corporation

Przygoda, R.T. et al (1999) Assessment of the utility of the micronucleus test for petroleum-derived materials. *Mutation Research* 438, 145-153

Redman, A. and Yadav, B. (2010) Aquatic toxicity predictions using the PETROTOX model for petroleum substance categories. Report prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

6.13. HIGHLY REFINED BASE OILS (HRBO)

Definition / Domain: The domain of this category is established by the refining processes by which the category members are produced and the low level of poly-aromatic content present in the oils. Additionally, the boiling point range and the carbon number range are as follows:

- Derived from crude petroleum
- Refinery processes
 - vacuum distillation
 - severe solvent extraction
 - dewaxing (solvent or catalytic)
 - severe hydrotreatment or oleum treatment

N.B.: some category members are subject to further intermediate processing such as chemical sweetening and/or chemical neutralisation to remove or convert residues of odorous sulphur compounds.

- At a minimum, satisfies the requirements of the FDA 178.3620 B test elements:
 - UV Absorbance
 - Hot acid test
- Hydrocarbon types: saturated, naphthenic, iso-paraffinic
- Boiling point range: 200 to < 600°C
- Carbon number range: predominantly C₁₂ to C₅₀
- Very low aromatic and sulphur content

Appendix 1 lists only those HRBO substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - HRBO substances are liquids.

Flammable Aerosol: Not relevant - HRBO substances are liquids.

Flammable Liquid: HRBO substances have flashpoints >112°C.

Flammable Solid: Not relevant - HRBO substances are liquids.

Oxidising Gas: Not relevant - HRBO substances are liquids.

Oxidising Liquid: HRBO substances are not considered oxidising based on structural considerations.

Oxidising Solid: Not relevant - HRBO substances are liquids.

Pyrophoric Liquid: HRBO substances do not spontaneously ignite in contact with air.

Pyrophoric Solid: Not relevant - HRBO substances are liquids.

Self-reactive Substance: HRBO substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: HRBO substances do not react exothermically.

Gas under Pressure: Not relevant - HRBO substances are liquids.

Organic Peroxide: HRBO substances do not meet the definition of a peroxide.

Corrosive to Metal: HRBO substances do not satisfy the requirement for classification as they are not corrosive to metal.

Substance which in contact with water emits flammable gas: HRBO substances do not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of HRBO substances have been tested in acute oral, dermal and inhalation studies. Results indicate the following:

| | |
|----------------------------|--|
| Rat oral | LD ₅₀ > 5000 mg/kg _{bw} (ARCO, 1987a) |
| Rat inhalation (dust/mist) | LC ₅₀ > 5 mg/l (ARCO, 1988a) |
| Rabbit dermal | LD ₅₀ > 2000 mg/kg _{bw} (ARCO, 1987bc) |

Skin Corrosion / Irritation: Samples of HRBO substances were tested in rabbit skin irritation studies. Results obtained indicate that exposure to HRBO substances does not result in skin irritation (ARCO, 1987c). There was no evidence of skin corrosion.

Serious Eye Damage / Irritation: HRBO substances were not irritating in a guideline test for eye irritation (ARCO, 1987d).

Respiratory or Skin Sensitization: No studies were located for respiratory sensitization. For skin sensitization HRBO substances were tested and showed no evidence of skin sensitization (ARCO, 1987e).

Germ Cell Mutagenicity: The mutagenic potential of HRBO substances has been tested via *in vitro* and *in vivo* tests. Results showed no evidence of mutagenic activity (EMBSI, 2003; EBSI, 1985; ARCO, 1987fj; McKee RH et al, 1990). Based on the available data, HRBO substances are not considered to be germ cell mutagens.

Carcinogenicity: Carcinogenic bioassays have been conducted and confirm that HRBO substances are non-carcinogenic (EMBSI, 2001; Chasey KL et al, 1993).

Reproductive Toxicity: HRBO substances were not reproductive toxicants (OECD 421). The NOAEL for oral exposure is greater than or equal to 1000 mg/(kg_{bw}*day) and the NOAEL for dermal exposure is greater than or equal to 2000 mg/(kg_{bw}*day) (Mobil, 1987b; Schreiner C et al, 1997; WIL Research Laboratories, 1995; Mobil, 1987c; McKee RH et al, 1987; Mobil, 1987a).

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies do not indicate any specific organ toxicity following single exposure to HRBO substances (ARCO, 1987a; ARCO, 1988).

Repeated Exposure: The repeat dose toxicity of HRBO substances has been studied. There is no toxicity associated with these materials, therefore there is no specific target organ toxicity following exposure (Smith J et al, 1996; Firriolo JM et al, 1995; Trimmer GW et al, 2004; Dalbey W et al, 1991; Mobil, 1988; API, 1987).

Aspiration: HRBO substances span a range of viscosities reported as $>3\text{mm}^2/\text{s}$ at 40°C .

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: Acute aquatic toxicity studies on WAF of HRBO substances report LL50 (96h) at $>10,000\text{ mg/l}$ for fish (IWL, 1992). For aquatic invertebrates the LL50 (48h) was $>100\text{ mg/l}$ (Petro-Canada, 2008a) and the weight of evidence indicates no toxicity to aquatic algae (Petro-Canada, 2008b).

Chronic (long-term) Aquatic Hazard: No chronic toxicity data is available for HRBO substances, but appropriate read-across data are available for LBO substances. The key study indicates a NOEL of 3 mg/l based on reproduction for aquatic invertebrates (EMBSI, 2012). This is supported by a QSAR prediction using PETROTOX, which indicates no chronic toxicity (Redman et al, 2010).

Environmental fate (biodegradation / bioaccumulation): HRBO substances are hydrocarbon UVCBs. Based on compositional information available and measured or predicted data on key constituents, HRBO substances are not expected to meet the criteria for ready degradability but are inherently biodegradable. Constituents of HRBO substances show measured or predicted values for $\log K_{ow}$ greater than 4 and are considered potentially bioaccumulative.

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the ‘worst-case’ C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers). Appendix 6 lists all alternative C&L recommendations (C&L permutations).

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|--------------------|-----------------|---|
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |

Labelling

Signal word: Danger

Hazard pictogram:



Hazard statements:

H304: May be fatal if swallowed and enters airways.

Precautionary statements:

P102: Keep out of reach of children. *(In case of consumer use P102 should be added on the label)*
*

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/...
(...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P331: Do NOT induce vomiting.

P405: Store locked up. *

P501: Dispose of contents/container to ... *(... in accordance with local/regional/national/international regulation (to be specified).)*

* This P-statement is not automatically triggered by the classification and labelling rules for these substances, however based on its physical chemical properties having a viscosity $\leq 20.5 \text{ mm}^2/\text{s}$ @ 40°C it is advised when used in consumer products.

Full list of Precautionary statements

General:

P102: Keep out of reach of children. *(In case of consumer use P102 should be added on the label)*
*

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/...
(...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P331: Do NOT induce vomiting.

Storage:

P405: Store locked up. *

Disposal:

P501: Dispose of contents/container to ... *(... in accordance with local/regional/national/international regulation (to be specified).)*

* This P-statement is not automatically triggered by the classification and labelling rules for these substances, however based on its physical chemical properties having a viscosity $\leq 20.5 \text{ mm}^2/\text{s}$ @ 40°C it is advised when used in consumer products.

REFERENCES

- API (1987) 28-day dermal toxicity study of API 83-15, hydrotreated heavy naphthenic distillate (CAS 64742-52-5), in the rabbit. Study conducted by Tegeris Laboratories Inc. API Health Environ. Sci. Dep. Rep. 35-32430. Washington DC: American Petroleum Institute
- ARCO (1987a) Acute oral toxicity study in rats administered test article F-53-01 ARCOprime 400. Mideco Study No. 55926. Los Angeles CA: ARCO
- ARCO (1987b) Acute dermal toxicity study in rabbits administered F-53-01 ARCOprime 400. UBTL/MIDECO Study No. 55927. Los Angeles CA: ARCO
- ARCO (1987c) Primary dermal irritation study in rabbits administered test article F-52-01 ARCOprime 70. Mideco Study No. 55923. Los Angeles CA: ARCO
- ARCO (1987d) Primary eye irritation study in rabbits administered test article F-52-01 ARCOprime 70. Mideco Study No. 55924. Los Angeles CA: ARCO
- ARCO (1987g) Dermal sensitisation study in albino guinea pigs administered with F-52-01 ARCOprime 70. Mideco Study No. 55925. Los Angeles CA: ARCO
- ARCO (1987h) Evaluation of chromosome aberrations in Chinese Hamster Ovary (CHO) cells. Study No. T4288.337. Los Angeles CA: ARCO
- ARCO (1988) Acute inhalation toxicity study in rats administered test article F-52-01. Study conducted by Bio-Research Laboratories Ltd. Study No. 82188. Los Angeles CA: ARCO
- Chasey, K.L. and McKee, R.H. (1993) Evaluation of the dermal carcinogenicity of lubricant base oils by the mouse skin painting bioassay and other proposed methods. *J Appl Toxicol* 13, 1, 57-65
- Dalbey, W. et al (1991) Four-week inhalation exposures of rats to aerosols of three lubricant base oils. *J Appl Toxicol* 11, 4, 297-302
- EBSI (1985) Mammalian mutagenesis studies in L5178Y mouse lymphoma cells. Study conducted by Bio/Dynamics Inc. Study No. V00027. East Millstone NJ: Exxon Biomedical Sciences Inc.
- EMBSI (2001) Combined chronic toxicity/carcinogenicity study of white oil in Fischer 344 rats. Study performed for CONCAWE. EMBSI Study No. 105970. Annandale NJ: ExxonMobil Biomedical Sciences Inc.
- EMBSI (2003) Modified Ames test results. Study No. 168825B. Annandale NJ: ExxonMobil Biomedical Sciences Inc.
- EMBSI (2012) Daphnia magna, reproduction test. Light Paraffinic Distillate Solvent Extract (MRD-08-346) Light Paraffinic Distillate (MRD-08-385) Catalytic Dewaxed Light Paraffinic Oil (MRD-09-435). Study performed for CONCAWE. EMBSI Study No. 0834646. Annandale NJ: ExxonMobil Biomedical Sciences Inc.
- Firriolo, J.M. et al (1995) Comparative 90-day feeding study with low-viscosity white mineral oil in Fischer-344 and Sprague-Dawley-derived CRL:CD rats. *Toxicologic Pathology* 23, 1, 26-33
- Girling, A.E. (1995) Lubricant base oil LVIN 38: chronic toxicity of water-accommodated fractions to *Daphnia magna*. Report No. SBGR.94.099. Sittingbourne: Shell Research Ltd

IWL (1992) Fisch test, akute Toxizität. Study conducted for Kuwait Petroleum Research & Technology B.V. Study No. Lab 712/3243/2.000. Köln: Institut für gewerbliche Wasserwirtschaft und Luftreinhaltung e.V.

Lampi, M. et al (2010) An evaluation of the persistence, bioaccumulation and toxicity of petroleum hydrocarbons. Report prepared for CONCAWE. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

McKee, R.H. et al (1987) Developmental toxicity of EDS recycle solvent and fuel oil. *Toxicology* 46, 205-215

McKee, R.H. et al (1990) An evaluation of the genotoxic potential of mineral hydrocarbons. *Environ Molecular Mutagen* 15, Suppl. 17, 41

Mobil (1987a) 100 SUS solvent refined base oil developmental toxicity screen in rats. Mobil Environ. and Health Sci. Lab. Study No. 51841. Princeton NJ: Mobil Oil Corporation

Mobil (1987b) Stock 461 rat reproduction study. Mobil Environ. and Health Sci. Lab. Study No. 40921-IA. Princeton NJ: Mobil Oil Corporation

Mobil (1987c) Stock 461 rat teratology study. Mobil Environ. and Health Sci. Lab. Study No. 40922. Princeton NJ: Mobil Oil Corporation

Mobil (1988) Stock 461 rat subchronic study. Mobil Environ. and Health Sci. Lab. Study No. 40921-IB. Princeton NJ: Mobil Oil Corporation

Petro-Canada (2008a) *Daphnia magna* toxicity test report. Study performed by AquaTox Testing & Consulting Inc. Study No. 212933. Mississauga ON: Petro-Canada Research & Development

Petro-Canada (2008b) *Pseudokirchneriella subcapitata* 72-hour growth inhibition toxicity test report. Study performed by AquaTox Testing & Consulting Inc. Study No. 212933. Mississauga ON: Petro-Canada Research & Development

Redman, A. and Yadav, B. (2010) Aquatic toxicity predictions using the PETROTOX model for petroleum substance categories. Report prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

Schreiner, C. et al (1997) Toxicity evaluation of petroleum blending streams: reproductive and developmental effects of hydrodesulfurized kerosine. *J Toxicol Environ Health* 52, 211-229

Smith, J.H. et al (1996) Ninety-day feeding study in Fischer-344 rats of highly refined petroleum-derived food-grade white oils and waxes. *Toxicologic Pathology* 24, 2, 214-230

Trimmer, G.W. et al (2004) Results of chronic dietary toxicity studies of high viscosity (P70H and P100H) white mineral oils in Fischer 344 rats. *Toxicologic Pathology* 32, 439-447

WIL Research Laboratories (1995) An oral reproduction/developmental toxicity screening study of OLOA 219 in finished oils in rats. Study conducted for Chevron Research and Technology Company. Study No. WIL-187007. Ashland OH: WIL Research Laboratories Inc.

6.14. OTHER LUBRICANT BASE OILS (LBO)

Definition / Domain: The domain of this category is established by the refining processes by which the category members are produced, the predominant hydrocarbon classes present, the boiling point range and the carbon number range as follows:

- Derived from crude petroleum which is refined by atmospheric and vacuum distillation
- Refinery processes
 - solvent extraction (phenol, furfural and N-methyl pyrrolidone)
 - solvent deasphalting (precipitation with propane or butane)
 - solvent dewaxing (or precipitation with methyl ethyl ketone)
 - catalyst dewaxing (isomerisation)
 - acid treatment (sulphuric acid or oleum)
 - hydrocracking (hydrogenation and cracking combined)
 - hydrogen treatment
 - hydro finishing
 - clay treatment
 - iso-dewaxing
- Hydrocarbon types: aromatics, paraffins, naphthenics
- Typical boiling ranges of 200°C to 800°C
- Typical carbon number range: predominantly C₁₂ to C₁₂₀

Appendix 1 lists only those LBO substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - LBO substances are liquids.

Flammable Aerosol: Not relevant - LBO substances are not in aerosol form.

Flammable Liquid: LBO substances typically have flash points >98°C.

Flammable Solid: Not relevant - LBO substances are liquids.

Oxidising Gas: Not relevant - LBO substances are liquids.

Oxidising Liquid: LBO substances are not considered oxidising based on structural considerations.

Oxidising Solid: Not relevant - LBO substances are liquids.

Pyrophoric Liquid: LBO substances do not spontaneously ignite in contact with air.

Pyrophoric Solid: Not relevant - LBO substances are liquids.

Self-reactive Substance: LBO substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: LBO substances do not react exothermically.

Gas under Pressure: Not relevant - LBO substances are liquids.

Organic Peroxide: LBO substances do not meet the definition of a peroxide.

Corrosive to Metal: LBO substances are liquids and do not meet the criteria for corrosion of metal.

Substance which in contact with water emits flammable gas: LBO substances do not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of LBO substances have been tested in acute oral, dermal and inhalation studies. Results indicate the following:

| | |
|----------------------------|---|
| Rat oral | LD ₅₀ > 5000 mg/kg _{bw} (API, 1982; API, 1986b) |
| Rat inhalation (dust/mist) | LC ₅₀ > 5.53 mg/l (EBSI, 1988) |
| Rabbit dermal | LD ₅₀ > 2000 mg/kg _{bw} (API, 1982; API, 1986b) |

Skin Corrosion / Irritation: Samples of LBO substances have been tested in rabbit skin irritation studies. The majority of the data were derived using a 24 hour occluded exposure protocol. The study performed on the “insufficiently refined” LBO substances showed moderate irritation. The study was performed for 24 hours rather than 4 hours and consequently the result from a shorter exposure time is not expected to cause irritation. In studies on “sufficiently refined” LBO substances no irritation was observed. There was no evidence of skin corrosion (API, 1982; API, 1986b).

Serious Eye Damage / Irritation: The effects of LBO substances on the eye have been investigated in rabbits using a number of samples. All of the LBO substances tested were non-irritating to the eyes (API, 1982; API, 1986b).

Respiratory or Skin Sensitization: Tests in guinea pig with LBO substances showed no evidence of skin sensitization (API, 1982; API, 1986b). There are no reports available to indicate a potential to cause respiratory sensitization.

Germ Cell Mutagenicity: The mutagenic potential of LBO substances has been extensively studied in a range of *in vivo* and *in vitro* assays. The majority of the studies showed no evidence of mutagenic activity (Blackburn et al., 1984; Blackburn et al, 1986; API, 1986d; API, 1986c; ARCO, 1987a; ARCO, 1987b, Przygoda et al, 1999; McKee RH, et al, 1990). Based on the available data, LBO substances are not considered to be germ cell mutagens.

Carcinogenicity: The carcinogenic potential of LBO substances has been investigated in animals following dermal exposure. Based on these finding, “insufficiently refined” LBO substances are carcinogenic and the “sufficiently refined” LBO substances are not carcinogenic (Doak, S.M.A., et al, 1983; Chasey & McKee, 1993).

Reproductive Toxicity: Results of developmental and reproductive toxicity studies on “sufficiently refined” LBO substances show no evidence of developmental or reproductive toxicity in rats. (WIL Research Laboratories, 1995; Mobil, 1987) There are no developmental toxicity data for “insufficiently refined” LBO substances, but their hazards are assumed to be similar to those of UDAE substances. In a read-across developmental study from UDAE substances, heavy paraffinic distillate furfural extract produced maternal, reproductive, and foetal toxicity in rats

(Schreiner, C., et al, 1997; Mobil, 1989). Therefore LBO substances are classified accordingly. For the “insufficiently refined” LBO substances, there are no data on fertility but based on evidence from repeated dose toxicity studies, no effects on reproductive organs are expected.

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies show no evidence of systemic toxicity (API, 1982; API, 1986b; API, 1987b; EBSI, 1988).

Repeated Exposure: The repeat dose toxicity of LBO substances has been investigated by dermal and inhalation routes for periods between 4 weeks and up to 2 years. For “insufficiently refined” LBO substances, read-across subchronic studies performed on UDAE substances resulted unspecific target organ toxicity in the following tissues: adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus (Mobil, 1990; Chasey & McKee, 1993; API, 1986a). For “sufficiently refined” LBO substances, Repeat dose inhalation and dermal studies showed no systemic effects (Dalbey, et al., 1991, API, 1987a; Mobil, 1983; EBSI, 1991).

Aspiration: LBO substances span a range of viscosities with values reported as $>2 \text{ mm}^2/\text{s}$ at 40°C .

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: All acute aquatic toxicity studies with fish, invertebrates and algae on samples of LBO substances show acute toxicity values greater than 100 mg/l. These tests were carried out on water accommodated fractions (EBSI, 1995; Petro Canada, 2008; Croucher, E.A. and Girling, A.E., 1988).

Chronic (long-term) Aquatic Hazard: Chronic aquatic toxicity studies on samples of LBO substances show chronic toxicity values greater than 1 mg/l for invertebrates. These tests were carried out on water accommodated fractions (EMBSI, 2012; Girling, A.E., 1995).

Environmental fate (biodegradation / bioaccumulation): LBO substances are hydrocarbon UVCBs. Based on compositional information available and measured or predicted data, key constituents are not expected to meet the criteria for ready degradability but are inherently biodegradable. Constituents of LBO substances show predicted values for $\log K_{ow}$ ranging from 2 to greater than 6 and are considered potentially bioaccumulative (HydroQual, 2010).

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the ‘worst-case’ C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers). Appendix 6 lists all alternative C&L recommendations (C&L permutations) including OIN and/or CLP Notes, where applicable.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child Route of exposure: Dermal | H361d: Suspected of damaging the unborn child by dermal route. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, liver, lymph nodes, kidney, stomach, thymus Route of exposure: Dermal | H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by dermal route. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H350: May cause cancer.

H361d: Suspected of damaging the unborn child by dermal route.

H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by dermal route.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Additional labelling requirements:

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

REFERENCES

API (1982) Acute toxicity tests of API 78-9 paraffinic oil, nominal viscosity 70 SUS/100 °F (CAS 64742-56-9). Study conducted by Elars Bioresearch Laboratories Inc. API Med. Res. Publ. 29-33104. Washington DC: American Petroleum Institute

API (1986a) 28-day dermal toxicity study in the rabbit of API 83-12. Hydrotreated light naphthenic distillate (CAS 64742-53-6). Study conducted by Tegeris Laboratories Inc. API Med. Res. Publ. 33-30499. Washington DC: American Petroleum Institute

API (1986b) Acute oral toxicity study in rats. Acute dermal toxicity study in rabbits. Primary dermal irritation study in rabbits. Primary eye irritation study in rabbits. Dermal sensitization study in guinea pigs. API 83-12 hydrotreated light naphthenic distillate (CAS 64742-53-6). Study conducted by Hazleton Laboratories America Inc. API Med. Res. Publ. 33-30592. Washington DC: American Petroleum Institute

API (1986c) Mutagenicity of API 83-12, hydrotreated light naphthenic distillate (CAS 64742-53-6), in a mouse lymphoma mutation assay. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 33-32802. Washington DC: American Petroleum Institute

API (1986d) Mutagenicity of API 83-15, heavy naphthenic distillate (CAS 64742-52-5), in a mouse lymphoma mutation assay. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 33-32800. Washington DC: American Petroleum Institute

API (1987a) 28-day dermal toxicity study of API 83-15, hydrotreated heavy naphthenic distillate (CAS 64742-52-5), in the rabbit. Study conducted by Tegeris Laboratories Inc. API Health Environ. Sci. Dep. Rep. 35-32430. Washington DC: American Petroleum Institute

API (1987b) Acute inhalation toxicity evaluation of a petroleum derived hydrocarbon in rats. API 83-12 hydrotreated light naphthenic distillate. Study conducted by Hazleton Laboratories America Inc. API Health Environ. Sci. Dep. Rep. 34-32775. Washington DC: American Petroleum Institute

ARCO (1987a) Evaluation of chromosome aberrations in Chinese hamster ovary (CHO) cells. Study conducted by Microbiological Associates Inc. ARCO Study No. ATX-85-0059. Los Angeles CA: ARCO

ARCO (1987b) Evaluation of chromosome aberrations in Chinese hamster ovary (CHO) cells. Study conducted by Microbiological Associates Inc. ARCO Study No. ATX-85-0054. Los Angeles CA: ARCO

Blackburn, G.R. et al (1984) Estimation of the dermal carcinogenic activity of petroleum fractions using a modified Ames assay. *Cell Biology and Toxicology* 1, 1, 67-80

Blackburn, G.R. et al (1986) Predicting carcinogenicity of petroleum distillation fractions using a modified *Salmonella* mutagenicity assay. *Cell Biology and Toxicology* 2, 1, 63-84

Chasey, K.L. and McKee, R.H. (1993) Evaluation of the dermal carcinogenicity of lubricant base oils by the mouse skin painting bioassay and other proposed methods. *J Appl Toxicol* 13, 1, 57-65

Croucher, E.A. and Girling, A.E. (1988) Oils: acute toxicity of four oils to *Daphnia magna* and *Gammarus pulex*. Report No. SBGR.88.075. Sittingbourne: Shell Research Ltd

Dalbey, W. et al (1991) Four-week inhalation exposures of rats to aerosols of three lubricant base oils. *J Appl Toxicol* 11, 4, 297-302

Doak, S.M.A. et al (1983) The carcinogenic potential of twelve refined mineral oils following long-term topical application. *Br J Cancer* 48, 429-436

EBSI (1988) Four hour acute inhalation toxicity study in rats. MRD-87-102. EBSI Study No. 210215. East Millstone NJ: Exxon Biomedical Sciences Inc.

EBSI (1991) Dermal carcinogenesis assay in C₃H/HeNCrlBR mice. Report prepared for Exxon Company USA. EBSI Study No. 201111. East Millstone NJ: Exxon Biomedical Sciences Inc.

EBSI (1995) Fish, acute toxicity test. MRD-94-981 basestock solvent neutral 600. Report prepared for Exxon Company International. EBSI Study No. 198140. East Millstone NJ: Exxon Biomedical Sciences Inc.

EMBSI (2012) *Daphnia magna*, reproduction test. Light Paraffinic Distillate Solvent Extract (MRD-08-346) Light Paraffinic Distillate (MRD-08-385) Catalytic Dewaxed Light Paraffinic Oil (MRD-09-435). Study performed for CONCAWE. EMBSI Study No. 0834646. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

Girling, A.E. (1995) Lubricant base oil LVIN 38: chronic toxicity of water-accommodated fractions to *Daphnia magna*. Report No. SBGR.94.099. Sittingbourne: Shell Research Ltd

HydroQual (2010) PETRORISK Model. Prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

McKee, R.H. et al (1990) An evaluation of the genotoxic potential of mineral hydrocarbons. *Environ Molecular Mutagen* 15, Suppl. 17, 41

Mobil (1983) Thirteen-week toxicity study by dermal application of metalworking fluid components to rats. Mobil Environ. and Health Sci. Lab. Study No. 1451-81. Princeton NJ: Mobil Oil Corporation

Mobil (1987) 100 SUS solvent refined base oil developmental toxicity screen in rats. Mobil Environ. and Health Sci. Lab. Study No. 51841. Princeton NJ: Mobil Oil Corporation

Mobil (1989) Developmental toxicity study in rats exposed dermally to 318 isthmus furfural extract. Mobil Environ. and Health Sci. Lab. Study No. 62884. Princeton NJ: Mobil Oil Corporation

Mobil (1990) Thirteen-week administration of 318 isthmus furfural extract to rats. Mobil Environ. and Health Sci. Lab. Study No. 61737. Princeton NJ: Mobil Oil Corporation

Petro-Canada (2008) 72-hour growth inhibition toxicity test report. *Pseudokirchneriella subcapitata*. Study performed by AquaTox Testing & Consulting Inc. Study No. 213706. Mississauga ON: Petro-Canada Research & Development

Przygoda, R.T. et al (1999) Assessment of the utility of the micronucleus test for petroleum-derived materials. *Mutation Research* 438, 145-153

Schreiner, C. et al (1997) Toxicity evaluation of petroleum blending streams: reproductive and developmental effects of hydrodesulfurized kerosine. *J Toxicol Environ Health* 52, 211-229

WIL Research Laboratories (1995) An oral reproduction/developmental toxicity screening study of OLOA 219 in finished oils in rats. Study conducted for Chevron Research and Technology Company. Study No. WIL-187007. Ashland OH: WIL Research Laboratories Inc.

6.15. UNTREATED DISTILLATE AROMATIC EXTRACTS (UDAE)

Definition / Domain: Distillate Aromatic Extracts is the generic name for extracts of a vacuum distillate produced as by-products in the refining of lube base oils and waxes. Vacuum distillates (lubricating oil basestocks) are extracted with a solvent to selectively remove the aromatic compounds (especially 3-7 fused ring PAC). The solvent is then stripped from the resulting extract, and the remaining aromatic concentrate (aromatic extract) is the untreated distillate aromatic extract (UDAE). This may be further processed and the result is a treated DAE (TDAE), which are included in a separate category. UDAE substances are not intentional mixtures of chemicals but are complex combinations of hydrocarbon species.

The category domain is established by the refining processes by which the category members are produced, the predominant hydrocarbon classes present, the boiling point range and the carbon number range as follows:

- Derived from crude petroleum
- Refinery process:
 - Solvent extraction of vacuum distillate fractions (without further processing)
- Hydrocarbon types: mostly alkylated PAC, naphthenic and iso-paraffinic
- Typical Boiling range: 250°C to 640°C
- Typical carbon number range: C₁₅ to C₅₀

Appendix 1 lists only those UDAE substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - UDAE substances are liquids.

Flammable Aerosol: Not relevant - UDAE substances are not in aerosol form.

Flammable Liquid: UDAE substances typically have flash points > 140°C.

Flammable Solid: Not relevant - UDAE substances are liquids.

Oxidising Gas: Not relevant - UDAE substances are liquids.

Oxidising Liquid: UDAE substances are not considered oxidising based on structural considerations.

Oxidising Solid: Not relevant - UDAE substances are liquids.

Pyrophoric Liquid: UDAE substances do not spontaneously ignite in contact with air.

Pyrophoric Solid: Not relevant - UDAE substances are liquids.

Self-reactive Substance: UDAE substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: UDAE substances do not react exothermically.

Gas under Pressure: Not relevant - UDAE substances are liquids.

Organic Peroxide: UDAE substances do not meet the definition of a peroxide.

Corrosive to Metal: UDAE substances do not meet the criteria for corrosion of metal.

Substance which in contact with water emits flammable gas: UDAE substances do not react with water.

1.1 Health Hazards

Acute Toxicity: Samples of UDAE substances have been tested in acute oral, dermal and inhalation studies. Results indicate the following:

| | |
|----------------|---|
| Rat oral | LD ₅₀ > 5000 mg/kg _{bw} (API 1986b) |
| Rat inhalation | LC ₅₀ > 5 mg/l (ARCO 1983) |
| Rabbit dermal | LD ₅₀ > 3000 mg/kg _{bw} (API 1986b) |

Skin Corrosion / Irritation: Samples of UDAE substances have been tested in rabbit skin irritation non-guideline tests (24h exposure, occluded), which over predict irritation due to occluded conditions. No more than slight irritation would be expected in a guideline study (API 1986b). Upon repeated exposure some UDAE substances may cause skin dryness or cracking.

Serious Eye Damage / Irritation: The effects of UDAE substances on the eye have been investigated in rabbits. Results showed minimal redness which resolved quickly (API 1986b).

Respiratory or Skin Sensitization: Tested in guinea pigs, samples of UDAE substances showed no evidence of skin sensitization (API 1986b). There are no reports available to indicate UDAE substances have the potential to cause respiratory sensitization.

Germ Cell Mutagenicity: The mutagenic potential of UDAE substances has been extensively studied in a range of *in vivo* and *in vitro* assays (Blackburn et al. 1984, 1986; API 1986c; Mobil 1987). Based on the available data, UDAE substances are not considered germ cell mutagens.

Carcinogenicity: The carcinogenic potential of UDAE substances has been investigated in mouse skin painting studies. Results show that UDAE substances are carcinogenic (API, 1989).

Reproductive Toxicity: In a developmental study a distillate aromatic extract caused maternal, reproductive, and foetal toxicity in rats (WIL, 2012). There are no data on fertility but based on evidence from repeated dose toxicity studies, effects on male reproductive organs were observed via oral exposure (Mobil, 1990).

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies show no evidence of systemic toxicity (API, 1986b; ARCO, 1983).

Repeated Exposure: The repeat dose toxicity of UDAE substances has been studied in a 28-day sub-acute study via dermal exposure. No evident effects were observed (API, 1986a). However, results from subchronic studies performed on UDAE

substances via oral and dermal exposure resulted in specific target organ toxicity in the following tissues: adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus. Additional effects were observed in the prostate, testes and seminal vesicles in the subchronic study via oral exposure. The NOAEL was determined to be < 30 mg/kg_{bw} (Mobil, 1990).

Aspiration: UDAE substances span a range of viscosities with values reported as >10 mm²/s at 40 °C.

1.2 Environmental Hazards

Acute (short-term) Aquatic Hazard: Studies on acute aquatic toxicity with samples of UDAE substances show acute toxicity values greater than 1000 mg/l for fish, 35.9 mg/L (BP, 1994) for *Daphnia* (EMBSI, 2010b) and 18.8 mg/l for algae (EMBSI, 2010a). Tests were carried out on water accommodated fractions.

Chronic (long-term) Aquatic Hazard: Chronic aquatic toxicity studies on *Daphnia magna* exposed to samples of UDAE substances show variable chronic toxicity, with NOEL values between 0.1 and 1 mg/l (EMBSI 2012a and 2012b).

Environmental fate (biodegradation / bioaccumulation): UDAE substances are hydrocarbon UVCBs. Based on the known or expected properties of individual constituents, UDAE substances are not predicted to be readily biodegradable but are inherently biodegradable. Constituents of UDAE substances show measured or predicted values for log K_{ow} ≥ 4 and are considered potentially bioaccumulative.

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the ‘worst-case’ C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers). Appendix 6 lists all alternative C&L recommendations (C&L permutations).

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|--|
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, liver, lymph nodes, kidney, stomach, thymus | H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard



GHS09: environment

**Hazard statements:**

H304: May be fatal if swallowed and enters airways.

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P331: Do NOT induce vomiting.

P391: Collect spillage.

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements**Prevention:**

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)**Response:**P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

P391: Collect spillage.

Storage:

P405: Store locked up.

Disposal:P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

REFERENCES

API (1986a) 28-day dermal toxicity study in the rabbit. API 83-16 light paraffinic distillate solvent extract (CAS 64742-05-8). Study conducted by Tegeris Laboratories Inc. API Health Environ. Sci. Dep. Rep. 33-31695. Washington DC: American Petroleum Institute

API (1986b) Acute oral toxicity study in rats. Acute dermal toxicity study in rabbits. Primary dermal irritation study in rabbits. Primary eye irritation study in rabbits. Dermal sensitization study in guinea pigs. API 83-16 light paraffinic distillate solvent extract (CAS 64742-05-8). Study conducted by Hazleton Laboratories America Inc. API Health Environ. Sci. Dep. Rep. 33-31226. Washington DC: American Petroleum Institute

API (1986c) Mutagenicity of API 83-16 light paraffinic distillate solvent extract (petroleum) (CAS 64742-05-8) in a mouse lymphoma mutation assay. Study conducted by Litton Bionetics Inc. API Health Environ. Sci. Dep. Rep. 33-32803. Washington DC: American Petroleum Institute

API (1989) 24-Month dermal carcinogenesis/chronic toxicity screening bioassay of refinery streams in C₃H/HeJ mice. Study No. 36-33220. Washington DC: American Petroleum Institute

ARCO (1983) Acute inhalation toxicity study in rats administered test article F-30-02. Study conducted by Bio-Research Laboratories Ltd. Study No. 81677. Los Angeles CA: ARCO

Blackburn, G.R. et al (1984) Estimation of the dermal carcinogenic activity of petroleum fractions using a modified Ames assay. *Cell Biology and Toxicology* 1, 1, 67-80

Blackburn, G.R. et al (1986) Predicting carcinogenicity of petroleum distillation fractions using a modified *Salmonella* mutagenicity assay. *Cell Biology and Toxicology* 2, 1, 63-84

BP (1994) The acute toxicity of PSG 1860 to rainbow trout (*Oncorhynchus mykiss*). Study conducted by Safepharm Laboratories Ltd. Report No. 692/11. Brussels: BP Oil Europe

EMBSI (2010a) Alga - growth inhibition test. Study performed for CONCAWE. EMBSI Study No. 0834667. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2010b) Daphnia - acute toxicity test. Study performed for CONCAWE. EMBSI Study No. 0834642A. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2012a) Daphnia sp, reproduction test. MRD-08-346 DAE #2 and MRD-08-385 UATO. Study performed for CONCAWE. EMBSI Study No. 0834346. Annandale NJ. ExxonMobil Biomedical Sciences Inc.

EMBSI (2012b) Daphnia sp, reproduction test. MRD-08-346 DAE #2 and MRD-08-385 UATO. Study performed for CONCAWE. EMBSI Study No. 0834346A. Annandale NJ. ExxonMobil Biomedical Sciences Inc.

Mobil (1987) Micronucleus assay of bone marrow red blood cells from rats treated for thirteen weeks with 318 isthmus furfural extract. Mobil Environ. and Health Sci. Lab. Study No. 61738. Princeton NJ: Mobil Oil Corporation

Mobil (1990) Thirteen-week administration of 318 isthmus furfural extract to rats. Mobil Environ. and Health Sci. Lab. Study No. 61737. Princeton NJ: Mobil Oil Corporation

WIL (2012) A Dermal Prenatal Developmental Toxicity Study of Extract, Light Paraffinic Distillate Solvent in Rats. Testing Laboratory: Wil Research Laboratories. Owner Company: American Petroleum Institute

6.16. TREATED DISTILLATE AROMATIC EXTRACTS (TDAE)

Definition / Domain: Distillate Aromatic Extracts is the generic name for extracts of a vacuum distillate produced as by-products in the refining of lube base oils and waxes. Vacuum distillates (lubricating oil basestocks) are extracted with a solvent to selectively remove the aromatic compounds (especially 3-7 fused ring PAC). The solvent is then stripped from the resulting extract, and the remaining aromatic concentrate (aromatic extract) is the untreated distillate aromatic extract (UDAE), which are included in a separate category. The distillate aromatic extract may be further processed and the result is a treated DAE (TDAE) produced to meet physical-chemical and technical specifications, rather than chemical composition. TDAE substances are not intentional mixtures of chemicals but are complex combinations of hydrocarbon species.

The category domain of TDAE substances is established by the refining processes by which the category members are produced, the predominant hydrocarbon classes present, the boiling point range and the carbon number ranges as follows:

- Derived from crude petroleum
- Refinery process:
 - Solvent extraction of vacuum distillate fractions and further processing such as:
 - Hydrotreatment
 - Hydrodesulphurization
 - Clay-treatment
 - Acid-treatment
 - Carbon-treatment
 - Further solvent extraction
- Hydrocarbon types: mostly alkylated PAC, naphthenic and iso-paraffinic. TDAE subjected to hydrotreatment may significantly decrease levels of PAC contained in them.
- Typical boiling range: 250°C to 640°C
- Typical carbon number range: C₁₃ to C₅₀

Appendix 1 lists only those TDAE substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - TDAE substances are liquids.

Flammable Aerosol: Not relevant - TDAE substances are not in aerosol form.

Flammable Liquid: TDAE substances typically have flash points >140°C.

Flammable Solid: Not relevant - TDAE substances are liquids.

Oxidising Gas: Not relevant - TDAE substances are liquids.

Oxidising Liquid: TDAE substances are not considered oxidising based on structural considerations.

Oxidising Solid: Not relevant - TDAE substances are liquids.

Pyrophoric Liquid: TDAE substances do not spontaneously ignite in contact with air.

Pyrophoric Solid: Not relevant - TDAE substances are liquids.

Self-reactive Substance: TDAE substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: TDAE substances do not react exothermically.

Gas under Pressure: Not relevant - TDAE substances are liquids.

Organic Peroxide: TDAE substances do not meet the definition of a peroxide.

Corrosive to Metal: TDAE substances are liquids and do not meet the criteria for corrosion of metal.

Substance which in contact with water emits flammable gas: TDAE substances do not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of TDAE substances have been tested in acute oral, dermal and inhalation studies. Results indicate the following:

| | |
|----------------|--|
| Rat oral | LD ₅₀ > 5000 mg/kg _{bw} (API 1982;, ARCO 1983a,1985a; UBTL 1983a, b, c) |
| Rat inhalation | LC ₅₀ > 5 mg/l (ARCO 1983d, e, EMBSI 1988b; EBSI, 1988) |
| Rabbit dermal | LD ₅₀ >2000 mg/kg _{bw} (ARCO 1973, 1982b, 1984a,b,c, 1985b; API 1982a, b, c,d,e) |

Skin Corrosion / Irritation: Samples of TDAE substances have been tested in rabbit skin irritation non-guideline tests (24h exposure, occluded), which over predict irritation due to occluded conditions. No more than slight irritation would be expected in a guideline study. Upon repeated exposure some TDAE substances may cause skin dryness and cracking (API 1986a; API 1982e,f; Trimmer, G.W. et al. 1989).

Serious Eye Damage / Irritation: The irritating potential of samples of TDAE substances has been investigated in rabbits. Results showed minimal conjunctival chemosis which resolved quickly (API 1986a; API 1982f).

Respiratory or Skin Sensitization: Tested in guinea pigs and human volunteers, samples of TDAE substances showed no evidence of skin sensitization. There are no reports available to indicate TDAE substances have the potential to cause respiratory sensitization (API 1986a; API 1982f; EBSI, 1988e, f; Trimmer, G.W. et al. 1989).

Germ Cell Mutagenicity: The mutagenic potential of samples of TDAE substances has been extensively studied in a range of *in vivo* and *in vitro* assays. Based on the available data, TDAE substances are not considered germ cell mutagens (Blackburn et al. 1984, 1986; API 1986c, d; Mobil 1987a; McKee, et al, 1990).

Carcinogenicity: The carcinogenic potential of samples of TDAE substances has been investigated in mouse skin painting studies. Results suggest that TDAE substances with ≥ 3% DMSO extractables as measured by IP346 have the potential to cause skin tumours (Gradiski et al. 1983). Samples of TDAE substances with lower

levels of polycyclic aromatic compounds (PAC) (with < 3% DMSO extractables) are not carcinogenic (Doak, S.M.A. et al, 1985).

Reproductive Toxicity: The reproductive toxicity of TDAE substances with less than 3% DMSO extractables is read-across to LBO substances. Results of developmental and reproductive toxicity studies on “sufficiently refined” LBO substances did not show any evidence of developmental or reproductive toxicity in rats (WIL Research Laboratories, 1995; Mobil, 1987b). There are no developmental toxicity data for TDAE substances, but their hazards are assumed to be similar to those of UDAE substances. In a read-across developmental study from UDAE substances, heavy paraffinic distillate furfural extract produced maternal, reproductive, and foetal toxicity in rats (Mobil, 1989). For TDAE substances with $\geq 3\%$ DMSO extractables, there are no data on fertility but based on evidence from repeated dose toxicity studies of representative samples, no effects on reproductive organs are expected (Mobil 1987b)**Specific Target Organ Toxicity (STOT)**

Single Exposure: Acute exposure studies show no evidence of systemic toxicity (API 1986b; API 1982; ARCO 1983; EBSI 1988).

Repeated Exposure: The repeat dose toxicity of samples of TDAE substances has been investigated by oral, dermal and inhalation routes for periods between 4 weeks and up to 2 years. For TDAE substances with $\geq 3\%$ DMSO extractables, read-across subchronic studies resulted in specific target organ toxicity in the following tissues: adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus (Mobil, 1990; API, 1986a). For TDAE substances with <3% DMSO extractables, repeat dose inhalation and dermal studies showed no systemic effects (Dalbey, et al., 1991; Dalbey, 2001; API, 1987; Mobil, 1983; EBSI, 1991a, b; Whitman, et al., 1989;).

Aspiration: TDAE substances span a range of viscosities with values reported as $>10 \text{ mm}^2/\text{s}$ at 40°C .

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: Acute aquatic toxicity studies on samples of TDAE substances, carried out using the WAF methodology, report acute toxicity values for fish, crustaceans and algae greater than 100 mg/l (BP, 1994; BP, 1995; EMBSI, 2010a and 2010b).

Chronic (long-term) Aquatic Hazard: Chronic aquatic toxicity studies on *Daphnia magna* exposed to a sample of a TDAE substance show a NOEL value above 1000 mg/l (BP, 1995).

Environmental fate (biodegradation / bioaccumulation): TDAE substances are hydrocarbon UVCBs. Based on the known or expected properties of individual constituents, TDAE substances are not predicted to be readily biodegradable but are inherently biodegradable. Constituents of TDAE substances show measured or predicted values for $\log K_{ow} \geq 4$ and are therefore considered potentially bioaccumulative.

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the ‘worst-case’ C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers). Appendix 6 lists all alternative C&L recommendations (C&L permutations) including OIN and/or CLP Notes, where applicable.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|--|
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, liver, lymph nodes, kidney, stomach, thymus | H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and/or thymus through prolonged or repeated exposure.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P331: Do NOT induce vomiting.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

REFERENCES

- API (1982) Acute toxicity tests of API 78-9 paraffinic oil, nominal viscosity 70 SUS/100°F (CAS 64742-56-9). Study conducted by Elars Bioresearch Laboratories Inc. API Med. Res. Publ. 29-33104. Washington DC: American Petroleum Institute
- API (1982a) Acute toxicity tests of API 78-10 Paraffinic oil, nominal viscosity 150 SUS/100°F (CAS. 64742-56-0). Study conducted by Elars Bioresearch Laboratories Inc. API Med. Res. Publ. 29-33105. Washington DC: American Petroleum Institute
- API (1982b) Acute toxicity tests of API 79-3 Paraffinic oil, nominal viscosity 350 SUS/100°F (CAS 64742-65-0). Study conducted by Elars Bioresearch Laboratories Inc. API Med. Res. Publ. 29-33067. Washington DC: American Petroleum Institute
- API (1982c) Acute toxicity tests of API 79-4 Paraffinic oil, nominal viscosity 550 SUS/100°F (CAS 64742-65-0). Study conducted by Elars Bioresearch Laboratories Inc. API Med. Res. Publ. 29-33066. Washington DC: American Petroleum Institute
- API (1982d) Acute toxicity tests of API 79-5 Paraffinic oil, nominal viscosity 800 SUS/100°F (CAS 64742-65-0). Study conducted by Elars Bioresearch Laboratories Inc. API Med. Res. Publ. 29-33068. Washington DC: American Petroleum Institute
- API (1982e) Acute toxicity tests of API 78-10 Paraffinic oil, nominal viscosity 150 SUS/100°F (CAS 64742-56-0). Study conducted by Elars Bioresearch Laboratories Inc. API Med. Res. Publ. 29-33105. Washington DC: American Petroleum Institute
- API (1982f) Acute toxicity tests of API 78-9 Paraffinic oil, nominal viscosity 70 SUS/100°F (CAS 64742-56-9). Study conducted by Elars Bioresearch Laboratories Inc. API Med. Res. Publ. 29-33104. Washington DC: American Petroleum Institute
- API (1986a) 28-day dermal toxicity study in the rabbit. API 83-16 light paraffinic distillate solvent extract (CAS 64742-05-8). Study conducted by Tegeris Laboratories Inc. API Health Environ. Sci. Dep. Rep. 33-31695. Washington DC: American Petroleum Institute
- API (1986b) Acute oral toxicity study in rats. Acute dermal toxicity study in rabbits. Primary dermal irritation study in rabbits. Primary eye irritation study in rabbits. Dermal sensitization study in guinea pigs. API 83-16 light paraffinic distillate solvent extract (CAS 64742-05-8). Study conducted by Hazleton Laboratories America Inc. API Health Environ. Sci. Dep. Rep. 33-31226. Washington DC: American Petroleum Institute
- API (1986c) Mutagenicity of API 83-16 light paraffinic distillate solvent extract (petroleum) (CAS 64742-05-8) in a mouse lymphoma mutation assay. Study conducted by Litton Bionetics Inc. API Health Environ. Sci. Dep. Rep. 33-32803. Washington DC: American Petroleum Institute
- API (1986d) Mutagenicity of API 83-15, heavy naphthenic distillate (CAS 64742-52-5), in a mouse lymphoma mutation assay. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 33-32800. Washington DC: American Petroleum Institute
- API (1987) 28-day dermal toxicity study of API 83-15, hydrotreated heavy naphthenic distillate (CAS 64742-52-5), in the rabbit. Study conducted by Tegeris Laboratories Inc. API Health Environ. Sci. Dep. Rep. 35-32430. Washington DC: American Petroleum Institute
- ARCO (1973) Acute dermal toxicity study in albino rabbits. Study conducted by Industrial Bio-Test Laboratories Inc. Report no. ATX-73-0004. Los Angeles CA: ARCO

ARCO (1982b) Acute toxicity studies of Tufflo 491. Study No. ATX-82-0035. Los Angeles CA: ARCO

ARCO (1983) Acute inhalation toxicity study in rats administered test article F-30-02. Study conducted by Bio-Research Laboratories, Ltd. Study No. 81677. Los Angeles CA: ARCO

ARCO (1983a) Acute oral toxicity study in rats administered 1095 extract oil. Study No. ATX-83-0025. Los Angeles CA: ARCO

ARCO (1983d) Acute inhalation toxicity study in rats administered test article F-30-02. Study conducted by Bio-Research Laboratories, Ltd. Study No. ATX-83-0030. Los Angeles CA: ARCO

ARCO (1983e) Acute inhalation toxicity study in rats administered test article F-38-01. Study conducted by Bio-Research Laboratories, Ltd. Study No. 81681. Los Angeles CA: ARCO

ARCO (1984a) Acute dermal toxicity study in rabbits administered test article F-30-01 1095 extract oil. Study No. TR-05-390-041. Los Angeles CA: ARCO

ARCO (1984b) Acute dermal toxicity study in rabbits administered test article F-31-01 2590 extract oil. Study No. TR-05-390-046. Los Angeles CA: ARCO

ARCO (1984c) Acute dermal toxicity study in rabbits administered test article F-32-01 6090 extract oil. Study No. TR-05-390-051. Los Angeles CA: ARCO

ARCO (1985a) Acute oral toxicity study of Tufflo 491 in rats. Study conducted by Biosearch, Inc. Study No. ATX-84-0046. Los Angeles CA: ARCO

ARCO (1985b) Acute dermal toxicity study in rabbits administered test article F-47-01 Tufflo 491. Study conducted by Biosearch, Inc. Study No. ATX-84-0047. Los Angeles CA: ARCO

Blackburn, G.R. et al (1984) Estimation of the dermal carcinogenic activity of petroleum fractions using a modified Ames assay. *Cell Biology and Toxicology* 1, 1, 67-80

Blackburn, G.R. et al (1986) Predicting carcinogenicity of petroleum distillation fractions using a modified *Salmonella* mutagenicity assay. *Cell Biology and Toxicology* 2, 1, 63-84

BP (1994) The acute toxicity of PSG 1861 to rainbow trout (*Oncorhynchus mykiss*). Study conducted by Safeparm Laboratories Ltd. Report No. 692/14. Brussels: BP Oil Europe

BP (1995) Assessment of the effect of PSG 1861 on the reproduction of *Daphnia magna*. Study conducted by Safeparm Laboratories Ltd. Report No. 692/15. Brussels: BP Oil Europe

Dalbey, W. et al (1991) Four-week inhalation exposures of rats to aerosols of three lubricant base oils. *J Appl Toxicol* 11, 4, 297-302

Dalbey, W. E. (2001) Subchronic inhalation exposures to aerosols of three petroleum lubricants. *Am Ind Hyg Assoc J* 62, 49-56

Doak, S.M.A. et al (1985) Carcinogenic potential of hydrotreated petroleum aromatic extracts. *Br J Ind Med* 42, 380-388

EBSI (1988) Four hour acute inhalation toxicity study in rats. MRD-87-102. EBSI Study No. 210215. East Millstone NJ: Exxon Biomedical Sciences Inc.

EBSI (1988b) Four Hour Acute Inhalation Toxicity Study in Rats. Testing laboratory: Exxon Biomedical Sciences, Inc. (East Millstone, New Jersey, USA). Report no.: 210115. Owner company: Exxon Biomedical Sciences, Inc. (East Millstone, New Jersey). Study number: 88 MRL 105. Report date: 1988-05-12.

EBSI (1988e) Evaluation of the skin irritating and sensitizing propensities of MRD-88-290 in humans. Study conducted by Product Investigations Inc. Report No. PI-5339. Study No. 88 MRL 297. East Millstone NJ: Exxon Biomedical Sciences Inc.

EBSI (1988f) Evaluation of the skin irritating and sensitizing propensities of MRD-88-291 in humans. Study conducted by Product Investigations Inc. Report No. PI-5340. Study No. 88 MRL 298. East Millstone NJ: Exxon Biomedical Sciences Inc.

EBSI (1991a) 14-day subchronic inhalation toxicity in rats. MRD-87-099. EBSI Study No. 209918. East Millstone NJ: Exxon Biomedical Sciences Inc.

EBSI (1991b) 14-day subchronic inhalation toxicity in rats. MRD-87-101. EBSI Study No. 210118. East Millstone NJ: Exxon Biomedical Sciences Inc.

EMBSI (2010a) Alga- growth inhibition test. Study performed for CONCAWE. EMBSI Study No.0834667. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

EMBSI (2010b) Daphnia - acute toxicity test. Study performed for CONCAWE. EMBSI Study No. 0834642A. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

Gradiski, D. et al (1983) The carcinogenic effect of a series of petroleum-derived oils on the skin of mice. *Environmental Research* 32, 258-268

McKee, R.H. et al (1990) An evaluation of the genotoxic potential of mineral hydrocarbons. *Environ Molecular Mutagen* 15, Suppl. 17, 41

Mobil (1983) Thirteen-week toxicity study by dermal application of metalworking fluid components to rats. Mobil Environ. and Health Sci. Lab. Study No. 1451-81. Princeton NJ: Mobil Oil Corporation

Mobil (1987a) Micronucleus assay of bone marrow red blood cells from rats treated for thirteen weeks with 318 isthmus furfural extract. Mobil Environ. and Health Sci. Lab. Study No. 61738. Princeton NJ: Mobil Oil Corporation

Mobil (1987b) 100 SUS solvent refined base oil developmental toxicity screen in rats. Mobil Environ. and Health Sci. Lab. Study No. 51841. Princeton NJ: Mobil Oil Corporation

Mobil (1989) Developmental toxicity study in rats exposed dermally to 318 isthmus furfural extract. Mobil Environ. and Health Sci. Lab. Study No. 62884. Princeton NJ: Mobil Oil Corporation

Mobil (1990) Thirteen-week administration of 318 isthmus furfural extract to rats. Mobil Environ. and Health Sci. Lab. Study No. 61737. Princeton NJ: Mobil Oil Corporation

Trimmer, G. W. et al. (1989). Evaluation of the dermal toxicity of paraffinic lube oils. *Toxicologist* 9: 162.

UBTL (1983a) Acute oral toxicity study in rats administered test article F-33-01. UBTL Study No. TR-05-390-022. Salt Lake City UT: UBTL

UBTL (1983b) Acute oral toxicity study in rats administered 2590 extract oil. UBTL Study No. TR-05-390-047 and TR-05-390-027. Salt Lake City UT: UBTL

UBTL (1983c) Acute oral toxicity study in rats administered test article F-35-01 6090/95 oil. UBTL Study No. TR-05-390-032. Salt Lake City UT: UBTL

Whitman, F.T. et al (1989) Evaluation of the acute and subacute inhalation toxicity of lubricating oil mists. *The Toxicologist* 9, 143

WIL Research Laboratories (1995) An oral reproduction/developmental toxicity screening study of OLOA 219 in finished oils in rats. Study conducted for Chevron Research and Technology Company. Study No. WIL-187007. Ashland OH: WIL Research Laboratories Inc.

6.17. RESIDUAL AROMATIC EXTRACTS (RAE)

Definition / Domain: The domain of this category is established by the refining process by which the category members are produced and the boiling point range and the carbon number range as follows:

- Derived from crude petroleum
- Refinery processes
 - Atmospheric distillation
 - Vacuum distillation
 - Propane extraction (deasphalting)
 - Solvent extraction
- Hydrocarbon types: alkylated aromatics, mixed aromatic cycloalkanes, and cycloparaffins.
- Boiling point range: >380°C
- Carbon number range: predominantly > C₂₅

Appendix 1 lists only those RAE substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - RAE substances are liquids at ambient temperature.

Flammable Aerosol: Not relevant - RAE substances are not in aerosol form.

Flammable Liquid: RAE substances typically have flash points greater than 250°C.

Flammable Solid: Not relevant - RAE substances are liquids at ambient temperature.

Oxidising Gas: Not relevant - RAE substances are liquids at ambient temperature.

Oxidising Liquid: RAE substances are not considered oxidising based on structural considerations.

Oxidising Solid: Not relevant - RAE substances are liquids at ambient temperature.

Pyrophoric Liquid: RAE substances do not spontaneously ignite in contact with air.

Pyrophoric Solid: Not relevant - RAE substances are liquids at ambient temperature.

Self-reactive Substance: RAE substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: RAE substances do not react exothermically.

Gas under Pressure: Not relevant - RAE substances are liquids.

Organic Peroxide: RAE substances do not meet the definition of a peroxide.

Corrosive to Metal: RAE substances do not meet the criteria for corrosion of metal.

Substance which in contact with water emits flammable gas: RAE substances do not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of RAE substances have been tested in acute oral, dermal and inhalation studies. Results indicate the following:

| | |
|----------------|---|
| Rat oral | LD ₅₀ > 5000 mg/kg _{bw} (API, 1986) |
| Rat inhalation | LC ₅₀ > 5 mg/l (ARCO, 1983) |
| Rabbit dermal | LD ₅₀ > 3000 mg/kg _{bw} (API, 1986) |

Skin Corrosion / Irritation: No primary skin irritation studies were located for RAE substances; however, a read-across skin irritation study from a UDAE substance was identified which was conducted under occluded conditions for 24 hours instead of semi-occluded conditions for 4 hours (API 1986). No more than slight irritation is expected in a guideline study. Additionally, RAE substances did not elicit skin irritation based on observations made during repeated dermal exposure studies (API, 1986). There was no evidence of skin corrosion.

Serious Eye Damage / Irritation: Based on read-across to studies conducted with UDAE substances, results indicate that RAE substances would not be expected to cause irritation (API, 1986).

Respiratory or Skin Sensitization: Based on a read-across study from a UDAE substance, RAE substances are not expected to be skin sensitizers (API, 1986).

Germ Cell Mutagenicity: The mutagenic potential of RAE substances has been studied in both *in vitro* and *in vivo* investigations. Based on the available data, RAE substances are not considered to be germ cell mutagens (Blackburn GR et al, 1996; Petrolabs, 1998a, b, c; EBSI, 1997a, b; Institute Pasteur de Lille, 2000; CIT, 2001; CONCAWE, 2012).

Carcinogenicity: RAE substances have been tested in mouse skin painting assays. Results indicate that some RAE substances can cause dermal carcinogenic lesions. Carcinogenic activity is likely related to the content of biologically active polycyclic aromatic hydrocarbons, which can be predicted based on results from modified Ames tests. Based on the limited evidence available, the relevance of these data for humans remains inconclusive; therefore, RAE substances should be suspected of causing cancer (EMBSI, 2005; Mobil, 2001; Kane M et al, 1984; BP, 1991; Mobil, 1991).

Reproductive Toxicity: There are no data on fertility but based on evidence from repeated dose toxicity studies, no effects on reproductive organs. (Mobil, 1990). In a developmental toxicity study conducted with a RAE substance, no effects were observed (Mobil, 1989). A testing proposal for reproductive toxicity has been included in the registration dossiers submitted to ECHA.

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies show no evidence of systemic toxicity. (API, 1986; ARCO, 1983).

Repeated Exposure: There was no systemic toxicity in repeat dose toxicity studies Mobil, 1990). The results are supported by 2 year dermal carcinogenic studies

indicate only dermal effects are likely (EMBSI, 2005; Mobil, 2001; Kane M et al, 1984; BP, 1991; Mobil, 1991).

Aspiration: RAE substances span a range of viscosities with values reported as $>2000 \text{ mm}^2/\text{s}$ at 40°C .

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: Samples of RAE substances have been tested in acute studies with fish and Daphnia. Results show the LL_{50} was $>1000 \text{ mg/l}$ for fish and Daphnia (BP, 1994a; BP, 1994b). To assess the impact on alga a PETROTOX QSAR prediction was used, with an EL_{50} (72h) of $>1000 \text{ mg/l}$ based on growth rate (Redman, 2010).

Chronic (long-term) Aquatic Hazard: Samples of RAE substances have been tested in 21-day *Daphnia magna* reproduction toxicity tests, and the EL_{50} was $>1000 \text{ mg/l}$ (BP, 1995).

Environmental fate (biodegradation / bioaccumulation): RAE substances are hydrocarbon UVCBs. Based on the known or expected properties of individual constituents, RAE substances are not predicted to be readily biodegradable but are inherently biodegradable. Constituents of RAE substances show measured or predicted values for $\log K_{ow} \geq 4$ and are considered potentially bioaccumulative.

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the ‘worst-case’ C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers). Appendix 6 lists all alternative C&L recommendations (C&L permutations) including OIN and/or CLP Notes, where applicable.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|------------------|-----------------|------------------------------------|
| Carcinogenicity: | Carc. 2 | H351: Suspected of causing cancer. |

Labelling

Signal word: Warning

Hazard pictogram:

GHS08: health hazard



Hazard statements:

H351: Suspected of causing cancer.

Precautionary statements:

P201: Obtain special instructions before use.

P280: Wear protective gloves/protective clothing/eye protection/face protection.
(*Manufacturer/supplier to specify type of equipment.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

P273: Avoid release to the environment

P391: Collect spillage

Full list of Precautionary statements**Prevention:**

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P280: Wear protective gloves/protective clothing/eye protection/face protection.
(*Manufacturer/supplier to specify type of equipment.*)

Response:

P308 + P313: IF exposed or concerned: Get medical advice/attention.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

REFERENCES

API (1986) Acute oral toxicity study in rats. Acute dermal toxicity study in rabbits. Primary dermal irritation study in rabbits. Primary eye irritation study in rabbits. Dermal sensitization study in guinea pigs. API 83-16 light paraffinic distillate solvent extract (CAS 64742-05-8). Study conducted by Hazleton Laboratories America Inc. API Health Environ. Sci. Dep. Rep. 33-31226. Washington DC: American Petroleum Institute

ARCO (1983) Acute inhalation toxicity study in rats administered test article F-30-02 (CAS 64742-04-7). Study conducted by Bio-Research Laboratories Ltd. Study No. 81677. Los Angeles CA: ARCO

Blackburn, G.R. et al (1996) Comparison of biological and chemical predictors of dermal carcinogenicity of petroleum oils. *Polycyclic Aromatic Compounds* **11**, 201-210

CONCAWE (2012) Use of the modified Ames test as an indicator of the carcinogenicity of residual aromatic extracts. Report No. 12/12. Brussels: CONCAWE

BP (1991) 1156, 1157 and 1158: 2-year skin painting study. Report No. 25-90-0275. Surrey UK: BP Group Occupational Health Centre

BP (1994a) The acute toxicity of PSG 1857 to *Daphnia magna*. Study conducted by Safepharm Laboratories Ltd. Report No. 599/43. Brussels: BP Oil Europe

BP (1994b) The acute toxicity of PSG 1857 to rainbow trout (*Oncorhynchus mykiss*). Study conducted by Safepharm Laboratories Ltd. Report No. 599/44. Brussels: BP Oil Europe

BP (1995) Assessment of the effect of PSG 1857 on the reproduction of *Daphnia Magna*. Study conducted by Safepharm Laboratories Ltd. Report No. 692/6. Brussels: BP Oil Europe

CIT (2001) *In vitro* mammalian cell gene mutation test in L5178Y TK^{+/+} mouse lymphoma cells. EXAROL 50. Study conducted for TOTALFINA. Study No. 20837 MLY. Evreux: Centre International de Toxicologie

EBSI (1997a) Microbial mutagenesis in *Salmonella* mammalian microsome preincubation assay using DMSO extraction modification. MRD-96-657 brightstock extract. Study conducted for Esso Italiana S.A. Report No. 165725. East Millstone NJ: Exxon Biomedical Sciences Inc.

EBSI (1997b) Microbial mutagenesis in *Salmonella* mammalian microsome preincubation assay using DMSO extraction modification. MRD-96-601 brightstock extract. Study conducted for Exxon Company International. Report No. 160125. East Millstone NJ: Exxon Biomedical Sciences Inc.

EMBSI (2005) Two year dermal carcinogenicity study in mice. Test substances MRD-96-596, MRD-96-597, MRD-96-598, MRD-96-599, MRD-96-601, MRD-96-657, MRD-96-661. EMBSI Environ. Toxicol. & Chem. Lab. Report No. 159611. Fairfax VA: ExxonMobil Lubricants & Petroleum Specialties

Institut Pasteur de Lille (2000) Détermination de l'activité mutagène du produit EXAROL 50 par le test d'Ames modifié appliqué à des produits pétroliers. Report No. IPL-R 001101. Study conducted for TOTAL. Lille: Institut Pasteur de Lille

Kane, M.L. et al (1984) Toxicological characteristics of refinery streams used to manufacture lubricating oils. *Am J Ind Med* 5, 3, 183-200

Mobil (1989) Developmental toxicity study in rats exposed dermally to 318 isthmus furfural extract. Mobil Environ. and Health Sci. Lab. Study No. 62884. Princeton NJ: Mobil Oil Corporation

Mobil (1990) Thirteen-week dermal administration of four bright stock extracts (BSEs) to rats. Mobil Environ. and Health Sci. Lab. Study No. 62239, 62260, 62261, 62262. Princeton NJ: Mobil Oil Corporation

Mobil (1991) Dermal carcinogenicity studies for samples 62274, 62273, 62216, 62215, 62157, 62246, 62271 and 62272 (SM-190 - SM-197). Study conducted by University of Cincinnati Medical Center, Department of Environmental Health. Princeton NJ: Mobil Oil Corporation

Mobil (2001) Dermal carcinogenicity of refined petroleum streams. Study conducted by Kettering Laboratory. Study No. 67746. Fairfax VA: Mobil Business Resources Corporation

PetroLabs (1998a) Modified Ames testing of one oil sample from Mobil Corporation. PLI Study No. 98056. Ivyland PA: Petrolabs Inc.

PetroLabs (1998b) Modified Ames testing of one oil sample from Mobil Corporation. PLI Study No. 98043. Ivyland PA: Petrolabs Inc.

Petrolabs (1998c) Modified Ames testing of ten oil samples from Mobil Corporation. PLI Study No. 98026. Ivyland PA: Petrolabs Inc.

Redman, A. and Yadav, B. (2010) Aquatic toxicity predictions using the PETROTOX model for petroleum substance categories. Report prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

6.18. SLACK WAXES (Slackwax)

Definition / Domain: The domain of this category is established by the refining processes by which the category members are produced, the predominant hydrocarbon classes present, the melting point range and the carbon number range as follows:

- Derived from vacuum distilled fractions and separated as a semi-solid by chilling
- Refinery processes
 - atmospheric distillation
 - vacuum distillation
 - hydrotreatment / hydrodesulphurisation
 - solvent extraction
 - chilling

N-B.: some category members are subject to further intermediate processing such as de-oiling or treatment with acid, clay, active carbon or hydrogenation but without changing their hydrocarbon composition significantly.

- Hydrocarbon types: The major components of all slack waxes are branched and straight chain paraffins and naphthenes (cycloparaffins), which normally account for at least 85% by volume of a wax process stream. Aromatic hydrocarbons, mainly alkylbenzenes and alkyl naphthalenes will not normally exceed 15% by volume of slack wax streams. The boiling points of hazardous, 3 to 7 fused-ring polycyclic aromatic hydrocarbons (PAHs) are in the boiling range of the petroleum waxes, but they are removed by solvent extraction before chilling and wax separation.
- Typical melting point range: predominantly 43 °C to 76 °C
- Typical boiling point range: predominantly 300 °C to 800 °C
- Typical carbon number range: predominantly C₁₂ to C₁₂₀

Appendix 1 lists only those Slackwax substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - Slackwax substances are solids.

Flammable Aerosol: Not relevant - Slackwax substances are solids.

Flammable Liquid: Not relevant - Slackwax substances are solids.

Flammable Solid: Slackwax substances do not meet the requirement for classification as a flammable solid.

Oxidising Gas: Not relevant - Slackwax substances are solids.

Oxidising Liquid: Not relevant - Slackwax substances are solids.

Oxidising Solid: Slackwax substances are not considered oxidising based on structural considerations.

Pyrophoric Liquid: Not relevant - Slackwax substances are solids.

Pyrophoric Solid: Slackwax substances do not spontaneously ignite in contact with air.

Self-reactive Substance: Slackwax substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: Slackwax substances do not react exothermically.

Gas under Pressure: Not relevant - Slackwax substances are solids.

Organic Peroxide: Slackwax substances do not meet the definition of a peroxide.

Corrosive to Metal: Slackwax substances do not meet the criteria for corrosion of metal.

Substance which in contact with water emits flammable gas: Slackwax substances do not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of Slackwax substances have been tested in acute oral and dermal studies. Results indicate the following:

| | |
|---------------|---|
| Rat oral | LD ₅₀ > 5000 mg/kg _{bw} (API, 1982; API, 1986b) |
| Rabbit dermal | LD ₅₀ > 2000 mg/kg _{bw} (API, 1982; API, 1986b) |

Skin Corrosion / Irritation: Slackwax substances from carcinogenic or unknown feed stock were tested in rabbit skin irritation studies (API, 1986b). Studies were conducted with a non-guideline 24 hour test with occlusive dressing. If a 4 hour test with semi-occlusive dressing was conducted the material would not be expected to be irritating to skin. A Slackwax substance from non-carcinogenic feed stock was tested in human volunteers and showed no evidence of irritation (EBSI, 1988). There was no evidence of irritation or corrosion.

Serious Eye Damage / Irritation: Eye irritation potential of a Slackwax substance (from carcinogenic or unknown feed stock) was evaluated in rabbits. Based on the results, the material is not considered to be an eye irritant (API, 1986b). Read-across from a "sufficiently refined" LBO substance showed no evidence of irritation indicating that Slackwax substances from non-carcinogenic feedstock are not irritating to the eye (API, 1982).

Respiratory or Skin Sensitization: No studies were available for respiratory sensitization. For skin sensitisation, a Slackwax substance from carcinogenic or unknown feed stocks was evaluated by read-across and determined to be non-sensitising (API, 1986b). For Slackwax substances from a non-carcinogenic feed stock, read-across studies from LBO substances indicate that dermal sensitization was not observed (API, 1982; EBSI, 1988).

Germ Cell Mutagenicity: Samples of Slackwax substances produced mixed results in *in vitro* assays. In *in vivo* assays the samples did not produce any clastogenetic effects in the mouse micronucleus assay. Based on the available data, Slackwax substances are not considered to be germ cell mutagens (Blackburn, GR et al, 1984;

Blackburn GR et al, 1986; PetroLabs, 2004; API, 1986d; API, 1986c; ARCO, 1987a; ARCO, 1987b; Przygoda RT et al, 1999; McKee RH, 1990).

Carcinogenicity: The carcinogenic potential of Slackwax substances is determined by the feedstock from which the Slackwax substance is derived. Based on the available data, studies with Slackwax substances from insufficiently refined feedstock were carcinogenic, while those from sufficiently refined feedstocks were not (Smith WE et al, 1951; Kane ML et al, 1984).

Reproductive Toxicity: The reproductive toxicity potential of Slackwax substances is determined by the feedstock from which the Slackwax substance is derived. For Slackwax substances from non-carcinogenic feed-stock, a key read-across screening study indicated no reproductive or developmental effects. An additional developmental toxicity study showed no effects (WIL Research Laboratories, 1995; Mobil, 1987). For Slackwax substances derived from carcinogenic feedstock a read-across study from UDAE substances indicates developmental effects are likely (Mobil, 1989).

Specific Target Organ Toxicity

Single Exposure: Acute exposure studies show no specific organ toxicity following single exposure to slack waxes (API, 1982; API, 1986b).

Repeated Exposure: The repeat dose toxicity of Slackwax substances from carcinogenic or unknown feed stocks was assessed using read-across. Results indicate that oral and dermal exposure is likely to result in target organ toxicity (adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus) (Mobil, 1990; Chasey & McKee, 1993). For Slackwax substances from non-carcinogenic feedstocks, dermal repeat dose read-across studies showed no evidence of target organ toxicity (Mobil, 1983; API, 1986a; API, 1987; EBSI, 1991).

Aspiration: Viscosity of Slackwax substances at 40 °C is not determined and in most cases the melting point is above this temperature. Viscosity for Slackwax substances ranges from 2.2 to 30 mm²/s at 100 °C.

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: All acute aquatic toxicity studies with fish, invertebrates and algae on samples of Slackwax substances (read-across from LBO substances) show acute toxicity values greater than 100 mg/l. These tests were carried out on water accommodated fractions (EBSI, 1995; Petro-Canada 2008; Croucher, E.A. and Girling, A.E., 1988). Supporting acute toxicity QSAR predictions for fish, invertebrates and algae show toxicity above 1000 mg/l (Redman 2010).

Chronic (long-term) Aquatic Hazard: Chronic aquatic toxicity studies on samples of Slackwax substances (reading across from LBO substances) show chronic toxicity values greater than 1 mg/l for invertebrates. These tests were carried out on water accommodated fractions (Girling, A.E., 1995). A supporting QSAR prediction for chronic fish toxicity is greater than 1000 mg/l (Redman, 2010).

Environmental fate (biodegradation / bioaccumulation): Slackwax substances are hydrocarbon UVCBs. Based on compositional information available and measured or predicted data, key constituents are not expected to meet the criteria for ready degradability but are inherently biodegradable. Constituents of Slackwax substances show predicted values for log K_{ow} ranging from 2 to greater than 6 and are therefore considered potentially bioaccumulative. (HydroQual, 2010).

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the ‘worst-case’ C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers). Appendix 6 lists all alternative C&L recommendations (C&L permutations) including OIN and/or CLP Notes, where applicable.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|------------------------|---|--|
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child Route of exposure: Dermal | H361d: Suspected of damaging the unborn child by dermal route. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, liver, lymph nodes, kidney, stomach, thymus Route of exposure: Oral and dermal | H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by oral and dermal route. |

Labelling

Signal word: Warning

Hazard pictogram:

GHS08: health hazard



Hazard statements:

H350: May cause cancer.

H361d: Suspected of damaging the unborn child by dermal route.

H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by oral and dermal route.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Additional labelling requirements:

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements**Prevention:**

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

REFERENCES

API (1982) Acute toxicity tests of API 78-9 paraffinic oil, nominal viscosity 70 SUS/100°F (CAS 64742-56-9). Study conducted by Elars Bioresearch Laboratories Inc. API Med. Res. Publ. 29-33104. Washington DC: American Petroleum Institute

API (1986a) 28-day dermal toxicity study in the rabbit of API 84-01. Light paraffinic distillate (CAS 64741-50-0). Study conducted by Tegeris Laboratories Inc. API Med. Res. Publ. 33-31642. Washington DC: American Petroleum Institute

API (1986b) Acute oral toxicity study in rats. Acute dermal toxicity study in rabbits. Primary dermal irritation study in rabbits. Primary eye irritation study in rabbits. Dermal sensitization study in guinea pigs. API 84-01 light paraffinic distillate (CAS 64741-50-0). Study conducted by Hazleton Laboratories America Inc. API Health Environ. Sci. Dep. Rep. 33-30595. Washington DC: American Petroleum Institute

API (1986c) Mutagenicity of API 83-15, heavy naphthenic distillate (CAS 64742-52-5), in a mouse lymphoma mutation assay. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 33-32800. Washington DC: American Petroleum Institute

API (1986d) Mutagenicity of API 84-01, light paraffinic distillate (CAS 64741-50-0), in a mouse lymphoma mutation assay. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 33-32801. Washington DC: American Petroleum Institute

API (1987) 28-day dermal toxicity study of API 83-15, hydrotreated heavy naphthenic distillate (CAS 64742-52-5), in the rabbit. Study conducted by Tegeris Laboratories Inc. API Health Environ. Sci. Dep. Rep. 35-32430. Washington DC: American Petroleum Institute

ARCO (1987a) Evaluation of chromosome aberrations in Chinese hamster ovary (CHO) cells. Study conducted by Microbiological Associates Inc. ARCO Study No. ATX-85-0059. Los Angeles CA: ARCO

ARCO (1987b) Evaluation of chromosome aberrations in Chinese hamster ovary (CHO) cells. Study conducted by Microbiological Associates Inc. ARCO Study No. ATX-85-0054. Los Angeles CA: ARCO

Blackburn, G.R. et al (1984) Estimation of the dermal carcinogenic activity of petroleum fractions using a modified Ames assay. *Cell Biology and Toxicology* 1, 1, 67-80

Blackburn, G.R. et al (1986) Predicting carcinogenicity of petroleum distillation fractions using a modified *Salmonella* mutagenicity assay. *Cell Biology and Toxicology* 2, 1, 63-84

Chasey, K.L. and McKee, R.H. (1993) Evaluation of the dermal carcinogenicity of lubricant base oils by the mouse skin painting bioassay and other proposed methods. *J Appl Toxicol* 13, 1, 57-65

Croucher, E.A. and Girling, A.E. (1988) Oils: acute toxicity of four oils to *Daphnia magna* and *Gammarus pulex*. Report No. SBGR.88.075. Sittingbourne: Shell Research Ltd

EBSI (1988) Evaluation of the skin irritating and sensitizing propensities of MRD-88-289 in humans. Study conducted by Product Investigations Inc. Report No. PI-5338. East Millstone NJ: Exxon Biomedical Sciences Inc.

EBSI (1991) Dermal carcinogenesis assay in C₃H/HeNCrIBR mice. Report prepared for Exxon Company USA. EBSI Study No. 201111. East Millstone NJ: Exxon Biomedical Sciences Inc.

EBSI (1995) Fish, acute toxicity test. MRD-94-981 basestock solvent neutral 600. Report prepared for Exxon Company International. EBSI Study No. 198140. East Millstone NJ: Exxon Biomedical Sciences Inc.

Girling, A.E. (1995) Lubricant base oil LVIN 38: chronic toxicity of water-accommodated fractions to *Daphnia magna*. Report No. SBGR.94.099. Sittingbourne: Shell Research Ltd

HydroQual (2010) PETRORISK Model. Prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

Kane, M.L. et al (1984) Toxicological characteristics of refinery streams used to manufacture lubricating oils. *Am J Ind Med* 5, 3, 183-200

McKee, R.H. et al (1990) An evaluation of the genotoxic potential of mineral hydrocarbons. *Environ Molecular Mutagen* 15, Suppl. 17, 41

Mobil (1983) Thirteen-week toxicity study by dermal application of metalworking fluid components to rats. Mobil Environ. and Health Sci. Lab. Study No. 1451-81. Princeton NJ: Mobil Oil Corporation

Mobil (1987) 100 SUS solvent refined base oil developmental toxicity screen in rats. Mobil Environ. and Health Sci. Lab. Study No. 51841. Princeton NJ: Mobil Oil Corporation

Mobil (1989) Developmental toxicity study in rats exposed dermally to 318 isthmus furfural extract. Mobil Environ. and Health Sci. Lab. Study No. 62884. Princeton NJ: Mobil Oil Corporation

Mobil (1990) Thirteen-week administration of 318 isthmus furfural extract to rats. Mobil Environ. and Health Sci. Lab. Study No. 61737. Princeton NJ: Mobil Oil Corporation

Petro-Canada (2008) 72-hour growth inhibition toxicity test report. *Pseudokirchneriella subcapitata*. Study performed by AquaTox Testing & Consulting Inc. Study No. 213706. Mississauga ON: Petro-Canada Research & Development

PetroLabs (2004) Modified Ames testing of four slack waxes from American Petroleum Institute. Report No. 04040. Ivyland PA: PetroLabs Inc.

Przygoda, R.T. et al (1999) Assessment of the utility of the micronucleus test for petroleum-derived materials. *Mutation Research* 438, 145-153

Smith, W.E. et al (1951) Experimental analysis of the carcinogenic activity of certain petroleum products. *Arch Ind Hyg Occup Med* 4, 4, 299-314

WIL Research Laboratories (1995) An oral reproduction/developmental toxicity screening study of OLOA 219 in finished oils in rats. Study conducted for Chevron Research and Technology Company. Study No. WIL-187007. Ashland OH: WIL Research Laboratories Inc.

6.19. PARAFFIN AND HYDROCARBON WAXES (Paraffinwax)

Definition / Domain: The domain of this category is established by the process by which the category members are produced, the predominant hydrocarbon classes present, the melting point range and the carbon number range as follows:

- Derived from vacuum distilled fractions and separated as a solid by chilling.
- Refinery processes
 - atmospheric distillation
 - vacuum distillation
 - hydrotreatment / hydrodesulphurisation
 - solvent extraction
 - chilling

Note: some category members are subject to further processing such as de-oiling or treatment with acid, clay, active carbon or hydrogenation but without changing their hydrocarbon composition significantly.

- Hydrocarbon types: the major components of all paraffin and hydrocarbon waxes are branched and straight chain paraffins and naphthenes (cycloparaffins), which normally account for at least 85% by volume of a wax process stream. Aromatic hydrocarbons, mainly alkylbenzenes and alkylnaphthalenes will not normally exceed 15% by volume of paraffin and hydrocarbon wax streams. The boiling point range of paraffin and hydrocarbon waxes is such that components of specific toxicological concern such as benzene (boiling point 80 °C) and n-hexane (boiling point 69 °C) are typically not present. The boiling points of the hazardous, 3 to 7 fused-ring polycyclic aromatic hydrocarbons (PAHs) are in the boiling range of the paraffin and hydrocarbon waxes, but they are removed by solvent extraction before chilling and wax separation.
- Typical melting point range: predominantly 43 °C to 95 °C
- Typical boiling point range: predominantly 300 °C to 800 °C
- Typical carbon number range: predominantly C₁₂ to C₈₅

Appendix 1 lists only those Paraffinwax substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - Paraffinwax substances are solids.

Flammable Aerosol: Not relevant - Paraffinwax substances are solids.

Flammable Liquid: Not relevant - Paraffinwax substances are solids.

Flammable Solid: Paraffinwax substances do not meet the requirement for classification as a flammable solid as the flash point is typically >160 °C.

Oxidising Gas: Not relevant - Paraffinwax substances are solids.

Oxidising Liquid: Not relevant - Paraffinwax substances are solids.

Oxidising Solid: Not considered oxidising based on structural considerations.

Pyrophoric Liquid: Not relevant - Paraffinwax substances are solids.

Pyrophoric Solid: Paraffinwax substances do not spontaneously ignite in contact with air.

Self-reactive Substance: Paraffinwax substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: Paraffinwax substances do not react exothermically.

Gas under Pressure: Not relevant - Paraffinwax substances are solids.

Organic Peroxide: Paraffinwax substances do not meet the definition of a peroxide.

Corrosive to Metal: Paraffinwax substances do not meet the requirement for corrosion to metal.

Substance, which in contact with water emits flammable gas: Paraffinwax substances do not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of Paraffinwax substances have been tested in acute oral and dermal studies. Results indicate the following:

| | |
|------------|--|
| Rat oral | LD ₅₀ > 5000 mg/kg _{bw} (SafePharm Laboratories, 2007a; IBR, 1976) |
| Rat dermal | LD ₅₀ > 2000 mg/kg _{bw} (BIBRA, 1993b) |

Skin Corrosion / Irritation: Paraffinwax substances were tested in rabbit skin irritation studies under semi-occlusive conditions for 4 hours. Slight erythema was observed and was fully reversible by 24 hours (NOTOX, 2003). There was no evidence of skin corrosion.

Serious Eye Damage / Irritation: Eye irritation potential of a Paraffinwax substance was evaluated. Results indicate that the eye irritation that occurred had cleared within 24 hours. Based on the Draize scores, the material is not considered to be an eye irritant (SafePharm Laboratories, 2007b).

Respiratory or Skin Sensitization: No studies were located for respiratory sensitization. For skin sensitization a Paraffinwax substance was evaluated in a guideline study and determined to be non-sensitising (Phycher Bio Développement, 2007).

Germ Cell Mutagenicity: Paraffinwax substances tested negative in *in vitro* assays (TNO, 2005a; TNO, 2005b; TNO, 2005c). *In vivo* assays for samples of Paraffinwax substances did not exhibit mutagenicity (McKee RH et al, 1990). Based on the available data, Paraffinwax substances are not considered to be germ cell mutagens.

Carcinogenicity: The carcinogenic potential of Paraffinwax substances was assessed in oral and dermal studies. The Paraffinwax substances were not considered to be carcinogenic (Shubik P et al, 1962).

Reproductive Toxicity: Paraffinwax substances were assessed for fertility and developmental effects via read-across to “sufficiently refined” LBO substances. No reproductive toxicity was observed (WIL Research Laboratories, 1995; Mobil, 1987).

Specific Target Organ Toxicity

Single Exposure: Acute exposure studies do not indicate any specific organ toxicity following single exposure to Paraffinwax substances (SafePharm Laboratories, 2007a; IBR, 1976; BIBRA, 1993b).

Repeated Exposure: The repeat dose toxicity of Paraffinwax substances was assessed for both oral and dermal routes of exposure either as the substance or as read-across from LBO substances. The study data indicate that no target organ toxicity was observed (BIBRA, 1993a; Worrell NR, 1992; Shubik P et al, 1962; Mobil, 1983; API, 1987; EBSI, 1991).

Aspiration: Paraffinwax substances span a range of viscosities with values reported in the range 3 to 30 mm²/s at 100° C.

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: All acute aquatic toxicity studies with fish, invertebrates and algae on samples of Paraffinwax substances (reading across from LBO substances) show acute toxicity values greater than 100 mg/l. These tests were carried out on water accommodated fractions. (EBSI1995, Petro-Canada 2008, Croucher, E.A. and Girling, A.E.1988). Supporting acute toxicity QSAR predictions for fish, invertebrates and algae show toxicity above 1000 mg/l (Redman, 2010).

Chronic (long-term) Aquatic Hazard: Chronic aquatic toxicity studies on samples of Paraffinwax substances (reading across from LBO substances) show chronic toxicity values greater than 1 mg/l for invertebrates. These tests were carried out on water accommodated fractions (Girling, A.E., 1995). A supporting QSAR prediction for chronic fish toxicity is greater than 1000 mg/l (Redman, 2010).

Environmental fate (biodegradation / bioaccumulation): Paraffinwax substances are hydrocarbon UVCBs. Based on compositional information available and measured or predicted data, key constituents are not expected to meet the criteria for ready degradability but are inherently biodegradable. Constituents of Paraffinwax substances show predicted values for log K_{ow} ranging from 2 to greater than 6 and are therefore considered potentially bioaccumulative (HydroQual, 2010).

Part 2 - Summary of Classification and Labelling Recommendations

Classification and labelling according to CLP / GHS

Paraffinwax substances are not classified.

REFERENCES

API (1987) 28-day dermal toxicity study of API 83-15, hydrotreated heavy naphthenic distillate (CAS 64742-52-5), in the rabbit. Study conducted by Tegeris Laboratories Inc. API Health Environ. Sci. Dep. Rep. 35-32430. Washington DC: American Petroleum Institute

BIBRA (1993a) A 90-day feeding study in the rat with two mineral waxes identified as paraffin wax 64 (OFH-064) and micro/paraffin wax mixture. Study conducted for European Wax Federation. BIBRA Report No. 1205/2/93. Surrey UK: BIBRA Toxicology International

BIBRA (1993b) An acute dermal toxicity limit test in the rat with SX30. Study conducted for Shell International Petroleum Mij. B.V. BIBRA Report No. 1091/2. Surrey UK: BIBRA Toxicology International

Croucher, E.A. and Girling, A.E. (1988) Oils: acute toxicity of four oils to *Daphnia magna* and *Gammarus pulex*. Report No. SBGR.88.075. Sittingbourne: Shell Research Ltd

EBSI (1991) Dermal carcinogenesis assay in C₃H/HeNCrIBR mice. Report prepared for Exxon Company USA. EBSI Study No. 201111. East Millstone NJ: Exxon Biomedical Sciences Inc.

EBSI (1995) Fish, acute toxicity test. MRD-94-981 basestock solvent neutral 600. Report prepared for Exxon Company International. EBSI Study No. 198140. East Millstone NJ: Exxon Biomedical Sciences Inc.

Girling, A.E. (1995) Lubricant base oil LVIN 38: chronic toxicity of water-accommodated fractions to *Daphnia magna*. Report No. SBGR.94.099. Sittingbourne: Shell Research Ltd

HydroQual (2010) PETRORISK Model. Prepared for CONCAWE.

IBR (1976) Akute Toxizitätsprüfung von "R 9107" nach oraler Applikation an der Ratte. Report No. 1-4-195/1-76. Hannover: International Bio-Research Inc.

McKee, R.H. et al (1990) An evaluation of the genotoxic potential of mineral hydrocarbons. *Environ Molecular Mutagen* 15, Suppl. 17, 41

Mobil (1983) Thirteen-week toxicity study by dermal application of metalworking fluid components to rats. Mobil Environ. and Health Sci. Lab. Study No. 1451-81. Princeton NJ: Mobil Oil Corporation

Mobil (1987) 100 SUS solvent refined base oil developmental toxicity screen in rats. Mobil Environ. and Health Sci. Lab. Study No. 51841. Princeton NJ: Mobil Oil Corporation

NOTOX (2003) Primary skin irritation/corrosion study with SX-50 (Sarawax 50) in the rabbit (4-hour semi-occlusive application). Report No. 393648. The Netherlands: NOTOX

Petro-Canada (2008) 72-hour growth inhibition toxicity test report. *Pseudokirchneriella subcapitata*. Study performed by AquaTox Testing & Consulting Inc. Study No. 213706. Mississauga ON: Petro-Canada Research & Development

Phycher Bio Développement (2007) Paraffin waxes (Fischer-Tropsch), full range, C15-50 - branched and linear. Skin sensitisation in the guinea pig Magnusson and Kligman maximisation method. Report No. 2041/0056. Study conducted for Shell International Gas Ltd. Cestas France: Phycher Bio Développement

Redman, A. and Yadav, B. (2010) Aquatic toxicity predictions using the PETROTOX model for petroleum substance categories. Report prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

SafePharm Laboratories (2007a) Paraffin waxes (Fischer-Tropsch), full range, C15-50 - branched and linear. Acute oral toxicity in the rat - fixed dose method. Report No. 2041/0050. Study conducted for Shell International Gas Ltd. Derbyshire UK: SafePharm Laboratories Ltd

SafePharm Laboratories (2007b) Paraffin waxes (Fischer-Tropsch), full range, C15-50 - branched and linear. Acute eye irritation in the rabbit. Report No. 2041/0055. Study conducted for Shell International Gas Ltd. Derbyshire UK: SafePharm Laboratories Ltd

Shubik, P. et al (1962) Studies on the toxicity of petroleum waxes. *Toxicol Applied Pharmacol* 4, Suppl. 1, 1-62

TNO (2005a) Bacterial reverse mutation test with extract of Sasolwax 5203. Report No. V 6205/12. Study conducted for European Wax Federation. Zeist, The Netherlands: TNO

TNO (2005b) Chromosomal aberration test with Sasolwax 5203 in cultured Chinese hamster ovary (CHO) cells. Report No. V 6202/11. Study conducted for European Wax Federation. Zeist, The Netherlands: TNO

TNO (2005c) Gene mutation test at the TK-locus of L5178Y cells with Sasolwax 5203. Report No. V 6203/08. Study conducted for European Wax Federation. Zeist, The Netherlands: TNO

WIL Research Laboratories (1995) An oral reproduction/developmental toxicity screening study of OLOA 219 in finished oils in rats. Study conducted for Chevron Research and Technology Company. Study No. WIL-187007. Ashland OH: WIL Research Laboratories Inc.

Worrell, N.R. (1992) A 90-day feeding study in the rat with six different mineral oils (N15(H), N70(H), N70(A), P15(H), N10(A) and P100(H)), three different mineral waxes (a low melting point wax, a high melting point wax and a high sulphur wax) and coconut oil. BIBRA Report No. 1010/3/92. Study conducted for CONCAWE. Surrey UK: BIBRA Toxicology International

6.20. FOOTSOILS (Footsoil)

Definition / Domain: The domain of this category is established by the refining processes by which the category members are produced, the predominant hydrocarbon classes present and the carbon number range as follows:

- Derived from crude petroleum which is refined by atmospheric and vacuum distillation
- Refinery processes
 - acid treatment (sulphuric or silicic acid)
 - clay treatment
 - de-oiling of slack waxes
 - activated carbon
- Hydrocarbon types: aromatics, paraffins, naphthenics
- Typical carbon number range: predominantly C₂₀ to C₅₀

Appendix 1 lists only those Footsoil substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - Footsoil substances are liquids.

Flammable Aerosol: Not relevant - Footsoil substances are not in aerosol form.

Flammable Liquid: Footsoil substances typically have flash points >98°C (read-across to LBO substances).

Flammable Solid: Not relevant - Footsoil substances are liquids.

Oxidising Gas: Not relevant - Footsoil substances are liquids.

Oxidising Liquid: Footsoil substances are not considered oxidising based on structural considerations.

Oxidising Solid: Not relevant - Footsoil substances are liquids.

Pyrophoric Liquid: Footsoil substances do not spontaneously ignite in contact with air.

Pyrophoric Solid: Not relevant - Footsoil substances are liquids.

Self-reactive Substance: Footsoil substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: Footsoil substances do not react exothermically.

Gas under Pressure: Not relevant - Footsoil substances are liquids.

Organic Peroxide: Footsoil substances do not meet the definition of a peroxide.

Corrosive to Metal: Footsoil substances are liquids and do not meet the criteria for corrosion of metal.

Substance, which in contact with water emits flammable gas: Footsoil substances do not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of Footsoil substances have been tested in acute oral, dermal and inhalation studies. Results indicate the following:

| | |
|----------------|--|
| Rat oral | LD ₅₀ > 5000 mg/kg bw (API, 1986a; UBTL, 1983a) |
| Rat inhalation | LC ₅₀ > 5.53 mg/l (EBSI, 1988) |
| Rabbit dermal | LD ₅₀ > 2000 mg/kg bw (API, 1986a) |

Skin Corrosion / Irritation: Samples of Footsoil substances have been tested in rabbit skin irritation studies. The majority of the data were derived using a 24 hour occluded exposure protocol. The read-across study performed on “insufficiently refined” LBO substances showed moderate irritation. The study was performed for 24 hours rather than 4 hours and consequently the result from a shorter exposure time is not likely to cause irritation. In read-across studies on “sufficiently refined” LBO substances no irritation was observed. There was no evidence of skin corrosion (API, 1986a; API, 1982a).

Serious Eye Damage / Irritation: The effects of samples of Footsoil substances on the eye have been investigated in rabbits using a number of samples. All of the samples tested were non-irritating to the eyes (API, 1986a; API, 1982a).

Respiratory or Skin Sensitization: Tests in guinea pig with samples of Footsoil substances showed no evidence of skin sensitization (API, 1986a). There are no reports available to indicate a potential to cause respiratory sensitization.

Germ Cell Mutagenicity: Data were read-across from LBO substances. The mutagenic potential has been extensively studied in a range of *in vivo* and *in vitro* assays. The majority of the studies showed no evidence of mutagenic activity (Blackburn et al, 1984; Blackburn et al, 1986; Deitch et al, 1984; API, 1986d; API, 1986c; ARCO, 1987; Przygoda RT et al, 1999; McKee, RH, et al, 1990). Based on the available data, Footsoil substances are not considered to be germ cell mutagens.

Carcinogenicity: The carcinogenic potential of samples of Footsoil substances has been investigated in animals following dermal exposure. Based on these findings, Footsoil substances similar to “insufficiently refined” LBO substances are carcinogenic while those that are similar to “sufficiently refined” LBO substances are not carcinogenic (Doak, S.M.A., et al, 1983; Chasey & McKee, 1993).

Reproductive Toxicity: There are no reproductive toxicity data available for Footsoil substances. Data were derived from LBO substances. Results of developmental and reproductive toxicity studies on “sufficiently refined” LBO substances did not show any evidence of developmental or reproductive toxicity in rats (WIL Research Laboratories, 1995; Mobil, 1987). There are no developmental toxicity data for “insufficiently refined” LBO substances, but their hazards are assumed to be similar to those of UDAE substances. In a read-across developmental study from UDAE substances, heavy paraffinic distillate furfural extract produced maternal, reproductive, and foetal toxicity in rats (Mobil, 1989). For the carcinogenic Footsoil substances, there are no data on fertility but based on evidence from repeated dose toxicity studies, no effects on reproductive organs are expected.

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies with samples of Footsoil substances show no evidence of systemic toxicity (API, 1982; API, 1986b; API, 1987b).

Repeated Exposure: The repeat dose toxicity of samples of Footsoil substances has been investigated by dermal and inhalation routes for periods between 4 weeks and up to 2 years by read-across to LBO substances. For “insufficiently refined” LBO substances, read-across subchronic studies performed on UDAE substances resulted in specific target organ toxicity in the following tissues: adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus (Mobil, 1990; Chasey & McKee, 1993; API, 1986a). For “sufficiently refined” LBO substances, repeat dose inhalation and dermal studies showed no systemic effects (Dalbey, et al., 1991; Mobil, 1983; EBSI, 1991).

Aspiration: Samples of Footsoil substances span a range of viscosities with values reported as $>2 \text{ mm}^2/\text{s}$ at 40°C .

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: All acute aquatic toxicity studies with fish, invertebrates and algae on samples of Footsoil substances (reading across from LBO substances) show acute toxicity values greater than 100 mg/l. These tests were carried out on water accommodated fractions (EBSI 1995; Petro Canada 2008; Shell 1988). Supporting acute toxicity QSAR predictions for fish, invertebrates and algae show toxicity above 1000 mg/l (Redman, 2010).

Chronic (long-term) Aquatic Hazard: Chronic aquatic toxicity studies on a Footsoil substance show chronic toxicity values greater than 1 mg/l for invertebrates. These tests were carried out on water accommodated fractions (EMBSI, 2012).

Environmental fate (biodegradation / bioaccumulation): Footsoil substances are hydrocarbon UVCBs. Based on compositional information available and measured or predicted data, key constituents are not expected to meet the criteria for ready degradability but are inherently biodegradable. Constituents of Footsoil substances show predicted values for $\log K_{ow}$ ranging from 2 to greater than 6 and are therefore considered potentially bioaccumulative (HydroQual 2010).

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the ‘worst-case’ C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers). Appendix 6 lists all alternative C&L recommendations (C&L permutations) including OIN and/or CLP Notes, where applicable.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|--|
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, liver, lymph nodes, kidney, stomach, thymus | H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard


Hazard statements:

H304: May be fatal if swallowed and enters airways.

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure.

Precautionary statements:

P201: Obtain special instructions before use.

 P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

 P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

 P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

 P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Additional labelling requirements:

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

REFERENCES

API (1982) Acute toxicity tests of API 78-10 Paraffinic oil, nominal viscosity 150 SUS/100°F (CAS. 64742-56-0). Study conducted by Elars Bioresearch Laboratories Inc. API Med. Res. Publ. 29-33105. Washington DC: American Petroleum Institute

API (1986a) Acute oral toxicity study in rats. Acute dermal toxicity study in rabbits. Primary dermal irritation study in rabbits. Primary eye irritation study in rabbits. Dermal sensitization study in guinea pigs. API 83-12 hydrotreated light naphthenic distillate (CAS 64742-53-6). Study conducted by Hazleton Laboratories America Inc. API Med. Res. Publ. 33-30592. Washington DC: American Petroleum Institute

API (1986b) 28-day dermal toxicity study in the rabbit of API 83-12.Hydrotreated light naphthenic distillate (CAS 64742-53-6). Study conducted by Tegeris Laboratories Inc. API Med. Res. Publ. 33-30499. Washington DC: American Petroleum Institute

API (1986c) Mutagenicity of API 83-15, heavy naphthenic distillate (CAS 64742-52-5), in a mouse lymphoma mutation assay. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 33-32800. Washington DC: American Petroleum Institute

API (1986d) Mutagenicity of API 83-12, hydrotreated light naphthenic distillate (CAS 64742-53-6), in a mouse lymphoma mutation assay. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 33-32802. Washington DC: American Petroleum Institute

API (1987) Acute inhalation toxicity evaluation of a petroleum derived hydrocarbon in rats. API 83-12 hydrotreated light naphthenic distillate. Study conducted by Hazleton Laboratories America Inc. API Health Environ. Sci. Dep. Rep. 34-32775. Washington DC: American Petroleum Institute

ARCO (1987) Evaluation of chromosome aberrations in Chinese hamster ovary (CHO) cells. Study conducted by Microbiological Associates Inc. ARCO Study No. ATX-85-0059. Los Angeles CA: ARCO

BioResearch Laboratories, Ltd. (1984a). Acute inhalation toxicity study in rats. Study conducted by Bio-Research Laboratories Ltd. Report No. 81673.

Blackburn, G.R. et al (1984) Estimation of the dermal carcinogenic activity of petroleum fractions using a modified Ames assay. *Cell Biology and Toxicology* 1, 1, 67-80

Blackburn, G.R. et al (1986) Predicting carcinogenicity of petroleum distillation fractions using a modified *Salmonella* mutagenicity assay. *Cell Biology and Toxicology* 2, 1, 63-84

Chasey, K.L. and McKee, R.H. (1993) Evaluation of the dermal carcinogenicity of lubricant base oils by the mouse skin painting bioassay and other proposed methods. *J Appl Toxicol* 13, 1, 57-65

Dalbey, W. et al (1991) Four-week inhalation exposures of rats to aerosols of three lubricant base oils. *J Appl Toxicol* 11, 4, 297-302

Doak, S.M.A. et al (1983) The carcinogenic potential of twelve refined mineral oils following long-term topical application. *Br J Cancer* 48, 429-436

EBSI (1988) Four hour acute inhalation toxicity study in rats. MRD-87-102. EBSI Study No. 210215. East Millstone NJ: Exxon Biomedical Sciences Inc.

EBSI (1995) Fish, acute toxicity test. MRD-94-981 basestock solvent neutral 600. Report prepared for Exxon Company International. EBSI Study No. 198140. East Millstone NJ: Exxon Biomedical Sciences Inc.

EMBSI (2012) *Daphnia magna*, reproduction test. MRD-08-383 foots oil #1. Study performed for CONCAWE. EMBSI Study No. 0834746. Annandale NJ: ExxonMobil Biomedical Sciences Inc.

Girling, A.E. (1995) Lubricant base oil LVIN 38: chronic toxicity of water-accommodated fractions to *Daphnia magna*. Report No. SBGR.94.099. Sittingbourne: Shell Research Ltd

HydroQual (2010) PETRORISK Model. Prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

McKee, R.H. et al (1990) An evaluation of the genotoxic potential of mineral hydrocarbons. *Environ Molecular Mutagen* 15, Suppl. 17, 41

Mobil (1983) Thirteen-week toxicity study by dermal application of metalworking fluid components to rats. Mobil Environ. and Health Sci. Lab. Study No. 1451-81. Princeton NJ: Mobil Oil Corporation

Mobil (1987) 100 SUS solvent refined base oil developmental toxicity screen in rats. Mobil Environ. and Health Sci. Lab. Study No. 51841. Princeton NJ: Mobil Oil Corporation

Mobil (1989) Developmental toxicity study in rats exposed dermally to 318 isthmus furfural extract. Mobil Environ. and Health Sci. Lab. Study No. 62884. Princeton NJ: Mobil Oil Corporation

Mobil (1990) Thirteen-week administration of 318 isthmus furfural extract to rats. Mobil Environ. and Health Sci. Lab. Study No. 61737. Princeton NJ: Mobil Oil Corporation

Petro-Canada (2008) 72-hour growth inhibition toxicity test report. *Pseudokirchneriella subcapitata*. Study performed by AquaTox Testing & Consulting Inc. Study No. 213706. Mississauga ON: Petro-Canada Research & Development

Przygoda, R.T. et al (1999) Assessment of the utility of the micronucleus test for petroleum-derived materials. *Mutation Research* 438, 145-153

WIL Research Laboratories (1995) An oral reproduction/developmental toxicity screening study of OLOA 219 in finished oils in rats. Study conducted for Chevron Research and Technology Company. Study No. WIL-187007. Ashland OH: WIL Research Laboratories Inc.

6.21. PETROLATUMS (Petrolatum)

Definition / Domain: The domain of this category is established by the process by which the category members are produced, the predominant hydrocarbon classes present, the melting point range and the carbon number range as follows:

- Derived from vacuum distilled fractions and separated as a solid by chilling.
- Refinery processes
 - atmospheric distillation
 - vacuum distillation
 - hydrotreatment / hydrodesulphurisation
 - solvent extraction
 - chilling

Note: some category members are subject to further intermediate processing such as de-oiling or treatment with acid, clay, active carbon or hydrogenation but without changing their hydrocarbon composition significantly.

- Hydrocarbon types: the major components of all paraffin and hydrocarbon waxes are branched and straight chain paraffins and naphthenes (cycloparaffins), which normally account for at least 85% by volume of a wax process stream. Aromatic hydrocarbons, mainly alkylbenzenes and alkylnaphthalenes will not normally exceed 15% by volume of paraffin and hydrocarbon wax streams. The boiling point range of paraffin and hydrocarbon waxes is such that components of specific toxicological concern such as benzene (boiling point 80 °C) and n-hexane (boiling point 69 °C) are typically not present. The boiling points of the hazardous, 3 to 7 fused-ring polycyclic aromatic hydrocarbons (PAHs) are in the boiling range of the paraffin and hydrocarbon waxes, but they are removed by solvent extraction before chilling and wax separation.
- Typical melting point range: predominantly 43 °C to 95 °C
- Typical boiling point range: predominantly 300 °C to 800 °C
- Typical carbon number range: predominantly C₁₂ to C₈₅

Appendix 1 lists only those Petrolatum substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - Petrolatum substances are solids.

Flammable Aerosol: Not relevant - Petrolatum substances are solids.

Flammable Liquid: Not relevant - Petrolatum substances are solids.

Flammable Solid: Petrolatum substances typically have flash points > 160 °C.

Oxidising Gas: Not relevant - Petrolatum substances are solids.

Oxidising Liquid: Not relevant - Petrolatum substances are solids.

Oxidising Solid: Not considered oxidising based on structural considerations.

Pyrophoric Liquid: Not relevant - Petrolatum substances are solids.

Pyrophoric Solid: Petrolatum substances do not spontaneously ignite in contact with air.

Self-reactive Substance: Petrolatum substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: Petrolatum substances do not react exothermically.

Gas under Pressure: Not relevant - Petrolatum substances are solids.

Organic Peroxide: Petrolatum substances do not meet the definition of a peroxide.

Corrosive to Metal: Petrolatum substances do not meet the criteria the requirement for corrosion of metal.

Substance, which in contact with water emits flammable gas: Petrolatum substances do not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of Petrolatum substances have been tested in acute oral and dermal studies. Results indicate the following:

| | |
|---------------|---|
| Rat oral | LD ₅₀ >5000 mg/kg _{bw} (API, 1982; API, 1986b) |
| Rabbit dermal | LD ₅₀ >2000 mg/kg _{bw} (BIBRA, 1993b; API, 1986b) |

Skin Corrosion / Irritation: Samples of Petrolatum substances were evaluated in rabbit skin irritation studies. Results indicate that the material is not considered irritating to skin. There was no evidence of skin corrosion (API, 1986b; NOTOX, 2003).

Serious Eye Damage / Irritation: Samples of Petrolatum substances were evaluated in rabbit eye irritation studies. Results indicate that the material is not considered irritating to eye (API, 1986b; SafePharm Laboratories, 2007).

Respiratory or Skin Sensitization: No studies were located for respiratory sensitization. Samples of Petrolatum substances were evaluated for skin sensitization in the guinea pig and were shown to be non-sensitizing (API, 1986b; Kuhn, JO, 1995).

Germ Cell Mutagenicity: The mutagenicity for Petrolatum substances was assessed. *In vitro* assays gave mixed results depending on the degree of refining. *In vivo* assays were negative in the mouse micronucleus assay (Blackburn, GR et al, 1984; Blackburn GR et al, 1986; TNO, 2005a; API, 1986c; TNO, 2005b; ARCO, 1987; TNO, 2005c; Mobil, 1987b; McKee RH, 1990). Based on the available data, Petrolatum substances are not considered to be a germ cell mutagen.

Carcinogenicity: The carcinogenic potential of Petrolatum substances is determined by the feedstock from which the Petrolatum substance is derived. Based on the available data, Petrolatum substances from insufficiently refined feedstock are carcinogenic, while material from sufficiently refined feedstocks are not carcinogenic (Kane ML, 1984; Lijinsky W et al, 1966; Oser BL et al, 1965).

Reproductive Toxicity: The reproductive toxicity potential of Petrolatum substances is determined by the feedstock from which the Petrolatum substance is derived. For Petrolatum substances from sufficiently refined feed-stock, read-across studies indicated no reproductive toxicity (WIL Research Laboratories, 1995; Mobil, 1987a). For Petrolatum substances derived from insufficiently refined feedstock a read-across study indicates developmental effects are likely (Mobil, 1989).

Specific Target Organ Toxicity

Single Exposure: Acute exposure studies do not indicate any specific organ toxicity following single exposure to Petrolatum substances (API, 1982; API, 1986b; BIBRA, 1993b).

Repeated Exposure: The repeat dose toxicity of insufficiently refined Petrolatum substances was assessed by read-across to similar substances. Results indicate that oral and dermal exposure could result in target organ toxicity (adrenals, bone marrow, blood, liver, lymph nodes, kidney, stomach and thymus) (Mobil, 1990; Mobil, 1989; API, 1986a; Chasey KL & McKee RH, 1993). For sufficiently refined Petrolatum substances, dermal and oral repeat dose read-across studies indicate no biologically significant target organ toxicity (Worrell, NR, 1992; BIBRA, 1993a; Oser BL et al, 1965; Mobil, 1983; API, 1987; EBSI, 1991).

Aspiration: Petrolatum substances span a range of viscosities with values reported as 3 to 30 mm²/s at 100 °C.

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: All acute aquatic toxicity studies with fish, invertebrates and algae for Petrolatum substances (reading across from LBO substances) show acute toxicity values greater than 100 mg/l. These tests were carried out on water accommodated fractions (EBSI, 1995; Petro-Canada, 2008; Croucher, EA and Girling, AE, 1988). Supporting acute toxicity QSAR predictions for fish, invertebrates and algae show toxicity above 1000 mg/l (Redman, 2010).

Chronic (long-term) Aquatic Hazard: Chronic aquatic toxicity studies on samples of Petrolatum substances (reading across from LBO substances) show a lowest chronic toxicity value of 3 mg/l for invertebrates. These tests were carried out on water accommodated fractions (Girling, AE, 1995). A supporting QSAR prediction for chronic fish toxicity is greater than 1000 mg/l (Redman, 2010).

Environmental fate (biodegradation / bioaccumulation): Petrolatum substances are hydrocarbon UVCBs. Based on compositional information available and measured or predicted data, key constituents are not expected to meet the criteria for ready degradability but are inherently biodegradable. Constituents of Petrolatum substances show predicted values for log K_{ow} ranging from 2 to greater than 6 and are considered potentially bioaccumulative (HydroQual, 2010).

Part 2 - Summary of Classification and Labelling Recommendations

The information below represents the ‘worst-case’ C&L recommendation and must be used in the absence of information on certain relevant substance characteristics (C&L drivers). Appendix 6 lists all alternative C&L recommendations (C&L permutations) including OIN and/or CLP Notes, where applicable.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|---|
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child Route of exposure: Dermal | H361d: Suspected of damaging the unborn child by dermal route. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, blood, liver, lymph nodes, kidney, stomach, thymus Route of exposure: Oral and dermal | H372: Causes damage to adrenals, bone marrow, blood, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by oral and dermal routes. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard



Hazard statements:

H350: May cause cancer.

H361d: Suspected of damaging the unborn child by dermal route.

H372: Causes damage to adrenals, bone marrow, blood, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by oral and dermal routes.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Additional labelling requirements:

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements**Prevention:**

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

REFERENCES

API (1982) Acute toxicity tests of API 78-9 paraffinic oil, nominal viscosity 70 SUS/100°F (CAS 64742-56-9). Study conducted by Elars Bioresearch Laboratories Inc. API Med. Res. Publ. 29-33104. Washington DC: American Petroleum Institute

API (1986a) 28-day dermal toxicity study in the rabbit of API 84-01. Light paraffinic distillate (CAS 64741-50-0). Study conducted by Tegeris Laboratories Inc. API Med. Res. Publ. 33-31642. Washington DC: American Petroleum Institute

API (1986b) Acute oral toxicity study in rats. Acute dermal toxicity study in rabbits. Primary dermal irritation study in rabbits. Primary eye irritation study in rabbits. Dermal sensitization study in guinea pigs. API 84-01 light paraffinic distillate (CAS 64741-50-0). Study conducted by Hazleton Laboratories America Inc. API Med. Res. Publ. 33-30595. Washington DC: American Petroleum Institute

API (1986c) Mutagenicity of API 84-01, light paraffinic distillate (CAS 64741-50-0), in a mouse lymphoma mutation assay. Study conducted by Litton Bionetics Inc. API Med. Res. Publ. 33-32801. Washington DC: American Petroleum Institute

API (1987) 28-day dermal toxicity study of API 83-15, hydrotreated heavy naphthenic distillate (CAS 64742-52-5), in the rabbit. Study conducted by Tegeris Laboratories Inc. API Health Environ. Sci. Dep. Rep. 35-32430. Washington DC: American Petroleum Institute

ARCO (1987) Evaluation of chromosome aberrations in Chinese hamster ovary (CHO) cells. Study conducted by Microbiological Associates Inc. ARCO Study No. ATX-85-0059. Los Angeles CA: ARCO

BIBRA (1993a) A 90-day feeding study in the rat with two mineral waxes identified as paraffin wax 64 (OFH-064) and micro/paraffin wax mixture. Study conducted for European Wax Federation. BIBRA Report No. 1205/2/93. Surrey UK: BIBRA Toxicology International

BIBRA (1993b) An acute dermal toxicity limit test in the rat with SX30. Study conducted for Shell International Petroleum Mij. B.V. BIBRA Report No. 1091/2. Surrey UK: BIBRA Toxicology International

Blackburn, G.R. et al (1984) Estimation of the dermal carcinogenic activity of petroleum fractions using a modified Ames assay. *Cell Biology and Toxicology* 1, 1, 67-80

Blackburn, G.R. et al (1986) Predicting carcinogenicity of petroleum distillation fractions using a modified *Salmonella* mutagenicity assay. *Cell Biology and Toxicology* 2, 1, 63-84

Chasey, K.L. and McKee, R.H. (1993) Evaluation of the dermal carcinogenicity of lubricant base oils by the mouse skin painting bioassay and other proposed methods. *J Appl Toxicol* 13, 1, 57-65

Croucher, E.A. and Girling, A.E. (1988) Oils: acute toxicity of four oils to *Daphnia magna* and *Gammarus pulex*. Report No. SBGR.88.075. Sittingbourne: Shell Research Ltd

EBSI (1991) Dermal carcinogenesis assay in C₃H/HeNCrIBR mice. Report prepared for Exxon Company USA. EBSI Study No. 201111. East Millstone NJ: Exxon Biomedical Sciences Inc.

EBSI (1995) Fish, acute toxicity test. MRD-94-981 basestock solvent neutral 600. Report prepared for Exxon Company International. EBSI Study No. 198140. East Millstone NJ: Exxon Biomedical Sciences Inc.

Girling, A.E. (1995) Lubricant base oil LVIN 38: chronic toxicity of water-accommodated fractions to *Daphnia magna*. Report No. SBGR.94.099. Sittingbourne: Shell Research Ltd

HydroQual (2010) PETRORISK Model. Prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

Kane, M.L. et al (1984) Toxicological characteristics of refinery streams used to manufacture lubricating oils. *Am J Ind Med* 5, 3, 183-200

Kuhn, J.O. (1995) Dermal sensitization study in guinea pigs. 4531 pet blend white USP. Study conducted for Penzoil Products Company. Study No. 1588-94. Sugar Land TX: STILLMEADOW Inc.

Lijinsky, W. et al (1966) Skin tumorigenesis by an extract of amber petrolatum. *Toxicol Applied Pharmacol* 8, 1, 113-117

McKee, R.H. et al (1990) An evaluation of the genotoxic potential of mineral hydrocarbons. *Environ Molecular Mutagen* 15, Suppl. 17, 41

Mobil (1983) Thirteen-week toxicity study by dermal application of metalworking fluid components to rats. Mobil Environ. and Health Sci. Lab. Study No. 1451-81. Princeton NJ: Mobil Oil Corporation

Mobil (1987a) 100 SUS solvent refined base oil developmental toxicity screen in rats. Mobil Environ. and Health Sci. Lab. Study No. 51841. Princeton NJ: Mobil Oil Corporation

Mobil (1987b) Micronucleus assay of bone marrow red blood cells from rats treated for thirteen weeks with 318 isthmus furfural extract. Mobil Environ. and Health Sci. Lab. Study No. 61738. Princeton NJ: Mobil Oil Corporation

Mobil (1989) Developmental toxicity study in rats exposed dermally to 318 isthmus furfural extract. Mobil Environ. and Health Sci. Lab. Study No. 62884. Princeton NJ: Mobil Oil Corporation

Mobil (1990) Thirteen-week administration of 318 isthmus furfural extract to rats. Mobil Environ. and Health Sci. Lab. Study No. 61737. Princeton NJ: Mobil Oil Corporation

NOTOX (2003) Primary skin irritation/corrosion study with SX-50 (Sarawax 50) in the rabbit (4-hour semi-occlusive application). Report No. 393648. The Netherlands: NOTOX

Oser, B.L. et al (1965) Toxicologic studies of petrolatum in mice and rats. *Toxicol Applied Pharmacol* 7, 382-401

Petro-Canada (2008) 72-hour growth inhibition toxicity test report. *Pseudokirchneriella subcapitata*. Study performed by AquaTox Testing & Consulting Inc. Study No. 213706. Mississauga ON: Petro-Canada Research & Development

Redman, A. and Yadav, B. (2010) Aquatic toxicity predictions using the PETROTOX model for petroleum substance categories. Report prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

SafePharm Laboratories (2007) Paraffin waxes (Fischer-Tropsch), full range, C15-50 - branched and linear. Acute eye irritation in the rabbit. Report No. 2041/0055. Study conducted for Shell International Gas Ltd. Derbyshire UK: SafePharm Laboratories Ltd

TNO (2005a) Bacterial reverse mutation test with extract of Sasolwax 5203. Report No. V 6205/12. Study conducted for European Wax Federation. Zeist The Netherlands: TNO

TNO (2005b) Chromosomal aberration test with Sasolwax 5203 in cultured Chinese hamster ovary (CHO) cells. Report No. V 6202/11. Study conducted for European Wax Federation. Zeist The Netherlands: TNO

TNO (2005c) Gene mutation test at the TK-locus of L5178Y cells with Sasolwax 5203. Report No. V 6203/08. Study conducted for European Wax Federation. Zeist The Netherlands: TNO

WIL Research Laboratories (1995) An oral reproduction/developmental toxicity screening study of OLOA 219 in finished oils in rats. Study conducted for Chevron Research and Technology Company. Study No. WIL-187007. Ashland OH: WIL Research Laboratories Inc.

Worrell, N.R. (1992) A 90-day feeding study in the rat with six different mineral oils (N15(H), N70(H), N70(A), P15(H), N10(A) and P100(H)), three different mineral waxes (a low melting point wax, a high melting point wax and a high sulphur wax) and coconut oil. BIBRA Report No. 1010/3/92. Study conducted for CONCAWE. Surrey UK: BIBRA Toxicology International

6.22. BITUMENS (Bitumen)

Definition / Domain: The domain of this category is established by the process by which the category members are produced, the predominant hydrocarbon classes present, the melting point range and the carbon number range as follows:

- Derived from crude petroleum.
- Refinery processes
 - atmospheric distillation
 - vacuum distillation
 - solvent deasphalting
 - thermal cracking
- Hydrocarbon types: predominantly asphaltenes (MW 2,000 to 5,000) and maltenes (MW 500 to 2,000) with small amounts of lower weight materials, including polycyclic aromatic hydrocarbons (PAHs).
- Typical boiling point range greater than 320 °C to more than 500 °C
- Typical carbon number range: predominantly greater than C₂₅ but with the bulk of the material having carbon numbers greater than C₅₀ and up to C₈₀

Appendix 1 lists only those Bitumen substances with active registrations at the time of issuing this report.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - Bitumen substances are solids.

Flammable Aerosol: Not relevant - Bitumen substances are not in aerosol form.

Flammable Liquid: Bitumen substances are high molecular weight hydrocarbon solids.

Flammable Solid: Bitumen substances have flash points are greater than 180 °C.

Oxidising Gas: Not relevant - Bitumen substances are solids.

Oxidising Liquid: Not relevant - Bitumen substances are solids. They are not considered oxidising based on structural considerations.

Oxidising Solid: Bitumen substances are solids. They are not considered oxidising based on structural considerations.

Pyrophoric Liquid: Not relevant - Bitumen substances are solids. They do not spontaneously ignite in contact with air.

Pyrophoric Solid: Bitumen substances do not spontaneously ignite in contact with air.

Self-reactive Substance: Bitumen substances are not self-reactive. They do not undergo exothermic decomposition when heated.

Self-heating Substance: Bitumen substances do not react exothermically.

Gas under Pressure: Not relevant - Bitumen substances are solids.

Organic Peroxide: Bitumen substances do not meet the definition of a peroxide.

Corrosive to Metal: Bitumen substances do not meet the criteria for corrosion of metal.

Substance which in contact with water emits flammable gas: Bitumen substances do not react with water.

1.2 Health Hazards

Read across from bitumen substances to oxidized asphalt, is justified based on the weight of evidence from all available studies and the fact that the oxidation process increases the molecular weight and is not expected to change the toxicity of the material.

Acute Toxicity: Samples of Bitumen substances have been tested in acute oral and dermal studies. Results show the following:

| | |
|---------------|--|
| Rat oral | LD ₅₀ > 5000 mg/kg _{bw} (API 1982a, API 1982b) |
| Rabbit dermal | LD ₅₀ > 2000 mg/kg _{bw} (API 1982a, API 1982b) |

Fumes from OxiAsph (aerosol and vapour) have been tested in an acute inhalation study and the 4.5hr LC₅₀ (rat) was > 94.4 mg/m³ (Fraunhofer Institute of Technology and Aerosol Research 2000). No acute inhalation toxicity data are available for straight-run bitumen but a study has been performed on a sample of oxidized (air-rectified) asphalt, which is used for read across. For all of these endpoints bitumen is not acutely toxic. Read across of oxidized asphalt to straight run bitumen is considered valid since mild oxidation is not expected to change the composition or acute toxicity of the material. Additionally repeated dose toxicity studies on bitumen and oxidized asphalt support that bitumens are not acutely hazardous. Therefore bitumens are not classified as acutely toxic under CLP(EC 1272/2008) criteria.

Skin Corrosion / Irritation: Samples of Bitumen substances have been tested in rabbit skin irritation studies, performed under occlusion and during 24 hours, rather than 4 hour semi-occluded exposure recommended by current OECD guidelines. Only minimal, transient irritation was seen (API 1982a; API 1982b). Mean erythema and oedema scores over the 72 hour period were low. Consequently, the result from a shorter exposure time will not meet the criteria for classification.

Serious Eye Damage / Irritation: The effects of Bitumen substances on the eye have been investigated in rabbits. None of the samples tested showed more than minimal redness and swelling, which resolved quickly (API 1982a; API 1982b).

Respiratory or Skin Sensitization: Tests in guinea pigs with samples of Bitumen substances showed no evidence of skin sensitization (API 1983a, API 1983b). There are no data available for respiratory sensitisation for bitumen.

Germ Cell Mutagenicity: The mutagenic potential of Bitumen substances and fume condensates from Bitumen substances has been extensively studied in a range of *in vivo* and *in vitro* assays. It is important to recognize that toxicity studies involving exposure to fume or fume condensates from bitumens represent only the volatile fraction of the whole material. Overall, there is no convincing evidence from studies in animals that exposure to fumes from bitumen causes mutagenic or clastogenic

effects. (Kriech 2007; De Meo, et al, 1996; Qian, H.W., et al, 1996; Bottin, M.C., et al., 2006; Micillino, J.C. et al, 2002;). The available data do not provide clear consistent evidence of genotoxic activity. Chronic inhalation studies with oxidized (air-rectified) asphalt, together with comparative fume composition information, indicate that read across to the bitumen category, is appropriate. Based on these in vivo animal studies, it clearly is shown that bitumen-induced DNA adducts are not necessarily linked to mutagenic effects. Consequently, bitumens are unlikely to be mutagenic and do not meet the criteria for classification and labelling under CLP Regulation, (EC)1272/2008.

Carcinogenicity: The carcinogenic potential of Bitumen substances and fumes from Bitumen substances has been investigated in animals following dermal and inhalation exposure. In addition epidemiological studies have been undertaken in exposed human populations. The data available do not indicate that exposure to Bitumen substances or fumes from Bitumen substances present a carcinogenic hazard under normal condition of use (Clark et al, 2011; Goyak et al, 2011; Fraunhofer, 2006; Hueper, WC & Payne, WW, 1960; Wallcave, L et al, 1971; Boffetta P et al, 2001,2009, Fuhst et al, 2006).

Reproductive Toxicity: There are no studies available on reproductive or developmental toxicity. Testing proposals for developmental and reproductive toxicity have been included in the registration dossiers submitted to ECHA.

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies show no evidence of systemic toxicity (API 1982a; API 1982b; Fraunhofer 2000).

Repeated Exposure: The repeat dose toxicity of Bitumen substances has been investigated by dermal and inhalation routes. Apart from mild irritation of the upper respiratory tract there is no evidence that exposure to Bitumen substances or fumes from Bitumen substances causes significant systemic toxicity (Fraunhofer 2001; API 1983c; API 1983d)

Aspiration: Not relevant as Bitumen substances are solid.

1.2 Environmental Hazards

Acute (short-term) Aquatic Hazard: There are no data available on the acute aquatic toxicity of Bitumen substances. Bitumen substances are not expected to exert chronic toxicity based on water solubility limitations. QSAR assessment, based on their hydrocarbon composition, indicates that they would be expected to give LL50 values > 1000 mg/l for fish, daphnia and algae (Redman, et al 2010).

Chronic (long-term) Aquatic Hazard: There are no chronic toxicity data available for Bitumen substances. QSAR assessment of chronic toxicity, based on hydrocarbon composition, indicates that they would be expected to give chronic NOEL values in fish and daphnia of > 1000 mg/l. (Redman, et al, 2010).

Environmental fate (biodegradation / bioaccumulation): Bitumen substances are hydrocarbon UVCBs. Based on compositional information available and measured or predicted data on key constituents, Bitumen substances are not expected to meet the criteria for ready degradability. Constituents of substances - which are expected to have similar environmental performance since the oxidation process is not changing the hazard - profile show predicted values for $\log K_{ow} \geq 4$ and are considered potentially bioaccumulative (HydroQual, 2010).

Part 2 - Summary of Classification and Labelling Recommendations

Classification and labelling according to CLP / GHS

Bitumen substances are not classified.

REFERENCES

- API (1982a) Acute toxicity studies of vacuum residuum. API 81-13. Study conducted by Hazleton Raltech Inc. API Med. Res. Publ. 30-31987. Washington DC: American Petroleum Institute
- API (1982b) Acute toxicity studies of vacuum residuum. API 81-14. Study conducted by Hazleton Raltech Inc. API Med. Res. Publ. 30-31989. Washington DC: American Petroleum Institute
- API (1983a) Dermal sensitization study in guinea pigs closed patch technique vacuum residuum. API 81-13. Study conducted by Hazleton Laboratories America Inc. API Med. Res. Publ. 31-31415. Washington DC: American Petroleum Institute
- API (1983b) Dermal sensitization study in guinea pigs closed patch technique vacuum residuum. API 81-14. Study conducted by Hazleton Laboratories America Inc. API Med. Res. Publ. 31-31416. Washington DC: American Petroleum Institute
- API (1983c) 28-day dermal toxicity study in the rabbit. API 81-13 vacuum residuum. Study conducted by Borriston Laboratories Inc. API Med. Res. Publ. 30-32852. Washington DC: American Petroleum Institute
- API (1983d) 28-day dermal toxicity study in the rabbit. API 81-14 vacuum residuum. Study conducted by Borriston Laboratories Inc. API Med. Res. Publ. 30-32853. Washington DC: American Petroleum Institute
- API (1984a) Mutagenicity evaluation studies in the rat bone marrow cytogenetic assay and in the mouse lymphoma forward mutation assay API 81-13 vacuum residuum. Study conducted by Litton Bionetics. API Med. Res. Publ. 31-30614. Washington DC: American Petroleum Institute
- API (1984b) Mutagenicity evaluation studies in the rat bone marrow cytogenetic assay and in the mouse lymphoma forward mutation assay API 81-14 vacuum residuum. API Med. Res. Publ. 31-30615. Washington DC: American Petroleum Institute
- Boffetta, P. et al (2001) IARC epidemiological study of cancer mortality among European asphalt workers. Internal Report 01/003. Lyon: International Agency for Research on Cancer
- Boffetta, P. et al (2009) A case-control study of lung cancer nested in a cohort of European asphalt workers. Lyon: International Agency for Research on Cancer
- Bottin, M.C. et al (2006) Genotoxic effects of bitumen fumes in Big Blue® transgenic rat lung. *Mutation Research* 596, 91-105
- Clark, C.R. et al (2011) Asphalt fume dermal carcinogenicity potential: I. dermal carcinogenicity evaluation of asphalt (bitumen) fume condensates. *Regul. Toxicol. Pharmacol* 61, 9-16
- De Meo, M. et al (1996) *In vitro* studies of the genotoxic effects of bitumen and coal-tar fume condensates: comparison of data obtained by mutagenicity testing and DNA adduct analysis by ³²P-postlabelling. *Chemico-Biological Interactions* 101, 73-88
- Fraunhofer (2000). 14-Day dose range finding inhalation study of bitumen fumes in Wistar (WU) rats. Report No. 02N00515. Hannover: Fraunhofer Institute of Toxicology and Aerosol Research

Fraunhofer (2000) Acute inhalation toxicity study of 100 mg/m bitumen fumes in Wistar (WU) rats. Report No. 02G00012. Hannover: Fraunhofer Institute of Toxicology and Aerosol Research

Fraunhofer (2001). 13 weeks inhalation toxicity study of bitumen fumes in Wistar (WU) rats. Report No. 02G01005. Hannover: Fraunhofer Institute of Toxicology and Aerosol Research

Fraunhofer (2006) Twenty-four month inhalation carcinogenicity study of bitumen fumes in Wistar (WU) - rats. Report No. 02G03003. Study conducted for ARBIT. Hannover: Fraunhofer Institute of Toxicology and Experimental Medicine

Fuhst et al. (2006) 24 months inhalation carcinogenicity study of bitumen fumes in Wistar (WU) rats. *J Occup Environ Hyg* 4 (S1), 20-43

Goyak, K. O. et al (2011) Paving asphalt products exhibit a lack of carcinogenic and mutagenic activity. *Int J Toxicol* 30, 5, 492-497

Hueper, W.C. and Payne, W.W. (1960) Carcinogenic studies on petroleum asphalt, cooling oil, and coal tar. *Archives of Pathology* 70, 372-384

HydroQual (2010) PETRORISK Model. Prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

Kriech, A.J. et al (2007) Generation of bitumen fumes using two fume generation protocols and comparison to worker industrial hygiene exposures. *J Occup and Environ Hyg.* 4, S1, 6-19

Micillino, J.C. et al (2002) Lack of genotoxicity of bitumen fumes in transgenic mouse lung. *Toxicology* 170, 11-20

Qian, H.W. et al (1996) Induction of micronuclei in cultured mammalian cells by fume condensates of roofing asphalt. *Am J Ind Med* 29, 554-559

Redman, A. and Yadav, B. (2010) Aquatic toxicity predictions using the PETROTOX model for petroleum substance categories. Report prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

Wallcave, L. et al (1971) Skin tumorigenesis in mice by petroleum asphalts and coal-tar pitches of known polynuclear aromatic hydrocarbon content. *Toxicol Applied Pharmacol* 18, 41-52

6.23. OXIDIZED ASPHALT (OxiAsph)

Definition / Domain: Oxidized asphalt is derived from crude petroleum. It is a complex black solid, obtained by blowing air through heated petroleum residues, or the raffinate from a deasphalting process with or without a catalyst. The process is principally one of oxidative condensation which increases the molecular weight.

- Derived from crude petroleum
- Refinery processes
 - atmospheric distillation
 - vacuum distillation
 - solvent deasphalting
 - thermal cracking
 - oxidation
- Hydrocarbon types: Predominantly asphaltenes (MW 2,000 to 5,000) and maltenes (MW 500 to 2,000) with small amounts of lower weight materials, including polycyclic aromatic hydrocarbons (PAHs).
- Typical boiling point range: Greater than 308 °C
- Typical carbon number range: Predominantly greater than C₂₅ but with the bulk of the material having carbon numbers greater than C₅₀ and up to C₈₀

As shown in **Appendix 1**, OxiAsph is defined by a single EC number (265-169-4).

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - OxiAsph is solid.

Flammable Aerosol: Not relevant - OxiAsph is not in aerosol form.

Flammable Liquid: OxiAsph is a high molecular weight hydrocarbon solid.

Flammable Solid: OxiAsph has flash point greater than 180 °C.

Oxidising Gas: Not relevant - OxiAsph is solid.

Oxidising Liquid: Not relevant - OxiAsph is solid. It is not considered oxidising based on structural considerations.

Oxidising Solid: OxiAsph is solid. It is not considered oxidising based on structural considerations.

Pyrophoric Liquid: Not relevant - OxiAsph is solid. It does not spontaneously ignite in contact with air.

Pyrophoric Solid: OxiAsph does not spontaneously ignite in contact with air.

Self-reactive Substance: OxiAsph is not self-reactive. It does not undergo exothermic decomposition when heated.

Self-heating Substance: OxiAsph does not react exothermically.

Gas under Pressure: Not relevant - OxiAsph is solid.

Organic Peroxide: OxiAsph does not meet the definition of a peroxide.

Corrosive to Metal: OxiAsph does not meet the criteria for corrosion of metal.

Substance which in contact with water emits flammable gas: OxiAsph does not react with water.

1.2 Health Hazards

Read across from bitumen substances to oxidized asphalt, is justified based on the weight of evidence from all available studies and the fact that the oxidation process increases the molecular weight and is not expected to change the toxicity of the material.

Acute Toxicity: Samples of Bitumen substances have been tested in acute oral and dermal studies. Results show the following:

| | |
|---------------|--|
| Rat oral | LD ₅₀ > 5000 mg/kg _{bw} (API 1982a, API 1982b) |
| Rabbit dermal | LD ₅₀ > 2000 mg/kg _{bw} (API 1982a, API 1982b) |

Fumes from OxiAsph (aerosol and vapour) have been tested in an acute inhalation study and the 4hr LC₅₀ (rat) was > 94.4 mg/m³ (Fraunhofer 2001). Read across toxicity studies have been conducted on straight-run asphalt to assess the acute oral and dermal hazard. Acute inhalation toxicity data are available for an oxidized (air-rectified) asphalt. For all these endpoints oxidized asphalt is non-toxic.

Skin Corrosion / Irritation: Samples of Bitumen substances have been tested in rabbit skin irritation studies. The data were derived using a 24 hour occluded exposure protocol. Only minimal, transient irritation was seen (API 1982a, API 1982b).

Serious Eye Damage / Irritation: The effects of Bitumen substances on the eye have been investigated in rabbits. None of the samples tested showed more than minimal redness and swelling, which resolved quickly (API 1982a, API 1982b).

Respiratory or Skin Sensitization: Tests in guinea pigs with samples of Bitumen substances showed no evidence of skin sensitization. There are no reports available to indicate that OxiAsph has the potential to cause respiratory sensitization (API 1984a, API 1984b).

Germ Cell Mutagenicity: The mutagenic potential of Bitumen substances and fume condensates from Bitumen substances has been extensively studied in a range of *in vivo* and *in vitro* assays. Overall, there is no evidence that exposure to Bitumen substances or fumes from Bitumen substances causes mutagenic effects (Kriech 2007; De Meo, et al, 1996; Qian, HW 1996; Bottin, MC, et al, 2006; Micillino, JC et al, 2002; Fraunhofer, 2009). Based on the available data, OxiAsph is not considered to be a germ cell mutagen.

Carcinogenicity: The carcinogenic potential of OxiAsph and fumes from OxiAsph has been investigated in animals following dermal and inhalation exposure. In addition epidemiological studies have been undertaken in exposed human populations. Based on the available information, OxiAsph is not considered to be a carcinogenic hazard and does not meet the criteria for classification as carcinogen (Clark 2011; Freeman 2011; Fraunhofer 2007; Niemeier et al., 1985; Sivak et al, 1989; Sivak et al, 1997; Boffetta P et al, 2009; Boffetta P et al, 2001).

Reproductive Toxicity: The potential effects on reproductive and developmental toxicity have been investigated in an OECD 422 screening study on fumes from OxiAsph. The data available do not indicate a concern for reproductive toxicity following exposure to fume from OxiAsph (Fraunhofer 2009). Testing proposals for developmental and reproductive toxicity have been included in the registration dossiers submitted to ECHA.

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies show no evidence of systemic toxicity. (API 1982a; API 1982b; Fraunhofer 2001).

Repeated Exposure: The repeat dose toxicity of OxiAsph has been investigated by dermal and inhalation routes. Apart from mild irritation of the upper respiratory tract there is no evidence to suggest that exposure to OxiAsph causes systemic toxicity (Fraunhofer 2006; API 1983a; API 1983b).

Aspiration: Not relevant as OxiAsph is solid.

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: There are no data available on the acute aquatic toxicity of OxiAsph. QSAR assessment, based hydrocarbon composition, indicates that it would be expected to give LL50 values > 1000 mg/l for fish, daphnia and algae (Redman, et al, 2010).

Chronic (long-term) Aquatic Hazard: There are no chronic toxicity data available for OxiAsph. OxiAsph is not expected to exert chronic toxicity based on water solubility limitations. QSAR assessment of chronic toxicity, based on hydrocarbon composition, indicates that it would be expected to give chronic NOEL values in fish and daphnia of > 1000 mg/l. (Redman, et al, 2010).

Environmental fate (biodegradation / bioaccumulation): OxiAsph is a hydrocarbon UVCB. Based on compositional information available and measured or predicted data on key constituents, OxiAsph is not expected to meet the criteria for ready degradability. Constituents of Bitumen substances - which are expected to have similar environmental performance since the oxidation process is not changing the hazard profile - show predicted values for $\log K_{ow} \geq 4$ and are considered potentially bioaccumulative (HydroQual, 2010).

Part 2 - Summary of Classification and Labelling Recommendations

Classification and labelling according to CLP / GHS

OxiAsph is not classified.

REFERENCES

- API (1982a) Acute toxicity studies of vacuum residuum. API 81-13. Study conducted by Hazleton Raltech Inc. API Med. Res. Publ. 30-31987. Washington DC: American Petroleum Institute
- API (1982b) Acute toxicity studies of vacuum residuum. API 81-14. Study conducted by Hazleton Raltech Inc. API Med. Res. Publ. 30-31989. Washington DC: American Petroleum Institute
- API (1983a) 28-day dermal toxicity study in the rabbit. API 81-13 vacuum residuum. Study conducted by Borrison Laboratories Inc. API Med. Res. Publ. 30-32852. Washington DC: American Petroleum Institute
- API (1983b) 28-day dermal toxicity study in the rabbit. API 81-14 vacuum residuum. Study conducted by Borrison Laboratories Inc. API Med. Res. Publ. 30-32853. Washington DC: American Petroleum Institute
- API (1984a) Dermal sensitization study in guinea pigs closed patch technique vacuum residuum. API 81-13. Study conducted by Hazleton Laboratories America Inc. API Med. Res. Publ. 31-31415. Washington DC: American Petroleum Institute
- API (1984b) Dermal sensitization study in guinea pigs closed patch technique vacuum residuum. API 81-14. Study conducted by Hazleton Laboratories America Inc. API Med. Res. Publ. 31-31416. Washington DC: American Petroleum Institute
- Boffetta, P. et al (2001) IARC epidemiological study of cancer mortality among European asphalt workers. Internal Report 01/003. Lyon: International Agency for Research on Cancer
- Boffetta, P. et al (2009) A case-control study of lung cancer nested in a cohort of European asphalt workers. Lyon: International Agency for Research on Cancer
- Bottin, M.C. et al (2006) Genotoxic effects of bitumen fumes in Big Blue® transgenic rat lung. *Mutation Research* 596, 91-105
- Clark, C.R. et al (2011) Asphalt fume dermal carcinogenicity potential: I. dermal carcinogenicity evaluation of asphalt (bitumen) fume condensates. *Regul. Toxicol. Pharmacol* 61, 9-16
- De Meo, M. et al (1996) *In vitro* studies of the genotoxic effects of bitumen and coal-tar fume condensates: comparison of data obtained by mutagenicity testing and DNA adduct analysis by ³²P-postlabelling. *Chemico-Biological Interactions* 101, 73-88
- Fraunhofer (2007) Twenty-four month inhalation carcinogenicity study of bitumen fumes in Wistar (WU) - rats. Report No. 02G03003. Study conducted for ARBIT. Hannover: Fraunhofer Institute of Toxicology and Experimental Medicine
- Fraunhofer (2009) Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test and mammalian erythrocyte micronucleus test via inhalation with roofing asphalt fume condensate. Report No. 02G08016. Study conducted for API. Hannover: Fraunhofer Institute of Toxicology and Experimental Medicine
- Freeman, J.J. et al (2011) Asphalt fume dermal carcinogenicity potential: II. Initiation-promotion assay of Type III built-up roofing asphalt. *Regul. Toxicol. Pharmacol.* 61, 1, 17-22 doi:10.1016/j.yrtph.2011.05.008

HydroQual (2010) PETRORISK Model. Prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

Kriech, A.J. et al (2007) Generation of bitumen fumes using two fume generation protocols and comparison to worker industrial hygiene exposures. *J Occup and Environ Hyg.* *4*, *S1*, 6-19

Micillino, J.C. et al (2002) Lack of genotoxicity of bitumen fumes in transgenic mouse lung. *Toxicology* *170*, 11-20

Niemeier, R.W. et al (1985) A comparison of the skin carcinogenicity of condensed roofing asphalt and coal tar pitch fumes. In: Proc.10th international symposium on polynuclear hydrocarbons, p. 609-647. Columbus OH: Battelle Press

Qian, H.W. et al (1996) Induction of micronuclei in cultured mammalian cells by fume condensates of roofing asphalt. *Am J Ind Med* *29*, 554-559

Redman, A. and Yadav, B. (2010) Aquatic toxicity predictions using the PETROTOX model for petroleum substance categories. Report prepared for CONCAWE. Mahwah NJ: HydroQual Inc.

Sivak, A. et al (1989) Assessment of the cocarcinogenic/promoting activity of asphalt fumes. Arthur D. Little Study No. 200-83-2612. Cincinnati OH: National Institute for Occupational Safety and Health

Sivak, A. et al (1997) Skin carcinogenicity of condensed asphalt roofing fumes and their fractions following dermal application to mice. *Cancer Letters* *117*, 113-123

6.24. PETROLEUM COKES (PetCoke)

Definition / Domain: Petroleum coke is a black solid produced through the thermal decomposition of heavy petroleum process streams and residues. The petroleum feedstock undergoes cracking and carbonisation to produce a product with a high carbon to hydrogen ratio, which may be granular, sponge or needle-like in appearance. Petroleum cokes can be described as either green or calcined coke.

Appendix 1 lists all PetCoke substances; they are exempt from REACH registration and not subject to CLP notification.

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - PetCoke substances are solid.

Flammable Aerosol: Not relevant - PetCoke substances are solid.

Flammable Liquid: Not relevant - PetCoke substances are solid.

Flammable Solid: PetCoke substances do not meet the criteria for flammability.

Oxidising Gas: Not relevant - PetCoke substances are solid.

Oxidising Liquid: Not relevant - PetCoke substances are solid.

Oxidising Solid: PetCoke substances are solid. They are not considered oxidising based on structural considerations.

Pyrophoric Liquid: Not relevant - PetCoke substances are solid.

Pyrophoric Solid: PetCoke substances are not pyrophoric.

Self-reactive Substance: PetCoke substances are not self-reactive.

Self-heating Substance: PetCoke substances do not react exothermically.

Gas under Pressure: Not relevant - PetCoke substances are solid.

Organic Peroxide: PetCoke substances do not meet the definition of a peroxide.

Corrosive to Metal: PetCoke substances do not meet the criteria for corrosion of metal.

Substance which in contact with water emits flammable gas: PetCoke substances do not react with water.

1.2 Health Hazards

Acute Toxicity: PetCoke substances have not been tested for acute oral, dermal or inhalation toxicity. The data from repeated dose studies in rats, mice and monkeys indicate that their acute toxicity is low (ARCO, 1999; API, 1982b).

Skin Corrosion / Irritation: PetCoke substances have not been tested in skin corrosion/irritation studies. However, their physical-chemical properties and observations made during dermal carcinogenicity studies in mice indicate that the dermal irritation potential of PetCoke substances is low (API, 1982b).

Serious Eye Damage / Irritation: PetCoke substances have not been tested in eye irritation studies. However, their physical-chemical properties and observations made during repeated exposure studies in rats and carcinogenicity studies in both rats and monkeys, indicate that the eye irritation potential of PetCoke substances is low (API, 1985).

Respiratory or Skin Sensitization: PetCoke substances have not been tested in animal sensitization studies. However, the physico-chemical properties of PetCoke substances and observations made during repeated exposure studies in rats and carcinogenicity studies in both rats and monkeys, did not indicate that any evidence of allergic reactions (ARCO, 1999; API, 1982b). There are no reports in the literature to indicate allergic reactions to humans. It is concluded that the respiratory and dermal sensitization potential of PetCoke substances is low.

Germ Cell Mutagenicity: The mutagenic potential of PetCoke substances has been studied in both *in vivo* and *in vitro* assays. Based on the available data, PetCoke substances are not considered to be germ cell mutagens (API, 1981a; API, 1981b).

Carcinogenicity: The carcinogenic potential of PetCoke substances has been investigated in animals following both dermal and inhalation exposures. In addition epidemiological studies have been undertaken in exposed human populations. Based on the available data, PetCoke substances are not considered carcinogenic (API, 1982a; API, 1985).

Reproductive Toxicity: The potential for PetCoke substances to induce reproductive toxicity has been examined in animal studies. Results from these studies indicate that exposure to PetCoke substances is unlikely to present a reproductive hazard (API, 2004).

Specific Target Organ Toxicity (STOT)

Single Exposure: There are no acute exposure studies available for PetCoke substances.

Repeated Exposure: The repeat dose toxicity of PetCoke substances has been investigated by dermal and inhalation routes. Apart from mild irritation of the upper respiratory tract the data do not indicate that exposure to PetCoke substances causes systemic toxicity (API, 1982a; API, 1985).

Aspiration: Not relevant as PetCoke substances are solid.

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: Samples of PetCoke substances have been tested for acute aquatic toxicity studies. Results show the following:

| | |
|---------------------------------|---------------------------|
| LC ₅₀ Fathead minnow | > 1,000 mg/l (API, 2007b) |
| EC ₅₀ Daphnia | > 1,000 mg/l (API, 2007a) |
| IC ₅₀ Algae | > 1,000 mg/l (API, 2006) |

Chronic (long-term) Aquatic Hazard: There are no chronic toxicity data available for PetCoke substances. The available short-term data and physical-chemical properties of PetCoke substances indicate that they are unlikely to pose a long-term hazard to the environment.

Environmental fate (biodegradation / bioaccumulation): PetCoke substances are amorphous solids composed mainly of elemental carbon. PetCoke substances are not expected to meet the criteria for ready degradability. The trace hydrocarbon components of PetCoke substances have values for log K_{ow} greater than 6. However, based on their physical-chemical properties (i.e. negligible solubility), PetCoke substances would not be expected to pose a long-term hazard to the environment.

Part 2 - Summary of Classification and Labelling Recommendations

PetCoke substances are not classified and not subject to CLP notification.

REFERENCES

API (1981a) *In vivo* and *in vitro* mutagenicity studies - delayed process coke. Petroleum coking sample 4-1-140. Study conducted by Hazleton Laboratories America Inc. API Med. Res. Publ. 28-30728. Washington DC: American Petroleum Institute

API (1981b) *In vivo* and *in vitro* mutagenicity studies - fluid process coke. Petroleum coking sample 6-1-468. Study conducted by Hazleton Laboratories America Inc. API Med. Res. Publ. 28-30726. Washington DC: American Petroleum Institute

API (1982a) Carcinogenic potential of petroleum coke and process products. Study conducted by Elars Bioresearch Laboratories Inc. API Med. Res. Publ. 30-31598. Washington DC: American Petroleum Institute

API (1982b) Carcinogenic potential of petroleum cokes and process products. 2. Bioassay. Study conducted by Elars Bioresearch Laboratories Inc. API Med. Res. Publ. 30-32011. Washington DC: American Petroleum Institute

API (1985) Chronic inhalation toxicity study of petroleum coke (delayed process) in rats and monkeys. Study conducted by International Research and Development Corporation. API Med. Res. Publ. 32-30234. Washington DC: American Petroleum Institute

API (2004) Petroleum coke: reproduction/developmental toxicity screening study in rats via nose-only inhalation exposures. Study conducted by Huntingdon Life Sciences. Study No. 03-4246. Washington DC: American Petroleum Institute

API (2006) Petroleum coke: a 96-hour toxicity test with the freshwater alga (*Selenastrum capricornutum*). Study conducted by Wildlife International Ltd. Report No. 472A-114. Washington DC: American Petroleum Institute

API (2007a) Petroleum coke: a 48-hour static-renewal acute immobilisation test with the cladoceran (*Daphnia magna*). Study conducted by Wildlife International Ltd. Report No. 472A-112. Washington DC: American Petroleum Institute

API (2007b) Petroleum coke: a 96-hour static-renewal acute toxicity test with the fathead minnow (*Pimephales promelas*). Study conducted by Wildlife International Ltd. Report No. 472A-113. Washington DC: American Petroleum Institute

ARCO (1999) Calcined coke (F-284) and green coke (F-285): fibrogenic screening study in the rat. Huntingdon Life Sciences Study No. 97-6119. Los Angeles CA: ARCO

6.25. SULFUR (Sulfur)

Definition / Domain: Most sulfur is produced in de-sulfurisation processes of oil refinery streams, natural gas, gas from coke manufacture, synthesis gas or biogas, where the sulfur is extracted in the form of hydrogen sulfide which is subsequently converted to elemental sulfur. These processes provide sulfur in the form of a mono-constituent substance, i.e. with a concentration of 80% weight/weight or more. Some of these processes, such as the Claus process, yield sulfur with purity in excess of 99%.

As shown in **Appendix 1**, Sulfur is defined by a single EC number (231-722-6).

Part 1 - Classification Endpoint Rationale / Data Summary

1.1 Physical Hazards

Explosive: Not considered explosive, based on structural and oxygen balance considerations.

Flammable Gas: Not relevant - Sulfur is a solid.

Flammable Aerosol: Not relevant - Sulfur is not in aerosol form.

Flammable Liquid: Not relevant - Sulfur is a solid.

Flammable Solid: Not relevant - as Sulfur is an inorganic substance.

Oxidising Gas: Not relevant - Sulfur is a solid.

Oxidising Liquid: Not relevant - Sulfur is a solid.

Oxidising Solid: Not relevant - Sulfur is an inorganic substance which does not contain oxygen or halogen atoms.

Pyrophoric Liquid: Not relevant - Sulfur is a solid.

Pyrophoric Solid: Sulfur does not spontaneously ignite in contact with air.

Self-reactive Substance: Sulfur is not self-reactive. It does not undergo exothermic decomposition when heated.

Self-heating Substance: Sulfur does not react exothermically.

Gas under Pressure: Not relevant - Sulfur is a solid.

Organic Peroxide: Sulfur does not meet the definition of a peroxide.

Corrosive to Metal: Sulfur is solid and does not meet the criteria for corrosion of metal.

Substance, which in contact with water emits flammable gas: Sulfur does not react with water.

1.2 Health Hazards

Acute Toxicity: Samples of Sulfur have been tested in acute oral, dermal and inhalation studies. Results indicate the following:

| | |
|----------------|---|
| Rat oral | LD ₅₀ > 2000 mg/(kg _{bw} *day) (Terlouw, G.D.C. et al, 1994a) |
| Rat inhalation | LC ₅₀ > 5430 mg/m ³ air (Terlouw, G.D.C. et al, 1994b) |
| Rabbit dermal | LD ₅₀ > 2000 mg/(kg _{bw} *day) (TNO, 1994a) |

Skin Corrosion / Irritation: Sulfur was examined for acute dermal irritating/corrosive properties in the rabbit. The test material was irritating to the skin. Based on the available data, Sulfur is not expected to be corrosive (TNO, 1994b).

Serious Eye Damage / Irritation: The effects of Sulfur on the eye have been investigated in the rabbit. None of the samples tested showed more than minimal effects, which resolved within 72 hours (TNO, 1994c; Ravi GS, 2005).

Respiratory or Skin Sensitization: Tests in guinea pigs showed no evidence of skin sensitization. These results together with extensive human experience indicate that Sulfur is not a dermal sensitizer (Sulaiman SM, 2005; Venugopala Rao, K, 2005; Arcelin, G, 1994a; Arcelin, G, 1994b). There is no evidence to indicate that Sulfur is likely to be a respiratory sensitizer.

Germ Cell Mutagenicity: The mutagenic potential of Sulfur has been extensively studied in a range of *in vivo* and *in vitro* assays. These studies showed no evidence of mutagenic activity (Shivaram, S, 2005c; Indrani, BK, 2005; Rao G, 2005). Based on the available data Sulfur is not a germ cell mutagen.

Carcinogenicity: Sulfur is not expected to be carcinogenic based on no evidence of mutagenicity and a lack of structural alerts for mutagenicity/carcinogenicity. Furthermore, since Sulfur did not cause hyperplasia or pre-neoplastic lesions in the repeat dose toxicity study, it is unlikely that it will present a carcinogenic hazard to man (Mallehappa HN, 2006b; Ramesh E, 2005; Mallehappa HN, 2006a).

Reproductive Toxicity: Based on weight of evidence approach, taking into account both dietary and occupational exposure in humans, its lack of mutagenic activity and its ubiquitous natural occurrence, Sulfur is unlikely to present a reproductive hazard to man (EPA 1991).

Specific Target Organ Toxicity (STOT)

Single Exposure: Acute exposure studies show no evidence of systemic toxicity (Terlouw, G.D.C. et al, 1994a; TNO, 1994a; Terlouw, G.D.C. et al, 1994b).

Repeated Exposure: A repeat dose toxicity study of Sulfur has been studied in rats following dermal and oral exposure for periods between 28 days and 21 weeks. No systemic toxicity was observed; the only effect observed was local skin effects (Mallehappa HN, 2006b; Ramesh E, 2005b; Mallehappa HN, 2006a).

Aspiration: Not relevant as Sulfur is a solid.

1.3 Environmental Hazards

Acute (short-term) Aquatic Hazard: Acute toxicity studies in fish, Daphnia and algae show LC₅₀/EC₅₀ values at >5 µg/l (maximum water solubility) (Pawlowski, S and Wydra, V 2005 a, b; Moll, M and Wydra, V, 2005).

Chronic (long-term) Aquatic Hazard: Sulfur is highly insoluble in water (water solubility < 5 µg/l) and is unlikely to present a chronic aquatic hazard.

Environmental fate (biodegradation / bioaccumulation): Biodegradation and bioaccumulation tests are not applicable for Sulfur as this substance is inorganic.

Part 2 - Summary of Classification and Labelling Recommendations

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|------------------------------|-----------------|-------------------------------|
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |

Labelling

Signal word: Warning

Hazard pictogram:

GHS07: exclamation mark



Hazard statements:

H315: Causes skin irritation.

Precautionary statements:

P280: Wear protective gloves/protective clothing/eye protection/face protection.
(Manufacturer/supplier to specify type of equipment.)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.)

P332 + P313: If skin irritation occurs: Get medical advice/attention.

Full list of Precautionary statements

Prevention:

P264: Wash ... thoroughly after handling. (Manufacturer/supplier to specify parts of the body to be washed after handling.)

P280: Wear protective gloves/protective clothing/eye protection/face protection.
(Manufacturer/supplier to specify type of equipment.)

Response:

P302 + P352: IF ON SKIN: Wash with plenty of water/... (...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.)

P321: Specific treatment (see ... on this label). (... Reference to supplemental first aid instruction.)

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

REFERENCES

Arcelin, G. (1994a) Contact hypersensitivity to SWPF (technical sulphur) in albino guinea pigs -maximization-test. Report prepared by Research and Consulting Company Ltd. Report No. 362226. Muttenz Switzerland: Sandoz Agro Ltd

Arcelin, G. (1994b) Contact hypersensitivity to SWPF (technical sulphur) in albino guinea pigs -modified Buehler method. Report prepared by Research and Consulting Company Ltd. Report No. 365051. Muttenz Switzerland: Sandoz Agro Ltd

EPA (1991) Sulfur: reregistration eligibility decision (RED) fact sheet. United States Pesticides and 738-F-91-110 Environmental Protection. Washington DC: US Environmental Protection Agency

EPA (2009) Sulfur - human health risk scoping document in support of registration review. Document EPA-HQ-OPP-2008-0176-0012. Washington DC: US Environmental Protection Agency

Indrani, B.K. (2005) *In vitro* mammalian chromosome aberration test with sulfur dust. Study conducted by Advinus Therapeutics Private Ltd. Study No. 4266/05. Cotignola (Ra) Italy: Solfotecnica Italiana SpA

Malleshappa, H.N. (2006a) Repeated dose (28 day) dermal toxicity study with sulphur technical in Wistar rats. Study conducted by Rallis Research Centre Rallis India Ltd. Study No. 4190/05. Mumbai: Sulphur Mills Ltd

Malleshappa, H.N. (2006b) Sub-chronic (90 day) oral toxicity study by gavage with sulphur technical in Wistar rats. Study conducted by Advinus Therapeutics Private Ltd. Study No. 4191/05. Mumbai: Sulphur Mills Ltd

Moll, M. and Wydra, V. (2005) Acute toxicity of sulphur dust to *Daphnia magna* in a 48-hour immobilization test. Study conducted by Institut für Biologische Analytik und Consulting IBACON GmbH. Report No. 23122220. Cotignola (Ra) Italy: Solfotecnica Italiana SpA

Pawlowski, S. and Wydra, V. (2005a) Acute toxicity of sulphur dust to rainbow trout (*Oncorhynchus mykiss*) in a 96-hour semi static test. Study conducted by Institut für Biologische Analytik und Consulting IBACON GmbH. Report No. 23121230. Cotignola (Ra) Italy: Solfotecnica Italiana SpA

Pawlowski, S. and Wydra, V. (2005b) Toxicity of sulphur dust to *Desmodesmus subspicatus* in an algal growth inhibition test. Study conducted by Institut für Biologische Analytik und Consulting IBACON GmbH. Report No. 23123210. Cotignola (Ra) Italy: Solfotecnica Italiana SpA

Ramesh, E. (2005) Repeated dose (28-day) oral toxicity study by gavage with sulfur dust in Wistar rats. Study conducted by Rallis Research Centre Rallis India Ltd. Study No.4264/05. Cotignola (Ra) Italy: Solfotecnica Italiana SpA

Rao, G. (2005) Mammalian erythrocyte micronucleus test in Swiss albino mice with sulphur technical. Study conducted by Rallis Research Centre Rallis India Ltd. Study No. 4192/05. Mumbai: Sulphur Mills Ltd

Ravi, G.S. (2005) Acute eye irritation/corrosion study with sulfur dust in New Zealand white rabbits. Study conducted by Rallis Research Centre Rallis India Ltd. Study No. 4261/05. Cotignola (Ra) Italy: Solfotecnica Italiana SpA

Shivaram, S. (2005) Bacterial reverse mutation test with sulfur dust. Study conducted by Rallis Research Centre Rallis India Ltd. Study No. 4265/05. Cotignola (Ra) Italy: Solfotecnica Italiana SpA

Sulaiman, S.M. (2005) Skin sensitisation study (Magnusson and Kligman test) with sulphur 80% WG in guinea pigs. Study conducted by Rallis Research Centre Rallis India Ltd. Study No. 4204/05. Mumbai: Sulphur Mills Ltd

Terlouw, G.D.C. et al (1994a) Sulfur technical: acute dermal toxicity study in rats. Report No. 536R. Muttenz Switzerland: Sandoz Agro Ltd

Terlouw, G.D.C. et al (1994b) Sulfur technical: acute oral toxicity study in rats. Report No. 535R. Muttenz Switzerland: Sandoz Agro Ltd

TNO (1994a) Acute (4-hour) inhalation toxicity study with sulfur technical in rats. Report No. V94.137. Study conducted for Sandoz Agro Ltd. Zeist The Netherlands: TNO Nutrition and Food Research

TNO (1994b) Acute dermal irritation/corrosion study with sulfur technical in albino rabbits. Report No. V 94.064. Study conducted for Sandoz Agro Ltd. Zeist The Netherlands: TNO Nutrition and Food Research

TNO (1994c) Acute eye irritation/corrosion study with sulfur technical in albino rabbits. Report No. V 94.063. Study conducted for Sandoz Agro Ltd. Zeist The Netherlands: TNO Nutrition and Food Research

Venugopala Rao, K. (2005) Skin sensitisation study (Magnusson and Kligman test) with sulfur dust in guinea pigs. Study conducted by Advinus Therapeutics Private Ltd. Study No. 4262/05. Cotignola (Ra) Italy: Solfotecnica Italiana SpA

APPENDIX 1: LISTING OF PETROLEUM SUBSTANCES

The tables below lists only those substances with active registrations at the time of issuing this report, with the following exceptions.

- Crude Oils are exempt from registration under REACH but still subject to notification under CLP.
- Petroleum Cokes are exempt from registration under REACH and are not subject to notification under CLP.

| CRUDE OILS | | |
|------------|-----------|-----------|
| EC # | CAS # | EC name |
| 232-298-5 | 8002-05-9 | Petroleum |

| LOW BOILING POINT NAPHTHAS (GASOLINES) | | |
|--|------------|---|
| EC # | CAS # | EC name |
| 232-349-1 | 8006-61-9 | Gasoline, natural |
| 232-453-7 | 8032-32-4 | Ligroine |
| 265-041-0 | 64741-41-9 | Naphtha (petroleum), heavy straight-run |
| 265-042-6 | 64741-42-0 | Naphtha (petroleum), full-range straight-run |
| 265-046-8 | 64741-46-4 | Naphtha (petroleum), light straight-run |
| 265-047-3 | 64741-47-5 | Natural gas condensates (petroleum) |
| 265-055-7 | 64741-54-4 | Naphtha (petroleum), heavy catalytic cracked |
| 265-056-2 | 64741-55-5 | Naphtha (petroleum), light catalytic cracked |
| 265-065-1 | 64741-63-5 | Naphtha (petroleum), light catalytic reformed |
| 265-066-7 | 64741-64-6 | Naphtha (petroleum), full-range alkylate |
| 265-068-8 | 64741-66-8 | Naphtha (petroleum), light alkylate |
| 265-070-9 | 64741-68-0 | Naphtha (petroleum), heavy catalytic reformed |
| 265-071-4 | 64741-69-1 | Naphtha (petroleum), light hydrocracked |
| 265-073-5 | 64741-70-4 | Naphtha (petroleum), isomerization |
| 265-075-6 | 64741-74-8 | Naphtha (petroleum), light thermal cracked |
| 265-079-8 | 64741-78-2 | Naphtha (petroleum), heavy hydrocracked |
| 265-085-0 | 64741-83-9 | Naphtha (petroleum), heavy thermal cracked |
| 265-086-6 | 64741-84-0 | Naphtha (petroleum), solvent-refined light |
| 265-089-2 | 64741-87-3 | Naphtha (petroleum), sweetened |
| 265-150-3 | 64742-48-9 | Naphtha (petroleum), hydrotreated heavy |
| 265-151-9 | 64742-49-0 | Naphtha (petroleum), hydrotreated light |
| 265-170-2 | 64742-66-1 | Naphtha (petroleum), catalytic dewaxed |
| 265-178-6 | 64742-73-0 | Naphtha (petroleum), hydrodesulfurized light |
| 265-185-4 | 64742-82-1 | Naphtha (petroleum), hydrodesulfurized heavy |
| 265-192-2 | 64742-89-8 | Solvent naphtha (petroleum), light aliph. |
| 265-199-0 | 64742-95-6 | Solvent naphtha (petroleum), light arom. |
| 270-077-5 | 68410-05-9 | Distillates (petroleum), straight-run light |
| 270-088-5 | 68410-71-9 | Raffinates (petroleum), catalytic reformer ethylene glycol-water countercurrent exts. |
| 270-093-2 | 68410-97-9 | Distillates (petroleum), light distillate hydrotreating process, low-boiling |
| 270-660-4 | 68475-79-6 | Distillates (petroleum), catalytic reformed depentanizer |
| 270-686-6 | 68476-46-0 | Hydrocarbons, C3-11, catalytic cracker distillates |
| 270-690-8 | 68476-50-6 | Hydrocarbons, C _≥ 5, C5-6-rich |
| 270-695-5 | 68476-55-1 | Hydrocarbons, C5-rich |
| 270-991-4 | 68513-02-0 | Naphtha (petroleum), full-range coker |
| 270-993-5 | 68513-03-1 | Naphtha (petroleum), light catalytic reformed, arom.-free |

| LOW BOILING POINT NAPHTHAS (GASOLINES) | | |
|--|-------------|---|
| EC # | CAS # | EC name |
| 271-058-4 | 68514-79-4 | Petroleum products, hydrofiner-powerformer reformates |
| 271-267-0 | 68527-27-5 | Naphtha (petroleum), full-range alkylate, butane-contg. |
| 271-635-0 | 68603-08-7 | Naphtha (petroleum), arom |
| 271-727-0 | 68606-11-1 | Gasoline, straight-run, topping-plant |
| 272-186-3 | 68783-12-0 | Naphtha (petroleum), unsweetened |
| 272-206-0 | 68783-66-4 | Naphtha (petroleum), light, sweetened |
| 272-895-8 | 68919-37-9 | Naphtha (petroleum), full-range reformed |
| 272-931-2 | 68921-08-4 | Distillates (petroleum), light straight-run gasoline fractionation stabilizer overheads |
| 273-271-8 | 68955-35-1 | Naphtha (petroleum), catalytic reformed |
| 285-510-3 | 85116-59-2 | Naphtha (petroleum), catalytic reformed light, arom.-free fraction |
| 289-220-8 | 86290-81-5 | Gasoline |
| 295-279-0 | 91995-18-5 | Aromatic hydrocarbons, C8, catalytic reforming-derived |
| 295-298-4 | 91995-38-9 | Hydrocarbons, C4-6, depentanizer lights, arom. hydrotreater |
| 295-331-2 | 91995-68-5 | Extracts (petroleum), catalytic reformed light naphtha solvent |
| 295-418-5 | 92045-37-9 | Kerosine (petroleum), straight-run wide-cut |
| 295-431-6 | 92045-50-6 | Naphtha (petroleum), heavy catalytic cracked, sweetened |
| 295-433-7 | 92045-52-8 | Naphtha (petroleum), hydrodesulfurized full-range |
| 295-440-5 | 92045-58-4 | Naphtha (petroleum), isomerization, C6-fraction |
| 295-441-0 | 92045-59-5 | Naphtha (petroleum), light catalytic cracked sweetened |
| 295-442-6 | 92045-60-8 | Naphtha (petroleum), light, C5-rich, sweetened |
| 295-445-2 | 92045-63-1 | Hydrocarbons, C4-11, naphtha-cracking, arom.-free |
| 295-446-8 | 92045-64-2 | Hydrocarbons, C6-7, naphtha-cracking, solvent-refined |
| 296-903-4 | 93165-19-6 | Distillates (petroleum), C6-rich |
| 297-401-8 | 93571-75-6 | Aromatic hydrocarbons, C7-12, C8-rich |
| 297-458-9 | 93572-29-3 | Gasoline, C5-11, high-octane stabilized reformed |
| 297-465-7 | 93572-35-1 | Hydrocarbons, C7-12, C>9-arom.-rich, reforming heavy fraction |
| 297-466-2 | 93572-36-2 | Hydrocarbons, C5-11, nonaroms.-rich, reforming light fraction |
| 297-852-0 | 93763-33-8 | Hydrocarbons, C6-11, hydrotreated, dearomatized |
| 309-871-4 | 101316-67-0 | Hydrocarbons, C6-rich, hydrotreated light naphtha distillates, solvent-refined |
| 309-879-8 | 101316-76-1 | Naphtha (petroleum), hydrodesulfurized full-range coker |
| 309-976-5 | 101795-01-1 | Naphtha (petroleum), sweetened light |
| 613-683-0 | 64741-72-6 | Naphtha (petroleum), polymn. |
| 614-725-0 | 68783-11-9 | Naphtha (petroleum), light polymn. |

| KEROSESINES | | |
|-------------|-------------|---|
| EC # | CAS # | EC name |
| 232-366-4 | 8008-20-6 | Kerosine (petroleum) |
| 265-132-5 | 64742-31-0 | Distillates (petroleum), chemically neutralized light |
| 265-149-8 | 64742-47-8 | Distillates (petroleum), hydrotreated light |
| 265-184-9 | 64742-81-0 | Kerosine (petroleum), hydrodesulfurized |
| 265-198-5 | 64742-94-5 | Solvent naphtha (petroleum), heavy arom. |
| 265-200-4 | 64742-96-7 | Solvent naphtha (petroleum), heavy aliph. |
| 294-799-5 | 91770-15-9 | Kerosine (petroleum), sweetened |
| 297-854-1 | 93763-35-0 | Hydrocarbons, C9-16, hydrotreated, dearomatized |
| 309-881-9 | 101316-80-7 | Solvent naphtha (petroleum), hydrocracked heavy arom. |

| MK1 DIESEL FUEL | | |
|-----------------|-------|-----------------|
| EC # | CAS # | EC name |
| 931-250-7 | None | MK1 Diesel Fuel |

| STRAIGHT-RUN GAS OILS | | |
|-----------------------|------------|---|
| EC # | CAS # | EC name |
| 265-043-1 | 64741-43-1 | Gas oils (petroleum), straight-run |
| 265-044-7 | 64741-44-2 | Distillates (petroleum), straight-run middle |
| 272-341-5 | 68814-87-9 | Distillates (petroleum), full-range straight-run middle |
| 272-817-2 | 68915-96-8 | Distillates (petroleum), heavy straight-run |

| CRACKED GAS OILS | | |
|------------------|-------------|--|
| EC # | CAS # | EC name |
| 265-060-4 | 64741-59-9 | Distillates (petroleum), light catalytic cracked |
| 265-062-5 | 64741-60-2 | Distillates (petroleum), intermediate catalytic cracked |
| 265-084-5 | 64741-82-8 | Distillates (petroleum), light thermal cracked |
| 269-781-5 | 68333-25-5 | Distillates (petroleum), hydrodesulfurized light catalytic cracked |
| 272-930-7 | 68921-07-3 | Distillates (petroleum), hydrotreated light catalytic cracked |
| 285-505-6 | 85116-53-6 | Distillates (petroleum), hydrodesulfurized thermal cracked middle |
| 295-411-7 | 92045-29-9 | Gas oils (petroleum), thermal-cracked, hydrodesulfurized |
| 309-865-1 | 101316-59-0 | Distillates (petroleum), hydrodesulfurized middle coker |

| VACUUM GAS OILS, HYDROCRACKED GAS OILS & DISTILLATE FUELS | | |
|---|------------|--|
| EC # | CAS # | EC name |
| 265-049-4 | 64741-49-7 | Condensates (petroleum), vacuum tower |
| 265-059-9 | 64741-58-8 | Gas oils (petroleum), light vacuum |
| 265-078-2 | 64741-77-1 | Distillates (petroleum), light hydrocracked |
| 265-190-1 | 64742-87-6 | Gas oils (petroleum), hydrodesulfurized light vacuum |
| 269-822-7 | 68334-30-5 | Fuels, diesel |
| 270-671-4 | 68476-30-2 | Fuel oil, no. 2 |
| 270-673-5 | 68476-31-3 | Fuel oil, no. 4 |
| 270-676-1 | 68476-34-6 | Fuels, diesel, no. 2 |
| 295-407-5 | 92045-24-4 | Gas oils (petroleum), hydrotreated light vacuum |

| OTHER GAS OILS | | |
|----------------|------------|---|
| EC # | CAS # | EC name |
| 265-148-2 | 64742-46-7 | Distillates (petroleum), hydrotreated middle |
| 265-182-8 | 64742-79-6 | Gas oils (petroleum), hydrodesulfurized |
| 265-183-3 | 64742-80-9 | Distillates (petroleum), hydrodesulfurized middle |

| HEAVY FUEL OIL COMPONENTS | | |
|---------------------------|------------|---|
| EC # | CAS # | EC name |
| 265-045-2 | 64741-45-3 | Residues (petroleum), atm. Tower |
| 265-058-3 | 64741-57-7 | Gas oils (petroleum), heavy vacuum |
| 265-063-0 | 64741-61-3 | Distillates (petroleum), heavy catalytic cracked |
| 265-064-6 | 64741-62-4 | Clarified oils (petroleum), catalytic cracked |
| 265-069-3 | 64741-67-9 | Residues (petroleum), catalytic reformer fractionator |
| 265-076-1 | 64741-75-9 | Residues (petroleum), hydrocracked |
| 265-081-9 | 64741-80-6 | Residues (petroleum), thermal cracked |
| 265-082-4 | 64741-81-7 | Distillates (petroleum), heavy thermal cracked |
| 265-162-9 | 64742-59-2 | Gas oils (petroleum), hydrotreated vacuum |
| 265-181-2 | 64742-78-5 | Residues (petroleum), hydrodesulfurized atmospheric tower |
| 265-189-6 | 64742-86-5 | Gas oils (petroleum), hydrodesulfurized heavy vacuum |
| 269-777-3 | 68333-22-2 | Residues (petroleum), atmospheric |
| 270-674-0 | 68476-32-4 | Fuel oil, residues-straight-run gas oils, high-sulfur |

| HEAVY FUEL OIL COMPONENTS | | |
|---------------------------|------------|--|
| EC # | CAS # | EC name |
| 270-675-6 | 68476-33-5 | Fuel oil, residual |
| 270-796-4 | 68478-17-1 | Residues (petroleum), heavy coker gas oil and vacuum gas oil |
| 270-984-6 | 68512-62-9 | Residues (petroleum), light vacuum |
| 271-384-7 | 68553-00-4 | Fuel oil, no. 6 |
| 271-763-7 | 68607-30-7 | Residues (petroleum), topping plant, low-sulfur |
| 272-184-2 | 68783-08-4 | Gas oils (petroleum), heavy atmospheric |
| 273-263-4 | 68955-27-1 | Distillates (petroleum), petroleum residues vacuum |
| 274-683-0 | 70592-76-6 | Distillates (petroleum), intermediate vacuum |
| 274-684-6 | 70592-77-7 | Distillates (petroleum), light vacuum |
| 274-685-1 | 70592-78-8 | Distillates (petroleum), vacuum |
| 292-658-2 | 90669-76-4 | Residues (petroleum), vacuum, light |
| 295-396-7 | 92045-14-2 | Fuel oil, heavy, high-sulfur |
| 295-511-0 | 92061-97-7 | Residues (petroleum), catalytic cracking |
| 298-754-0 | 93821-66-0 | Residual oils (petroleum) |

| UNREFINED / ACID TREATED OILS | | |
|-------------------------------|------------|---|
| EC # | CAS # | EC name |
| 265-051-5 | 64741-50-0 | Distillates (petroleum), light paraffinic |
| 265-052-0 | 64741-51-1 | Distillates (petroleum), heavy paraffinic |

| HIGHLY REFINED BASE OILS | | |
|--------------------------|-----------|-------------------------------|
| EC # | CAS # | EC name |
| 232-455-8 | 8042-47-5 | White mineral oil (petroleum) |

| OTHER LUBRICANT BASE OILS | | |
|---------------------------|------------|--|
| EC # | CAS # | EC name |
| 265-077-7 | 64741-76-0 | Distillates (petroleum), heavy hydrocracked |
| 265-090-8 | 64741-88-4 | Distillates (petroleum), solvent-refined heavy paraffinic |
| 265-091-3 | 64741-89-5 | Distillates (petroleum), solvent-refined light paraffinic |
| 265-096-0 | 64741-95-3 | Residual oils (petroleum), solvent deasphalted |
| 265-097-6 | 64741-96-4 | Distillates (petroleum), solvent-refined heavy naphthenic |
| 265-098-1 | 64741-97-5 | Distillates (petroleum), solvent-refined light naphthenic |
| 265-101-6 | 64742-01-4 | Residual oils (petroleum), solvent-refined |
| 265-146-1 | 64742-44-5 | Distillates (petroleum), clay-treated heavy naphthenic |
| 265-155-0 | 64742-52-5 | Distillates (petroleum), hydrotreated heavy naphthenic |
| 265-156-6 | 64742-53-6 | Distillates (petroleum), hydrotreated light naphthenic |
| 265-157-1 | 64742-54-7 | Distillates (petroleum), hydrotreated heavy paraffinic |
| 265-158-7 | 64742-55-8 | Distillates (petroleum), hydrotreated light paraffinic |
| 265-159-2 | 64742-56-9 | Distillates (petroleum), solvent-dewaxed light paraffinic |
| 265-160-8 | 64742-57-0 | Residual oils (petroleum), hydrotreated |
| 265-166-0 | 64742-62-7 | Residual oils (petroleum), solvent-dewaxed |
| 265-169-7 | 64742-65-0 | Distillates (petroleum), solvent-dewaxed heavy paraffinic |
| 265-174-4 | 64742-70-7 | Paraffin oils (petroleum), catalytic dewaxed heavy |
| 265-176-5 | 64742-71-8 | Paraffin oils (petroleum), catalytic dewaxed light |
| 276-736-3 | 72623-85-9 | Lubricating oils (petroleum), C20-50, hydrotreated neutral oil-based, high-viscosity |
| 276-737-9 | 72623-86-0 | Lubricating oils (petroleum), C15-30, hydrotreated neutral oil-based |
| 276-738-4 | 72623-87-1 | Lubricating oils (petroleum), C20-50, hydrotreated neutral oil-based |
| 278-012-2 | 74869-22-0 | Lubricating oils |

| OTHER LUBRICANT BASE OILS | | |
|---------------------------|-------------|---|
| EC # | CAS # | EC name |
| 295-301-9 | 91995-40-3 | Distillates (petroleum), dewaxed light paraffinic, hydrotreated |
| 297-474-6 | 93572-43-1 | Lubricating oils (petroleum), base oils, paraffinic |
| 305-588-5 | 94733-08-1 | Distillates (petroleum), solvent-refined hydrotreated heavy, hydrogenated |
| 305-594-8 | 94733-15-0 | Lubricating oils (petroleum), C18-40, solvent-dewaxed hydrocracked distillate-based |
| 309-874-0 | 101316-69-2 | Lubricating oils (petroleum), C>25, solvent-extd., deasphalted, dewaxed, hydrogenated |
| 309-877-7 | 101316-72-7 | Lubricating oils (petroleum), C24-50, solvent-extd., dewaxed, hydrogenated |

| UNTREATED DISTILLATE AROMATIC EXTRACTS | | |
|--|------------|---|
| EC # | CAS # | EC name |
| 265-103-7 | 64742-04-7 | Extracts (petroleum), heavy paraffinic distillate solvent |
| 265-104-2 | 64742-05-8 | Extracts (petroleum), light paraffinic distillate solvent |
| 265-111-0 | 64742-11-6 | Extracts (petroleum), heavy naphthenic distillate solvent |

| TREATED DISTILLATE AROMATIC EXTRACTS | | |
|--------------------------------------|------------|---|
| EC # | CAS # | EC name |
| 272-180-0 | 68783-04-0 | Extracts (petroleum), solvent-refined heavy paraffinic distillate solvent |

| RESIDUAL AROMATIC EXTRACTS | | |
|----------------------------|------------|--|
| EC # | CAS # | EC name |
| 265-110-5 | 64742-10-5 | Extracts (petroleum), residual oil solvent |
| 295-332-8 | 91995-70-9 | Extracts (petroleum), deasphalted vacuum residue solvent |

| SLACK WAXES | | |
|-------------|------------|-------------------------------------|
| EC # | CAS # | EC name |
| 265-165-5 | 64742-61-6 | Slack wax (petroleum) |
| 292-660-3 | 90669-78-6 | Slack wax (petroleum), clay-treated |
| 295-523-6 | 92062-09-4 | Slack wax (petroleum), hydrotreated |

| PARAFFIN AND HYDROCARBON WAXES | | |
|--------------------------------|------------|---|
| EC # | CAS # | EC name |
| 232-315-6 | 8002-74-2 | Paraffin waxes and Hydrocarbon waxes |
| 264-038-1 | 63231-60-7 | Paraffin waxes and Hydrocarbon waxes, microcryst. |
| 265-144-0 | 64742-42-3 | Hydrocarbon waxes (petroleum), clay-treated microcryst. |
| 265-145-6 | 64742-43-4 | Paraffin waxes (petroleum), clay-treated |
| 265-154-5 | 64742-51-4 | Paraffin waxes (petroleum), hydrotreated |
| 265-163-4 | 64742-60-5 | Hydrocarbon waxes (petroleum), hydrotreated microcryst. |

| FOOTS OILS | | |
|------------|------------|-------------------------------------|
| EC # | CAS # | EC name |
| 265-171-8 | 64742-67-2 | Foots oil (petroleum) |
| 295-394-6 | 92045-12-0 | Foots oil (petroleum), hydrotreated |
| 300-226-2 | 93924-32-4 | Foots oil (petroleum), clay-treated |

| PETROLATUMS | | |
|-------------|------------|--------------------------------------|
| EC # | CAS # | EC name |
| 232-373-2 | 8009-03-8 | Petrolatum |
| 265-206-7 | 64743-01-7 | Petrolatum (petroleum), oxidized |
| 295-459-9 | 92045-77-7 | Petrolatum (petroleum), hydrotreated |

| BITUMENS | | |
|-----------|------------|--|
| EC # | CAS # | EC name |
| 232-490-9 | 8052-42-4 | Asphalt |
| 265-057-8 | 64741-56-6 | Residues (petroleum), vacuum |
| 265-188-0 | 64742-85-4 | Residues (petroleum), hydrodesulfurized vacuum |
| 295-518-9 | 92062-05-0 | Residues (petroleum), thermal cracked vacuum |

| OXIDIZED ASPHALT | | |
|------------------|------------|-------------------|
| EC # | CAS # | EC name |
| 265-196-4 | 64742-93-4 | Asphalt, oxidized |

| PETROLEUM COKES | | |
|-----------------|------------|----------------------------|
| EC # | CAS # | EC name |
| 265-080-3 | 64741-79-3 | Coke (petroleum) |
| 265-209-3 | 64743-04-0 | Coke (petroleum), recovery |
| 265-210-9 | 64743-05-1 | Coke (petroleum), calcined |

| SULFUR | | |
|-----------|-----------|---------|
| EC # | CAS # | EC name |
| 231-722-6 | 7704-34-9 | Sulfur |

APPENDIX 2: REGULATORY AND OIL INDUSTRY NOTES

The classification and labelling recommendations in this report for the various categories of petroleum substances have been developed by Concawe based on available information and application of a default most severe classification. It is recognised however that for some endpoints, alternative classifications may be applicable, due to the variable properties of individual substances. The ‘default’ classifications apply, unless the conditions identified in the classification Notes listed below are met. These Notes are either derived from Annex VI Part 3.2 of the CLP Regulation, or have been developed by the oil industry as a practical solution for the provision of reliable and consistent hazard classifications.

Note = Classification, Labelling and Packaging of Substances and Mixtures (Regulation EC 1272/2008)

OIN = Oil Industry Note

| Note | Text |
|--------|---|
| Note L | The classification as a carcinogen need not apply if it can be shown that the substance contains less than 3 % DMSO extract as measured by IP 346 “Determination of polycyclic aromatics in unused lubricating base oils and asphaltene free petroleum fractions – Dimethyl sulphoxide extraction refractive index method”, Institute of Petroleum, London. This note applies only to certain complex oil-derived substances in Part 3. |
| Note N | The classification as a carcinogen need not apply if the full refining history is known and it can be shown that the substance from which it is produced is not a carcinogen. This note applies only to certain complex oil-derived substances in Part 3. |
| Note P | The classification as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0,1% w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-)P260-P262-P301 + P310-P331 (Table 3.1) shall apply. This note applies only to certain complex oil-derived substances in Part 3. |
| OIN 5 | The classification as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) needs not apply if it can be shown that the substance contains less than 3 % w/w toluene (EINECS No 203-625-9). |
| OIN 6 | The classification as a reproductive toxicant category 2; H361f (Suspected of damaging fertility) needs not apply if it can be shown that the substance contains less than 3 % w/w n-hexane (EINECS No 203-777-6). |
| OIN 8 | The classifications as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) and specific target organ toxicant category 1; H372 (Causes damage to organs through prolonged or repeated exposure) need not apply if the substance is not classified as carcinogenic. |
| OIN 10 | The classification as a carcinogen needs not apply if it can be shown that the substance has mutagenicity index (MI) less than 0.4 as measured by the test method described in ASTM E 1687-04 or if another predictive test demonstrates the substance is not a carcinogen. |
| OIN 14 | The classification as a specific target organ toxicant category 2; H373 (May cause damage to organs through prolonged or repeated exposure) needs not apply if the substance is not classified as carcinogenic. |
| OIN P | The following Oil industry note (OIN) applies instead of Note P: - The classifications as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0.1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-)P260-P262-P301+P310-P331 shall apply. |

APPENDIX 3: DOWNSTREAM LEGISLATION IMPACTED BY THE CLP REGULATION

Citations of original legislation listed below implicitly refer to amendments to-date by subsequent acts, as applicable. Acts repealed by the listed legislation can be seen in the respective record on the European Union law portal, EUR-Lex, at <http://eur-lex.europa.eu>.

- *Registration, evaluation, authorisation and restriction of chemicals (REACH)*: Regulation (EC) No. 1907/2006 of 18 December 2006;
- *Major accidents hazards involving dangerous substances (SEVESO III)*: Council Directive 2012/18/EU of 4 July 2012;
- *Plant protection products*: Regulation (EC) No 1107/2009 of 21 October 2009;
- *Biocidal products*: Regulation (EU) 528/2012 of 22 May 2012;
- *Chemical agents at work*: Council Directive 98/24/EC of 7 April 1998;
- *Carcinogens and mutagens at work*: Directive 2004/37/EC of the European Parliament and of the Council of 29 April 2004;
- *Young people at work*: Council Directive 94/33/EC of 22 June 1994;
- *Pregnant and breastfeeding workers*: Council Directive 92/85/EEC of 19 October 1992;
- *Health and safety signs at work*: Council Directive 92/58/EEC of 24 June 1992;
- *Eco-label award scheme*: Regulation (EC) No 1980/2000 of 17 July 2000;
- *Aerosol dispensers*: Council Directive 75/324/EEC of 20 May 1975;
- *Ambient air quality and cleaner air for Europe*: Directive 2008/50/EC of the European Parliament and Council of 21 May 2008;
- *Import and export of hazardous substances*: Regulation (EU) No 649/2012 of the European Parliament and of the Council of 4 July 2012;
- *Hazardous waste*: Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 (Waste Framework Directive);
- *Batteries and accumulators and their waste*: Directive 2006/66/EC of the European Parliament and of the Council of 6 September 2006;
- *Transport of Dangerous Goods*: Directive 2008/68/EC of the European Parliament and of the Council of 24 September 2008;
- *Detergents*: Regulation (EC) No 648/2004 of 31 March 2004;
- *Cosmetic products*: Regulation (EC) No 1223/2009 of the European Parliament and of the Council of 30 November 2009;
- *Safety of toys*: Directive 2009/48/EC of the European Parliament and of the Council of 18 June 2009
- *Limitation of emissions of volatile organic compounds from use of organic solvents*:

- Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control) - use of organic solvents in certain activities and installations;
- Directive 2004/42/EC of the European Parliament and of the Council of - use of organic solvents in certain paints and varnishes and vehicle refinishing products;
- *End-of-life vehicles*: Directive 2000/53/EC of the European Parliament and of the Council.
- *Waste electrical and electronic equipment (WEEE)*: Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012.

References:

- Commission Services (2006): “Analysis of the Potential Effects of the Proposed GHS Regulation on Its EU Downstream Legislation” and Addendum (DG Enterprise):
<http://ec.europa.eu/DocsRoom/documents/11827/attachments/9/translations/en/renditions/native> ;
- ECHA 2019: “Introductory Guidance on the CLP Regulation” version 3.0 that can be downloaded from the ECHA website:
https://echa.europa.eu/documents/10162/23036412/clp_introductory_en.pdf/b65a97b4-8ef7-4599-b122-7575f6956027

APPENDIX 4: APPLICATIONS FOR USING TEST DATA FOR THE UVCB SUBSTANCE

1. Application of Repeat Dose Toxicity Classifications (Benzene) to Low Boiling Naphthas (Gasolines)

In CLP Annex VI benzene is classified for repeat dose toxicity as H372 based on effects on the hematopoietic system. According to the rules laid down in CLP, classification and labelling of low boiling naphthas (and gasoline) for repeat dose toxicity would be triggered at benzene concentrations equal to or greater than 1% w/w.

Concawe believes it is inappropriate to apply classification for repeat dose toxicity to low boiling naphthas (gasolines) with concentrations of benzene below 10% for the following reasons:

- Repeated dermal dose studies with naphthas with exposures up to 2000 mg/kg showed no evidence of hematologic effects.
- Inhalation studies with gasoline and naphthas also showed no evidence of hematologic effects.
- Naphtha blending streams tested in sub chronic inhalation studies with exposures up to 7500 ppm showed some haematological changes, mainly reduced haemoglobin and haematocrit levels and some reductions in leukocyte and lymphocyte numbers in male rats from the highest exposure groups. Since these effects were exclusively found in the male rat, and spleen weights were unaltered, the effects are believed to be secondary to the renal changes (alpha-2 μ -globulin induced nephropathy).

2. Application of Repeat Dose Toxicity Classifications (Toluene) to Low Boiling Naphthas (Gasolines)

In CLP Annex VI, toluene is classified for repeat dose toxicity as H373 based on ototoxicity observed in animal studies at prolonged exposure to toluene vapours. According to the rules laid down in CLP, classification of low boiling naphthas (gasolines) for repeat dose toxicity would be triggered at toluene concentrations equal to or greater than 10% w/w. Concawe believes it is inappropriate to classify low boiling naphthas (gasolines) for repeat dose toxicity for the following reasons:

- Long-term inhalation studies with gasoline (PS-6) at concentrations up to 2056 ppm did not reveal any signs of neurotoxicity.
- Prolonged gasoline abuse (gasoline sniffing) has led to various (reversible) neurological effects but not ototoxicity.
- Toluene-induced ototoxicity cannot realistically be achieved since ototoxicity was only observed at prolonged exposure to concentrations of toluene that would cause explosive mixtures with gasoline.
- Exposure to gasoline vapours, and hence the toluene therein, is sufficiently limited by classification of gasoline as Cat. 1B carcinogen to prevent any ototoxicity from gasoline; existing occupational exposure limits for hydrocarbons would further restrict potential exposure.

3. Application of Repeat Dose Toxicity Classifications (n-hexane) to Low Boiling Naphthas (Gasolines)

Normal-hexane (n-hexane - CAS 110-54-3) is a linear hydrocarbon of 6 carbon atoms.

Exposure to n-hexane has been associated with a peripheral neuropathy in humans. This is reflected in EU-CLP harmonised classification for n-hexane as STOT RE 2; H373. This classification has a specific concentration limit of > 5% w/w, for mixtures containing n-hexane.

The toxicity on the peripheral nervous system has been shown to result from the action of a specific n-hexane metabolite: 2,5-hexane dione. This distinguishes n-hexane from other hydrocarbons (hexane isomers) and petroleum stream constituents, because only n-hexane is metabolised to the toxic metabolite and has a threshold depending on whether exposure is to n-hexane alone or commercial n-hexane (hexane isomers with up to 53% n-hexane).

This was demonstrated in a series of studies comparing n-hexane to commercial hexane.

Rats exposed to n-hexane at 500 ppm (~ 1760 mg/m³) developed neuropathy after 6 months of treatment. Co-exposure to hexane isomers did not potentiate n-hexane associated neurotoxicity.

In a neurotoxicity test where functional battery performance and motor activity was assessed, rats were exposed to concentrations of up to 9000 ppm (~ 31680 mg/m³) to commercial hexane. Results showed no effects to behaviour or evidence of toxicity setting the NOAEC for sub-chronic neurological effects at 9000 ppm.

Lifetime exposure of rats and mice to 9000 ppm of commercial hexane did not indicate significant differences in survivorship between treated and control animals.

Therefore, test data of commercial hexane indicates that peripheral neuropathy is a threshold effect, which does not manifest itself in complex substances with n-hexane concentrations below 53%. Thus, UVCB petroleum streams (e.g. Naphtha) which contain n-hexane at considerably lower concentrations than 53% can be considered to be below the threshold of concern and thus not classifiable as STOT RE 2; H373.

APPENDIX 5: HAZARD CLASSIFICATION FOR DEVELOPMENTAL TOXICITY ACCORDING TO CLP

According to CLP, Reproductive Toxicity is differentiated into three sub-headings:

- A) Adverse effects on sexual function and fertility;
- B) Adverse effects on development of the offspring;
- C) Adverse effects on or via lactation.

Developmental toxicity refers primarily to part B. A typical guideline study design that enables evaluation of this parameter is OECD TG 414. Alternatively, relevant data can be derived from the screening studies TG 421/ 422 or through other non-guideline studies, although these are not typically considered sufficiently robust to drive classification.

For parts A and/or C the multi-generation study TG 416, TG 426 or TG 443 is applicable; however, these aspects are not further discussed here.

When reviewing developmental toxicity study data for the purposes of classification and labelling, key concerns are: (a) death of the developing organism, (b) structural abnormality, (c) altered growth, and (d) functional deficiency. It is also clear that a distinction is made between significant (i.e., irreversible) effects and those indicative of developmental delays. If any developmental effect is observed in the presence of maternal toxicity, there is a need to carefully evaluate both the severity of the developmental effect and the nature of the maternal effect(s) as both may ultimately influence the decision to classify.

The classification guidelines emphasize that the evaluation should start with an assessment of the developmental effects before the potential for maternal influence is considered. Accordingly, when developmental effects are reported, it is best to review the original study reports, considering both group mean and individual litter data. Although some valuable insight can be gained from individual pup data, it is important to recognise that the recognised statistical unit in reproductive toxicity studies is the litter and not the individual foetus/pup. Among the parameters that should be considered are pre- and post-implantation loss, total number of progeny and percentage live.

As stated in the CLP legislation (3.7.2.4.3) classification for reproductive toxicity is not necessarily the outcome in the case of minor developmental changes, when there is only a small reduction in foetal/pup body weight or retardation of ossification when seen in association with maternal toxicity. However classification shall be considered where there is a significant toxic effect in the offspring, e.g. irreversible effects such as structural malformations, embryo/foetal lethality and /or significant post-natal functional deficiencies. In these cases, in depth review of the study report is warranted and if appropriate a comprehensive overview on a litter by litter basis to assess the impact of maternal toxicity on foetal development. Additionally the statistical significance of any deficiencies should be considered in the evaluation of biological significance. Small changes of statistical significance but of no biological significance are not considered sufficient to classify as a developmental toxicant.

In general, when there is evidence of severe developmental toxicity such as foetal death, resorptions and/or major malformations, and there is no basis to judge these effects as not relevant to humans, then maternal toxicity needs to be considered. Normally, such effects would lead to classification unless the maternal toxicity is severe, e.g. lethality, significant weight loss or reduced weight gain, or inanition. In such cases, a justification should be prepared taking into consideration the nature of both the foetal and maternal effects. When evaluating whether maternal toxicity

may be present, factors such as irritation (mild or severe), body weight gain throughout gestation, and food consumption should be examined. Classification may not be justified if the developmental effect is judged to be of low or minimal toxicological significance, for example reductions in pup weight gain, delayed ossification, rib variations, and/or other evidence of developmental delays.

Once this initial assessment has been completed, then other factors can be considered. Ultimately, classification as a reproductive toxicant is based on 'expert judgement' taking into account the total weight of evidence. This means that all available information that bears on the determination of reproductive toxicity is considered together, such as epidemiological studies, case reports in humans and specific reproduction studies along with sub-chronic, chronic and special study results in animals that provide relevant information regarding toxicity to growth, development and reproduction. The weight given to the available evidence will be influenced by factors such as the quality of the studies, consistency of results, nature and severity of effects, the presence of maternal toxicity in experimental animal studies, level of statistical significance for inter-group differences, number of endpoints affected, relevance of route of administration to humans and freedom from bias.

APPENDIX 6: C&L PERMUTATIONS

The information included in this Appendix is aimed at supporting the industry with recommended classification and labelling (C&L), as needed for either direct inclusion in the safety data sheet (SDS) for Petroleum Substances or as basis for devising the classification and labelling of mixtures containing Petroleum Substances, while considering the relevant substance characteristics (C&L drivers) leading to a certain classification and labelling (C&L permutation).

For each classified C&L permutation the following information is provided:

- **Classification and labelling according to CLP / GHS.** Contains the classification of the substance for each classified endpoint (for Section 2.1 of the SDS):
 - hazard class;
 - hazard category;
 - associated hazard statement (H), with code and full text including variable parts completed.
- **Labelling.** Contains the following elements (for the Label and for Section 2.2 of the SDS):
 - signal word;
 - hazard pictogram(s) (GHS), with code, description and picture;
 - hazard statement(s) (H), with code and full text including variable parts completed;
 - not more than six recommended precautionary statement(s) (P), with code and full text - the text in *italics* between brackets provides instructions where the applicable precautionary statement text must be adapted by each manufacturer/supplier;
 - when relevant, additional applicable label elements (EUH066, ‘lamp oils and grill lighters’, ‘restricted to professional users’).
- **Full list of Precautionary statements.** For inclusion into appropriate sections of the SDS main body, as deemed useful for industrial and professional users:
 - all precautionary statement(s) (P) relevant for the hazard classification, with code and full text - the text in *italics* between brackets provides instructions where the applicable precautionary statement text must be adapted by each manufacturer/supplier.

The C&L permutations result from the entry in Part 3 of Annex VI of CLP, if any, and from the self-classification for all other hazard classes or differentiations not covered there, as relevant. Where relevant, the Note(s) from Part 3 of Annex VI of CLP and/or the Oil Industry Note(s) (OIN) that have been applied to the C&L permutation are provided.

Each chapter in this Appendix is named with the full group name and (in brackets) the short name of the group.

Each chapter contains all permutations that could be applied to the relevant Petroleum Substances category. For substances which have been registered under REACH not all permutations listed within a Petroleum Substance category are applicable to every substance. The tables in each chapter show which C&L permutations codes can currently be assigned to each substance within the Petroleum Substance Categories.

The classification given in the SDS should be the same as the classification provided in the notification to the C&L inventory and/or the substance registration dossier submitted to ECHA.

CRUDE OILS (Crudeoil)

The Table below should be used to find the applicable C&L permutation according to the values of the relevant C&L drivers determined by each manufacturer/supplier; in the absence of information on the C&L drivers, the worst-case classification (permutation CLP 1. Crudeoil) must be applied.

| C&L drivers | | | C&L permutation |
|---|---|------------------------------------|-----------------|
| Viscosity \leq 20.5 mm ² /s at 40 °C | Flash point < 23 °C | Initial boiling point \leq 35 °C | CLP 1. Crudeoil |
| | | Initial boiling point > 35 °C | CLP 2. Crudeoil |
| | Flash point \geq 23 °C and \leq 60 °C | | CLP 3. Crudeoil |
| | Flash point > 60 °C | | CLP 4. Crudeoil |
| Viscosity > 20.5 mm ² /s at 40 °C | Flash point < 23 °C | Initial boiling point \leq 35 °C | CLP 5. Crudeoil |
| | | Initial boiling point > 35 °C | CLP 6. Crudeoil |
| | Flash point \geq 23 °C and \leq 60 °C | | CLP 7. Crudeoil |
| | Flash point > 60 °C | | CLP 8. Crudeoil |

Due to the variability of crude oil composition, the environmental toxicity may differ from that given below; therefore, crude oils can be classified using specific experimental data on the actual type of crude oil under consideration.

| CRUDE OILS | | |
|------------|-----------|--|
| EC # | CAS # | Acceptable C&L permutations |
| 232-298-5 | 8002-05-9 | CLP 1, CLP 2, CLP 3, CLP 4, CLP 5, CLP 6, CLP 7, CLP 8 |

CLP 1. Crudeoil (Viscosity \leq 20.5 mm²/s at 40 °C; Flash point < 23 °C and Initial boiling point \leq 35 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|---|
| Flammable liquids: | Flam. Liquid 1 | H224: Extremely flammable liquid and vapour. |
| Serious damage / eye irritation: | Eye Irrit. 2 | H319: Causes serious eye irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, liver, spleen, thymus | H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H224: Extremely flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H319: Causes serious eye irritation.

H336: May cause drowsiness or dizziness.

H350: May cause cancer.

H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*... Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

P337 + P313: If eye irritation persists: Get medical advice/attention.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 2. Crudeoil (Viscosity $\leq 20.5 \text{ mm}^2/\text{s}$ at 40°C ; Flash point $< 23^\circ\text{C}$ and Initial boiling point $> 35^\circ\text{C}$)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|---|
| Flammable liquids: | Flam. Liquid 2 | H225: Highly flammable liquid and vapour. |
| Serious damage / eye irritation: | Eye Irrit. 2 | H319: Causes serious eye irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, liver, spleen, thymus | H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure. |

| Hazard class | Hazard category | Hazard statement |
|---|-------------------|--|
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H225: Highly flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H319: Causes serious eye irritation.

H336: May cause drowsiness or dizziness.

H350: May cause cancer.

H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*... Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

P337 + P313: If eye irritation persists: Get medical advice/attention.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 3. Crudeoil (Viscosity $\leq 20.5 \text{ mm}^2/\text{s}$ at 40°C ; Flash point $\geq 23^\circ\text{C}$ and $\leq 60^\circ\text{C}$)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|---|
| Flammable liquids: | Flam. Liquid 3 | H226: Flammable liquid and vapour. |
| Serious damage / eye irritation: | Eye Irrit. 2 | H319: Causes serious eye irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, liver, spleen, thymus | H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H319: Causes serious eye irritation.

H336: May cause drowsiness or dizziness.

H350: May cause cancer.

H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer/supplier to specify type of equipment.)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P331: Do NOT induce vomiting.

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (... Manufacturer/supplier to specify other equipment.)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (Manufacturer/supplier to specify applicable conditions.)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (Manufacturer/supplier to specify applicable conditions.)

P264: Wash ... thoroughly after handling. (Manufacturer/supplier to specify parts of the body to be washed after handling.)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer/supplier to specify type of equipment.)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/...
(...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

P337 + P313: If eye irritation persists: Get medical advice/attention.

P370 + P378: In case of fire: Use ... to extinguish. (...*Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... *in accordance with local/regional/national/international regulation (to be specified).*)

CLP 4. Crudeoil (Viscosity ≤ 20.5 mm²/s at 40 °C; Flash point > 60 °C)
Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|---|
| Serious damage / eye irritation: | Eye Irrit. 2 | H319: Causes serious eye irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, liver, spleen, thymus | H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H319: Causes serious eye irritation.

H336: May cause drowsiness or dizziness.

H350: May cause cancer.

H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

P337 + P313: If eye irritation persists: Get medical advice/attention.

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

CLP 5. Crudeoil (Viscosity > 20.5 mm²/s at 40 °C; Flash point < 23 °C and Initial boiling point ≤ 35 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|---|
| Flammable liquids: | Flam. Liquid 1 | H224: Extremely flammable liquid and vapour. |
| Serious damage / eye irritation: | Eye Irrit. 2 | H319: Causes serious eye irritation. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, liver, spleen, thymus | H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H224: Extremely flammable liquid and vapour.

H319: Causes serious eye irritation.

H336: May cause drowsiness or dizziness.

H350: May cause cancer.

H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P280: Wear protective gloves/protective clothing/eye protection/face protection. *(Manufacturer/supplier to specify type of equipment.)*

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P501: Dispose of contents/container to ... *(... in accordance with local/regional/national/international regulation (to be specified).)*

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements**Prevention:**

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. *(... Manufacturer/supplier to specify other equipment.)*

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. *(Manufacturer/supplier to specify applicable conditions.)*

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. *(Manufacturer/supplier to specify applicable conditions.)*

P264: Wash ... thoroughly after handling. *(Manufacturer/supplier to specify parts of the body to be washed after handling.)*

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. *(Manufacturer/supplier to specify type of equipment.)*

Response:

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. *(...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)*

P314: Get medical advice/attention if you feel unwell.

P337 + P313: If eye irritation persists: Get medical advice/attention.

P370 + P378: In case of fire: Use ... to extinguish. *(...Manufacturer/supplier to specify appropriate media. – if water increases risk.)*

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... *(... in accordance with local/regional/national/international regulation (to be specified).)*

CLP 6. Crudeoil (Viscosity > 20.5 mm²/s at 40 °C; Flash point < 23 °C and Initial boiling point > 35 °C)





Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|---|
| Flammable liquids: | Flam. Liquid 2 | H225: Highly flammable liquid and vapour. |
| Serious damage / eye irritation: | Eye Irrit. 2 | H319: Causes serious eye irritation. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, liver, spleen, thymus | H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

| | | | |
|---|--|--|---|
| GHS02: flame  | GHS07: exclamation mark  | GHS08: health hazard  | GHS09: environment  |
|---|--|--|---|

Hazard statements:

H225: Highly flammable liquid and vapour.

H319: Causes serious eye irritation.

H336: May cause drowsiness or dizziness.

H350: May cause cancer.

H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer/supplier to specify type of equipment.)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (...
Manufacturer/supplier to specify other equipment.)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P337 + P313: If eye irritation persists: Get medical advice/attention.

P370 + P378: In case of fire: Use ... to extinguish. (...*Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... *in accordance with local/regional/national/international regulation (to be specified).*)

CLP 7. Crudeoil (Viscosity > 20.5 mm²/s at 40 °C; Flash point ≥ 23 °C and ≤ 60 °C)





Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|---|
| Flammable liquids: | Flam. Liquid 3 | H226: Flammable liquid and vapour. |
| Serious damage / eye irritation: | Eye Irrit. 2 | H319: Causes serious eye irritation. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, liver, spleen, thymus | H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

| | | | |
|---|--|--|---|
| GHS02: flame  | GHS07: exclamation mark  | GHS08: health hazard  | GHS09: environment  |
|---|--|--|---|

Hazard statements:

H226: Flammable liquid and vapour.

H319: Causes serious eye irritation.

H336: May cause drowsiness or dizziness.

H350: May cause cancer.

H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer/supplier to specify type of equipment.)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (...
Manufacturer/supplier to specify other equipment.)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P337 + P313: If eye irritation persists: Get medical advice/attention.

P370 + P378: In case of fire: Use ... to extinguish. (...*Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... *in accordance with local/regional/national/international regulation (to be specified).*)

CLP 8. Crudeoil (Viscosity > 20.5 mm²/s at 40 °C; Flash point > 60 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|---|
| Serious damage / eye irritation: | Eye Irrit. 2 | H319: Causes serious eye irritation. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, liver, spleen, thymus | H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

| | | |
|--|---|---|
| GHS07: exclamation mark  | GHS08: health hazard  | GHS09: environment  |
|--|---|---|

Hazard statements:

H319: Causes serious eye irritation.

H336: May cause drowsiness or dizziness.

H350: May cause cancer.

H373: May cause damage to blood, liver, spleen and thymus through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer/supplier to specify type of equipment.)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (Manufacturer/supplier to specify applicable conditions.)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (Manufacturer/supplier to specify applicable conditions.)

P264: Wash ... thoroughly after handling. (Manufacturer/supplier to specify parts of the body to be washed after handling.)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection.
(*Manufacturer/supplier to specify type of equipment.*)

Response:

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P337 + P313: If eye irritation persists: Get medical advice/attention.

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... *in accordance with local/regional/national/international regulation (to be specified).*)

LOW BOILING POINT NAPHTHAS (GASOLINES) (Naphtha)

The Table below should be used to find the applicable C&L permutation according to the values of the relevant C&L drivers determined by each manufacturer/supplier; in the absence of information on the C&L drivers, the worst-case classification (permutation CLP 01. Naphtha) must be applied.

| C&L drivers | | | | C&L permutation | |
|-------------------|------------------|-------------------|-------------------------------|------------------------------|-----------------|
| Benzene ≥ 0.1%w/w | Toluene ≥ 3% w/w | n-hexane ≥ 3% w/w | Flash point < 23°C | Initial boiling point ≤ 35°C | CLP 01. Naphtha |
| | | | | Initial boiling point > 35°C | CLP 02. Naphtha |
| | | | Flash point ≥ 23°C and ≤ 60°C | | CLP 03. Naphtha |
| | Toluene ≥ 3% w/w | n-hexane < 3% w/w | Flash point < 23°C | Initial boiling point ≤ 35°C | CLP 04. Naphtha |
| | | | | Initial boiling point > 35°C | CLP 05. Naphtha |
| | | | Flash point ≥ 23°C and ≤ 60°C | | CLP 06. Naphtha |
| | Toluene < 3% w/w | n-hexane ≥ 3% w/w | Flash point < 23°C | Initial boiling point ≤ 35°C | CLP 07. Naphtha |
| | | | | Initial boiling point > 35°C | CLP 08. Naphtha |
| | | | Flash point ≥ 23°C and ≤ 60°C | | CLP 09. Naphtha |
| | Toluene < 3% w/w | n-hexane < 3% w/w | Flash point < 23°C | Initial boiling point ≤ 35°C | CLP 10. Naphtha |
| | | | | Initial boiling point > 35°C | CLP 11. Naphtha |
| | | | Flash point ≥ 23°C and ≤ 60°C | | CLP 12. Naphtha |
| Benzene < 0.1%w/w | Toluene ≥ 3% w/w | n-hexane ≥ 3% w/w | Flash point < 23°C | Initial boiling point ≤ 35°C | CLP 13. Naphtha |
| | | | | Initial boiling point > 35°C | CLP 14. Naphtha |
| | | | Flash point ≥ 23°C and ≤ 60°C | | CLP 15. Naphtha |
| | Toluene ≥ 3% w/w | n-hexane < 3% w/w | Flash point < 23°C | Initial boiling point ≤ 35°C | CLP 16. Naphtha |
| | | | | Initial boiling point > 35°C | CLP 17. Naphtha |
| | | | Flash point ≥ 23°C and ≤ 60°C | | CLP 18. Naphtha |
| | Toluene < 3% w/w | n-hexane ≥ 3% w/w | Flash point < 23°C | Initial boiling point ≤ 35°C | CLP 19. Naphtha |
| | | | | Initial boiling point > 35°C | CLP 20. Naphtha |
| | | | Flash point ≥ 23°C and ≤ 60°C | | CLP 21. Naphtha |
| | Toluene < 3% w/w | n-hexane < 3% w/w | Flash point < 23°C | Initial boiling point ≤ 35°C | CLP 22. Naphtha |
| | | | | Initial boiling point > 35°C | CLP 23. Naphtha |
| | | | Flash point ≥ 23°C and ≤ 60°C | | CLP 24. Naphtha |

Note: The substances with EC# 295-418-5, 613-683-0 and 614-725-0 are not included in Annex VI of CLP and therefore Note OIN P is applied instead of Note P to permutations CLP 13 to CLP 24.

In accordance with the 5th ATP to the CLP Regulation, the following additional classification applies to the substance with EC # 265-185-4.

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Central nervous system | H372: Causes damage to central nervous system through prolonged or repeated exposure. |

Note 1: The permutations CLP 01 to CLP 24 for EC # 265-185-4 are named as CLP xx. White Spirit instead of CLP xx. Naphtha, to highlight the different hazard profile.

Note 2: Additional classification and labelling STOT RE 1 applies case-by-case if Benzene content is ≥10% w/w in Naphtha category substances.

In this particular case, the following precautionary statements will add (if not already included) to the full list as mentioned for each permutation:

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (Manufacturer/supplier to specify applicable conditions.)

P264: Wash ... thoroughly after handling. (Manufacturer/supplier to specify parts of the body to be washed after handling.)

P270: Do not eat, drink or smoke when using this product.

P314: Get medical advice/attention if you feel unwell.

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

| LOW BOILING POINT NAPHTHAS (GASOLINES) | | |
|--|------------|--|
| EC # | CAS # | Acceptable C&L permutations |
| 232-349-1 | 8006-61-9 | CLP 01 |
| 232-453-7 | 8032-32-4 | CLP 07 |
| 265-041-0 | 64741-41-9 | CLP 01, CLP 02, CLP 05, CLP 06, CLP 08, CLP 11, CLP 12, CLP 18, CLP 23, CLP 24 |
| 265-042-6 | 64741-42-0 | CLP 01, CLP 02, CLP 03, CLP 04, CLP 05, CLP 06, CLP 07, CLP 08, CLP 09, CLP 10, CLP 13, CLP 19, CLP 20, CLP 22, CLP 23 |
| 265-046-8 | 64741-46-4 | CLP 01, CLP 02, CLP 04, CLP 07, CLP 08, CLP 09, CLP 10 |
| 265-047-3 | 64741-47-5 | CLP 07 |
| 265-055-7 | 64741-54-4 | CLP 01, CLP 02, CLP 03, CLP 04, CLP 05, CLP 10, CLP 11, CLP 16, CLP 17, CLP 18, CLP 22, CLP 23, CLP 24 |
| 265-056-2 | 64741-55-5 | CLP 01, CLP 02, CLP 04, CLP 05, CLP 07, CLP 10, CLP 11 |
| 265-065-1 | 64741-63-5 | CLP 01, CLP 02, CLP 04, CLP 05, CLP 07, CLP 08, CLP 09, CLP 10 |
| 265-066-7 | 64741-64-6 | CLP 01, CLP 19, CLP 22, CLP 23 |
| 265-068-8 | 64741-66-8 | CLP 20, CLP 23 |
| 265-070-9 | 64741-68-0 | CLP 01, CLP 02, CLP 05, CLP 17, CLP 24 |
| 265-071-4 | 64741-69-1 | CLP 01, CLP 02, CLP 03, CLP 05, CLP 07, CLP 08, CLP 09, CLP 10, CLP 11, CLP 19, CLP 20, CLP 22, CLP 23 |
| 265-073-5 | 64741-70-4 | CLP 01, CLP 02, CLP 07, CLP 10, CLP 13, CLP 19, CLP 20, CLP 21, CLP 22, CLP 23 |
| 265-075-6 | 64741-74-8 | CLP 01, CLP 07, CLP 08, CLP 11 |
| 265-079-8 | 64741-78-2 | CLP 02, CLP 05, CLP 07, CLP 08, CLP 11, CLP 14, CLP 17, CLP 20, CLP 21, CLP 23, CLP 24 |
| 265-085-0 | 64741-83-9 | CLP 01, CLP 02, CLP 04, CLP 07, CLP 08, CLP 10, CLP 24 |
| 265-086-6 | 64741-84-0 | CLP 01, CLP 02, CLP 08, CLP 13, CLP 20, CLP 22, CLP 23 |
| 265-089-2 | 64741-87-3 | CLP 01, CLP 02, CLP 04, CLP 05, CLP 08, CLP 10, CLP 20, CLP 24 |
| 265-150-3 | 64742-48-9 | CLP 01, CLP 02, CLP 05, CLP 11, CLP 14, CLP 17, CLP 18, CLP 23, CLP 24 |
| 265-151-9 | 64742-49-0 | CLP 01, CLP 02, CLP 03, CLP 04, CLP 07, CLP 08, CLP 09, CLP 10, CLP 13, CLP 16, CLP 20, CLP 22, CLP 23, CLP 24 |
| 265-170-2 | 64742-66-1 | CLP 04, CLP 05, CLP 07, CLP 08 |
| 265-178-6 | 64742-73-0 | CLP 01, CLP 02, CLP 04, CLP 05, CLP 07, CLP 08, CLP 10, CLP 11, CLP 17 |
| 265-185-4 | 64742-82-1 | CLP 01, CLP 02, CLP 03, CLP 05, CLP 07, CLP 11, CLP 20, CLP 23, CLP 24 |
| 265-192-2 | 64742-89-8 | CLP 01, CLP 07, CLP 08, CLP 22, CLP 23, CLP 24 |
| 265-199-0 | 64742-95-6 | CLP 04, CLP 05, CLP 08, CLP 24 |
| 270-077-5 | 68410-05-9 | CLP 02, CLP 07 |
| 270-088-5 | 68410-71-9 | CLP 01, CLP 20 |
| 270-093-2 | 68410-97-9 | CLP 23, CLP 24 |
| 270-660-4 | 68475-79-6 | CLP 01, CLP 02, CLP 03, CLP 10, CLP 22 |
| 270-686-6 | 68476-46-0 | CLP 02, CLP 05, CLP 10, CLP 11, CLP 14, CLP 17, CLP 22, CLP 23 |
| 270-690-8 | 68476-50-6 | CLP 01, CLP 02, CLP 04, CLP 07, CLP 08, CLP 19, CLP 22 |
| 270-695-5 | 68476-55-1 | CLP 01, CLP 10, CLP 11, CLP 22 |
| 270-991-4 | 68513-02-0 | CLP 01, CLP 07, CLP 08 |
| 270-993-5 | 68513-03-1 | CLP 01, CLP 02, CLP 08 |
| 271-058-4 | 68514-79-4 | CLP 04 |
| 271-267-0 | 68527-27-5 | CLP 01, CLP 04, CLP 10, CLP 11, CLP 22, CLP 23 |
| 271-635-0 | 68603-08-7 | CLP 05 |
| 271-727-0 | 68606-11-1 | CLP 01, CLP 02, CLP 07, CLP 08, CLP 22, CLP 23, CLP 24 |
| 272-186-3 | 68783-12-0 | CLP 01, CLP 02, CLP 07, CLP 08, CLP 16, CLP 17, CLP 21, CLP 22, CLP 23, CLP 24 |
| 272-206-0 | 68783-66-4 | CLP 01, CLP 07 |
| 272-895-8 | 68919-37-9 | CLP 01, CLP 02, CLP 05, CLP 10, CLP 11, CLP 22, CLP 23, CLP 24 |
| 272-931-2 | 68921-08-4 | CLP 01, CLP 07, CLP 08 |
| 273-271-8 | 68955-35-1 | CLP 01, CLP 02, CLP 04, CLP 05, CLP 07, CLP 08, CLP 24 |
| 285-510-3 | 85116-59-2 | CLP 01, CLP 02, CLP 10, CLP 20 |
| 289-220-8 | 86290-81-5 | CLP 01, CLP 02, CLP 03, CLP 04, CLP 05, CLP 06, CLP 07, CLP 08, CLP 09, CLP 10, CLP 11, CLP 12, CLP 13, CLP 14, CLP 16, CLP 17, CLP 19, CLP 20, CLP 22, CLP 23 |
| 295-279-0 | 91995-18-5 | CLP 17, CLP 18, CLP 24 |
| 295-298-4 | 91995-38-9 | CLP 07, CLP 10, CLP 22 |
| 295-331-2 | 91995-68-5 | CLP 01, CLP 05 |

| LOW BOILING POINT NAPHTHAS (GASOLINES) | | |
|--|-------------|--|
| EC # | CAS # | Acceptable C&L permutations |
| 295-418-5 | 92045-37-9 | CLP 08, CLP 23, CLP 24 |
| 295-431-6 | 92045-50-6 | CLP 02, CLP 23 |
| 295-433-7 | 92045-52-8 | CLP 01, CLP 04, CLP 05, CLP 07, CLP 08 |
| 295-440-5 | 92045-58-4 | CLP 08, CLP 23 |
| 295-441-0 | 92045-59-5 | CLP 01, CLP 02, CLP 04, CLP 05, CLP 10, CLP 11, CLP 12, CLP 23 |
| 295-442-6 | 92045-60-8 | CLP 19, CLP 20, CLP 21, CLP 22, CLP 23, CLP 24 |
| 295-445-2 | 92045-63-1 | CLP 08 |
| 295-446-8 | 92045-64-2 | CLP 08 |
| 296-903-4 | 93165-19-6 | CLP 01, CLP 02, CLP 05, CLP 08, CLP 19, CLP 20, CLP 22, CLP 23 |
| 297-401-8 | 93571-75-6 | CLP 02, CLP 05, CLP 06, CLP 17, CLP 23, CLP 24 |
| 297-458-9 | 93572-29-3 | CLP 01, CLP 04, CLP 05 |
| 297-465-7 | 93572-35-1 | CLP 23, CLP 24 |
| 297-466-2 | 93572-36-2 | CLP 01, CLP 02 |
| 297-852-0 | 93763-33-8 | CLP 23 |
| 309-871-4 | 101316-67-0 | CLP 02, CLP 20 |
| 309-879-8 | 101316-76-1 | CLP 02, CLP 08 |
| 309-976-5 | 101795-01-1 | CLP 01 |
| 613-683-0 | 64741-72-6 | CLP 04, CLP 22, CLP 23 |
| 614-725-0 | 68783-11-9 | CLP 13, CLP 22, CLP 23, CLP 24 |

CLP 01. Naphtha (Benzene \geq 0.1% w/w; Toluene \geq 3% w/w; n-hexane \geq 3% w/w; Flashpoint $<$ 23 °C and Initial boiling point \leq 35 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 1 | H224: Extremely flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Fertility and unborn child | H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child. |
| Germ cell mutagenicity: | Muta. 1B | H340: May cause genetic defects. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H224: Extremely flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H340: May cause genetic defects.

H350: May cause cancer.

H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*). : Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Additional labelling requirements:

Restricted to professional users due to classification as mutagenic Category 1B and carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P321: Specific treatment (see ... on this label). (... Reference to supplemental first aid instruction.)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (...Manufacturer/supplier to specify appropriate media. – if water increases risk.)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

CLP 02. Naphtha (Benzene $\geq 0.1\%$ w/w; Toluene $\geq 3\%$ w/w; n-hexane $\geq 3\%$ w/w; Flashpoint $< 23^\circ\text{C}$ and Initial boiling point $> 35^\circ\text{C}$)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 2 | H225: Highly flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Fertility and unborn child | H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child. |
| Germ cell mutagenicity: | Muta. 1B | H340: May cause genetic defects. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H225: Highly flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H340: May cause genetic defects.

H350: May cause cancer.

H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*). : Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Additional labelling requirements:

Restricted to professional users due to classification as mutagenic Category 1B and carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P321: Specific treatment (see ... on this label). (... Reference to supplemental first aid instruction.)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (...Manufacturer/supplier to specify appropriate media. – if water increases risk.)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)





CLP 03. Naphtha (Benzene \geq 0.1% w/w; Toluene \geq 3% w/w; n-hexane \geq 3% w/w; Flashpoint \geq 23 °C and \leq 60 °C)
Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 3 | H226: Flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Fertility and unborn child | H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child. |
| Germ cell mutagenicity: | Muta. 1B | H340: May cause genetic defects. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

| | | | |
|---|--|---|---|
| GHS02: flame  | GHS07: exclamation mark  | GHS08: health hazard  | GHS09: environment  |
|---|--|---|---|

Hazard statements:

H226: Flammable liquid and vapour.
 H304: May be fatal if swallowed and enters airways.
 H315: Causes skin irritation.
 H336: May cause drowsiness or dizziness.
 H340: May cause genetic defects.
 H350: May cause cancer.
 H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child.
 H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.
 P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P273: Avoid release to the environment.
 P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)
 P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*). Do NOT induce vomiting.
 P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Additional labelling requirements:

Restricted to professional users due to classification as mutagenic Category 1B and carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.
 P202: Do not handle until all safety precautions have been read and understood.
 P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P233: Keep container tightly closed.
 P240: Ground and bond container and receiving equipment.
 P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)
 P242: Use non-sparking tools.
 P243: Take action to prevent static discharges.
 P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)
 P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)
 P271: Use only outdoors or in a well-ventilated area.
 P273: Avoid release to the environment.
 P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (...*Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (... *Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (...*Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... *in accordance with local/regional/national/international regulation (to be specified).*)

CLP 04. Naphtha (Benzene \geq 0.1% w/w; Toluene \geq 3% w/w; n-hexane $<$ 3% w/w; Flashpoint $<$ 23 °C and Initial boiling point \leq 35 °C)

The following Oil Industry Note (OIN) has been applied:

- OIN 6 - The classification as a reproductive toxicant category 2; H361f (Suspected of damaging fertility) needs not apply if it can be shown that the substance contains less than 3 % w/w n-hexane (EINECS No 203-777-6).

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 1 | H224: Extremely flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Germ cell mutagenicity: | Muta. 1B | H340: May cause genetic defects. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H224: Extremely flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H340: May cause genetic defects.

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*). Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Additional labelling requirements:

Restricted to professional users due to classification as mutagenic Category 1B and carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P321: Specific treatment (see ... on this label). (... Reference to supplemental first aid instruction.)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (...Manufacturer/supplier to specify appropriate media. – if water increases risk.)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

CLP 05. Naphtha (Benzene \geq 0.1% w/w; Toluene \geq 3% w/w; n-hexane $<$ 3% w/w; Flashpoint $<$ 23 °C and Initial boiling point $>$ 35 °C)

The following Oil Industry Note (OIN) has been applied:

- OIN 6 - The classification as a reproductive toxicant category 2; H361f (Suspected of damaging fertility) needs not apply if it can be shown that the substance contains less than 3 % w/w n-hexane (EINECS No 203-777-6).

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 2 | H225: Highly flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Germ cell mutagenicity: | Muta. 1B | H340: May cause genetic defects. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment


Hazard statements:

H225: Highly flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H340: May cause genetic defects.

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer/supplier to specify type of equipment.)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.). Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Additional labelling requirements:

Restricted to professional users due to classification as mutagenic Category 1B and carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements**Prevention:**

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (...*Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (...*Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (...*Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (...*in accordance with local/regional/national/international regulation (to be specified).*)

CLP 06. Naphtha (Benzene \geq 0.1% w/w; Toluene \geq 3% w/w; n-hexane $<$ 3% w/w; Flashpoint \geq 23 °C and \leq 60 °C)

The following Oil Industry Note (OIN) has been applied:

- OIN 6 - The classification as a reproductive toxicant category 2; H361f (Suspected of damaging fertility) needs not apply if it can be shown that the substance contains less than 3 % w/w n-hexane (EINECS No 203-777-6).

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 3 | H226: Flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Germ cell mutagenicity: | Muta. 1B | H340: May cause genetic defects. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.
 H304: May be fatal if swallowed and enters airways.
 H315: Causes skin irritation.
 H336: May cause drowsiness or dizziness.
 H340: May cause genetic defects.
 H350: May cause cancer.
 H361d: Suspected of damaging the unborn child.
 H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.
 P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P273: Avoid release to the environment.
 P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)
 P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*). Do NOT induce vomiting.
 P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Additional labelling requirements:

Restricted to professional users due to classification as mutagenic Category 1B and carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.
 P202: Do not handle until all safety precautions have been read and understood.
 P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P233: Keep container tightly closed.
 P240: Ground and bond container and receiving equipment.
 P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)
 P242: Use non-sparking tools.
 P243: Take action to prevent static discharges.
 P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)
 P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)
 P271: Use only outdoors or in a well-ventilated area.
 P273: Avoid release to the environment.
 P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 07. Naphtha (Benzene \geq 0.1% w/w; Toluene $<$ 3% w/w; n-hexane \geq 3% w/w; Flashpoint $<$ 23 °C and Initial boiling point \leq 35 °C)

The following Oil Industry Note (OIN) has been applied:

- OIN 5 - The classification as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) needs not apply if it can be shown that the substance contains less than 3 % w/w toluene (EINECS No 203-625-9).

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 1 | H224: Extremely flammable liquid and vapour. |
| Skin corrosion/irritation | Skin Irrit. 2 | H315: Causes skin irritation |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Fertility | H361f: Suspected of damaging fertility. |
| Germ cell mutagenicity: | Muta. 1B | H340: May cause genetic defects. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment


Hazard statements:

H224: Extremely flammable liquid and vapour.
 H304: May be fatal if swallowed and enters airways.
 H315: Causes skin irritation.
 H336: May cause drowsiness or dizziness.
 H340: May cause genetic defects.
 H350: May cause cancer.
 H361f: Suspected of damaging fertility.
 H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.
 P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P273: Avoid release to the environment.
 P280: Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer/supplier to specify type of equipment.)
 P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.). Do NOT induce vomiting.
 P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Additional labelling requirements:

Restricted to professional users due to classification as mutagenic Category 1B and carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements**Prevention:**

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (...*Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (... *Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (...*Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... *in accordance with local/regional/national/international regulation (to be specified).*)

CLP 08. Naphtha (Benzene \geq 0.1% w/w; Toluene < 3% w/w; n-hexane \geq 3% w/w; Flashpoint < 23 °C and Initial boiling point > 35 °C)

The following Oil Industry Note (OIN) has been applied:

- OIN 5 - The classification as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) needs not apply if it can be shown that the substance contains less than 3 % w/w toluene (EINECS No 203-625-9).

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 2 | H225: Highly flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Fertility | H361f: Suspected of damaging fertility. |
| Germ cell mutagenicity: | Muta. 1B | H340: May cause genetic defects. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H225: Highly flammable liquid and vapour.
 H304: May be fatal if swallowed and enters airways.
 H315: Causes skin irritation.
 H336: May cause drowsiness or dizziness.
 H340: May cause genetic defects.
 H350: May cause cancer.
 H361f: Suspected of damaging fertility.
 H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.
 P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*). Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Additional labelling requirements:

Restricted to professional users due to classification as mutagenic Category 1B and carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 09. Naphtha (Benzene \geq 0.1% w/w; Toluene < 3% w/w; n-hexane \geq 3% w/w; Flashpoint \geq 23°C and \leq 60°C)

The following Oil Industry Note (OIN) has been applied:

- OIN 5 - The classification as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) needs not apply if it can be shown that the substance contains less than 3 % w/w toluene (EINECS No 203-625-9).

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 3 | H226: Flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Fertility | H361f: Suspected of damaging fertility. |
| Germ cell mutagenicity: | Muta. 1B | H340: May cause genetic defects. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.
 H304: May be fatal if swallowed and enters airways.
 H315: Causes skin irritation.
 H336: May cause drowsiness or dizziness.
 H340: May cause genetic defects.
 H350: May cause cancer.
 H361f: Suspected of damaging fertility.
 H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*). Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Additional labelling requirements:

Restricted to professional users due to classification as mutagenic Category 1B and carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements**Prevention:**

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

CLP 10. Naphtha (Benzene \geq 0.1% w/w; Toluene < 3% w/w; n-hexane < 3% w/w; Flashpoint < 23 °C and Initial boiling point \leq 35 °C)

The following Oil Industry Notes (OIN) have been applied:

- OIN 5 - The classification as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) needs not apply if it can be shown that the substance contains less than 3 % w/w toluene (EINECS No 203-625-9).
- OIN 6 - The classification as a reproductive toxicant category 2; H361f (Suspected of damaging fertility) needs not apply if it can be shown that the substance contains less than 3 % w/w n-hexane (EINECS No 203-777-6).

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 1 | H224: Extremely flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Germ cell mutagenicity: | Muta. 1B | H340: May cause genetic defects. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H224: Extremely flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H340: May cause genetic defects.

H350: May cause cancer.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*). Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Additional labelling requirements:

Restricted to professional users due to classification as mutagenic Category 1B and carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 11. Naphtha (Benzene \geq 0.1% w/w; Toluene < 3% w/w; n-hexane < 3% w/w; Flashpoint < 23 °C and Initial boiling point > 35 °C)

The following Oil Industry Notes (OIN) have been applied:

- OIN 5 - The classification as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) needs not apply if it can be shown that the substance contains less than 3 % w/w toluene (EINECS No 203-625-9).
- OIN 6 - The classification as a reproductive toxicant category 2; H361f (Suspected of damaging fertility) needs not apply if it can be shown that the substance contains less than 3 % w/w n-hexane (EINECS No 203-777-6).

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 2 | H225: Highly flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Germ cell mutagenicity: | Muta. 1B | H340: May cause genetic defects. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment


Hazard statements:

H225: Highly flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H340: May cause genetic defects.

H350: May cause cancer.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer/supplier to specify type of equipment.)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.). Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Additional labelling requirements:

Restricted to professional users due to classification as mutagenic Category 1B and carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (...
Manufacturer/supplier to specify other equipment.)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (... *Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (...*Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... *in accordance with local/regional/national/international regulation (to be specified).*)

CLP 12. Naphtha (Benzene \geq 0.1% w/w; Toluene < 3% w/w; n-hexane < 3% w/w; Flashpoint \geq 23°C and \leq 60°C)

The following Oil Industry Notes (OIN) have been applied:

- OIN 5 - The classification as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) needs not apply if it can be shown that the substance contains less than 3 % w/w toluene (EINECS No 203-625-9).
- OIN 6 - The classification as a reproductive toxicant category 2; H361f (Suspected of damaging fertility) needs not apply if it can be shown that the substance contains less than 3 % w/w n-hexane (EINECS No 203-777-6).

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 3 | H226: Flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Germ cell mutagenicity: | Muta. 1B | H340: May cause genetic defects. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H340: May cause genetic defects.

H350: May cause cancer.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*). Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Additional labelling requirements:

Restricted to professional users due to classification as mutagenic Category 1B and carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 13. Naphtha (Benzene < 0.1 % w/w; Toluene ≥ 3% w/w; n-hexane ≥ 3% w/w; Flashpoint < 23 °C and Initial boiling point ≤ 35 °C)

Except for EC 295-418-5, 613-683-0 and 614-725-0, the following Note has been applied:

- Note P - The classification as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0.1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-)P260-P262-P301 + P310-P331 (Table 3.1) shall apply. This note applies only to certain complex oil-derived substances in Part 3 of Annex VI of CLP.

For EC 295-418-5, 613-683-0 and 614-725-0, the following Oil industry Note (OIN) has been applied instead of Note P:

- OIN P - The classifications as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0.1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-) P260-P262-P301+P310-P331 shall apply.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 1 | H224: Extremely flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Fertility and unborn child | H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H224: Extremely flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*). Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Full list of Precautionary statements

General:

P102: Keep out of reach of children. (*In case of consumer use P102 should be added on the label*)

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P262: Do not get in eyes, on skin, or on clothing

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (...Manufacturer/supplier to specify appropriate media. – if water increases risk.)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

CLP 14. Naphtha (Benzene < 0.1 % w/w; Toluene ≥ 3% w/w; n-hexane ≥ 3% w/w; Flashpoint < 23 °C and Initial boiling point > 35 °C)

Except for EC 295-418-5, 613-683-0 and 614-725-0, the following Note has been applied:

- Note P - The classification as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0,1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-)P260-P262-P301 + P310-P331 (Table 3.1) shall apply. This note applies only to certain complex oil-derived substances in Part 3 of Annex VI of CLP.

For EC 295-418-5, 613-683-0 and 614-725-0, the following Oil industry Note (OIN) has been applied instead of Note P:

- OIN P - The classifications as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0.1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-) P260-P262-P301+P310-P331 shall apply.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 2 | H225: Highly flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Fertility and unborn child | H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H225: Highly flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*). Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Full list of Precautionary statements

General:

P102: Keep out of reach of children, (*In case of consumer use P102 should be added on the label*)

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P262: Do not get in eyes, on skin, or on clothing

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P321: Specific treatment (see ... on this label). (... Reference to supplemental first aid instruction.)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (...Manufacturer/supplier to specify appropriate media. – if water increases risk.)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

CLP 15. Naphtha (Benzene < 0.1 % w/w; Toluene ≥ 3% w/w; n-hexane ≥ 3% w/w; Flashpoint ≥ 23 °C and ≤ 60 °C)

Except for EC 295-418-5, 613-683-0 and 614-725-0, the following Note has been applied:

- Note P - The classification as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0,1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-)P260-P262-P301 + P310-P331 (Table 3.1) shall apply. This note applies only to certain complex oil-derived substances in Part 3 of Annex VI of CLP.

For EC 295-418-5, 613-683-0 and 614-725-0, the following Oil industry Note (OIN) has been applied instead of Note P:

- OIN P - The classifications as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0.1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-) P260-P262-P301+P310-P331 shall apply.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|------------------------------|-----------------|---|
| Flammable liquids: | Flam. Liquid 3 | H226: Flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Reproductive Toxicity: | Repr. 2 Specific effect: Fertility and unborn child | H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H361fd: Suspected of damaging fertility. Suspected of damaging the unborn child.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer/supplier to specify type of equipment.)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.). Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Full list of Precautionary statements

General:

P102: Keep out of reach of children. (In case of consumer use P102 should be added on the label)

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (...Manufacturer/supplier to specify other equipment.)

P242: Use non-sparking tools.
 P243: Take action to prevent static discharges.
 P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)
 P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)
 P262: Do not get in eyes, on skin, or on clothing
 P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)
 P271: Use only outdoors or in a well-ventilated area.
 P273: Avoid release to the environment.
 P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)
 P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)
 P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].
 P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.
 P308 + P313: IF exposed or concerned: Get medical advice/attention.
 P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)
 P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)
 P331: Do NOT induce vomiting.
 P332 + P313: If skin irritation occurs: Get medical advice/attention.
 P362 + P364: Take off contaminated clothing and wash it before reuse.
 P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)
 P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.
 P403 + P235: Store in a well-ventilated place. Keep cool.
 P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 16. Naphtha (Benzene < 0.1 % w/w; Toluene ≥ 3% w/w; n-hexane < 3% w/w; Flashpoint < 23 °C and Initial boiling point ≤ 35 °C)

The following Oil Industry Note (OIN) has been applied:

- OIN 6 - The classification as a reproductive toxicant category 2; H361f (Suspected of damaging fertility) needs not apply if it can be shown that the substance contains less than 3 % w/w n-hexane (EINECS No 203-777-6).

Except for EC 295-418-5, 613-683-0 and 614-725-0, the following Note has been applied:

- Note P - The classification as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0,1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-)P260-P262-P301 + P310-P331 (Table 3.1)) shall apply. This note applies only to certain complex oil-derived substances in Part 3 of Annex VI of CLP.

For EC 295-418-5, 613-683-0 and 614-725-0, the following Oil industry Note (OIN) has been applied instead of Note P:

- OIN P - The classifications as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0.1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-) P260-P262-P301+P310-P331 shall apply.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 1 | H224: Extremely flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H224: Extremely flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H361f: Suspected of damaging the unborn child.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*). Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Full list of Precautionary statements

General:

P102: Keep out of reach of children. (*In case of consumer use P102 should be added on the label*)

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P262: Do not get in eyes, on skin, or on clothing

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 17. Naphtha (Benzene < 0.1 % w/w Toluene ≥ 3% w/w; n-hexane < 3% w/w; Flashpoint < 23 °C and Initial boiling point > 35 °C)

The following Oil Industry Note (OIN) has been applied:

- OIN 6 - The classification as a reproductive toxicant category 2; H361f (Suspected of damaging fertility) needs not apply if it can be shown that the substance contains less than 3 % w/w n-hexane (EINECS No 203-777-6).

Except for EC 295-418-5, 613-683-0 and 614-725-0, the following Note has been applied:

- Note P - The classification as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0,1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-)P260-P262-P301 + P310-P331 (Table 3.1) shall apply. This note applies only to certain complex oil-derived substances in Part 3 of Annex VI of CLP.

For EC 295-418-5, 613-683-0 and 614-725-0, the following Oil industry Note (OIN) has been applied instead of Note P:

- OIN P - The classifications as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0.1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-) P260-P262-P301+P310-P331 shall apply.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 2 | H225: Highly flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H225: Highly flammable liquid and vapour.
 H304: May be fatal if swallowed and enters airways.
 H315: Causes skin irritation.
 H336: May cause drowsiness or dizziness.
 H361d: Suspected of damaging the unborn child.
 H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.
 P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P273: Avoid release to the environment.
 P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)
 P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*). Do NOT induce vomiting.
 P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Full list of Precautionary statements

General:

P102: Keep out of reach of children. (*In case of consumer use P102 should be added on the label*)

Prevention:

P201: Obtain special instructions before use.
 P202: Do not handle until all safety precautions have been read and understood.
 P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P233: Keep container tightly closed.
 P240: Ground and bond container and receiving equipment.
 P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)
 P242: Use non-sparking tools.
 P243: Take action to prevent static discharges.
 P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)
 P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)
 P262: Do not get in eyes, on skin, or on clothing
 P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)
 P271: Use only outdoors or in a well-ventilated area.
 P273: Avoid release to the environment.
 P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 18. Naphtha (Benzene < 0.1 % w/w; Toluene ≥ 3% w/w; n-hexane < 3% w/w; Flashpoint ≥ 23 °C and ≤ 60 °C)

The following Oil Industry Note (OIN) has been applied:

- OIN 6 - The classification as a reproductive toxicant category 2; H361f (Suspected of damaging fertility) needs not apply if it can be shown that the substance contains less than 3 % w/w n-hexane (EINECS No 203-777-6).

Except for EC 295-418-5, 613-683-0 and 614-725-0, the following Note has been applied:

- Note P - The classification as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0,1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-)P260-P262-P301 + P310-P331 (Table 3.1) shall apply. This note applies only to certain complex oil-derived substances in Part 3 of Annex VI of CLP.

For EC 295-418-5, 613-683-0 and 614-725-0, the following Oil industry Note (OIN) has been applied instead of Note P:

- OIN P - The classifications as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0.1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-) P260-P262-P301+P310-P331 shall apply.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 3 | H226: Flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H361d: Suspected of damaging the unborn child.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer/supplier to specify type of equipment.)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.). Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Full list of Precautionary statements

General:

P102: Keep out of reach of children. (In case of consumer use P102 should be added on the label)

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (...Manufacturer/supplier to specify other equipment.)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (Manufacturer/supplier to specify applicable conditions.)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (Manufacturer/supplier to specify applicable conditions.)

P262: Do not get in eyes, on skin, or on clothing

P264: Wash ... thoroughly after handling. (Manufacturer/supplier to specify parts of the body to be washed after handling.)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer/supplier to specify type of equipment.)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 19. Naphtha (Benzene < 0.1 % w/w; Toluene < 3% w/w; n-hexane ≥ 3% w/w; Flashpoint < 23 °C and Initial boiling point ≤ 35 °C)

The following Oil Industry Note (OIN) has been applied:

- OIN 5 - The classification as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) needs not apply if it can be shown that the substance contains less than 3 % w/w toluene (EINECS No 203-625-9).

Except for EC 295-418-5, 613-683-0 and 614-725-0, the following Note has been applied:

- Note P - The classification as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0,1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-)P260-P262-P301 + P310-P331 (Table 3.1) shall apply. This note applies only to certain complex oil-derived substances in Part 3 of Annex VI of CLP.

For EC 295-418-5, 613-683-0 and 614-725-0, the following Oil industry Note (OIN) has been applied instead of Note P:

- OIN P - The classifications as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0.1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-) P260-P262-P301+P310-P331 shall apply.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 1 | H224: Extremely flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Fertility | H361f: Suspected of damaging fertility. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H224: Extremely flammable liquid and vapour.
 H304: May be fatal if swallowed and enters airways.
 H315: Causes skin irritation.
 H336: May cause drowsiness or dizziness.
 H361f: Suspected of damaging fertility.
 H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.
 P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P273: Avoid release to the environment.
 P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)
 P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*). Do NOT induce vomiting.
 P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Full list of Precautionary statements

General:

P102: Keep out of reach of children. (*In case of consumer use P102 should be added on the label*)

Prevention:

P201: Obtain special instructions before use.
 P202: Do not handle until all safety precautions have been read and understood.
 P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P233: Keep container tightly closed.
 P240: Ground and bond container and receiving equipment.
 P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)
 P242: Use non-sparking tools.
 P243: Take action to prevent static discharges.
 P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)
 P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)
 P262: Do not get in eyes, on skin, or on clothing
 P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)
 P271: Use only outdoors or in a well-ventilated area.
 P273: Avoid release to the environment.
 P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 20. Naphtha (Benzene < 0.1 % w/w; Toluene < 3% w/w; n-hexane ≥ 3% w/w; Flashpoint < 23 °C and Initial boiling point > 35 °C)

The following Oil Industry Note (OIN) has been applied:

- OIN 5 - The classification as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) needs not apply if it can be shown that the substance contains less than 3 % w/w toluene (EINECS No 203-625-9).

Except for EC 295-418-5, 613-683-0 and 614-725-0, the following Note has been applied:

- Note P - The classification as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0,1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-)P260-P262-P301 + P310-P331 (Table 3.1) shall apply. This note applies only to certain complex oil-derived substances in Part 3 of Annex VI of CLP.

For EC 295-418-5, 613-683-0 and 614-725-0, the following Oil industry Note (OIN) has been applied instead of Note P:

- OIN P - The classifications as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0.1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-) P260-P262-P301+P310-P331 shall apply.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 2 | H225: Highly flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Fertility | H361f: Suspected of damaging fertility. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H225: Highly flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H361f: Suspected of damaging fertility.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*). Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Full list of Precautionary statements

General:

P102: Keep out of reach of children. (*In case of consumer use P102 should be added on the label*)

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P262: Do not get in eyes, on skin, or on clothing

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 21. Naphtha (Benzene < 0.1 % w/w; Toluene < 3% w/w; n-hexane ≥ 3% w/w; Flashpoint ≥ 23 °C and ≤ 60 °C)

The following Oil Industry Note (OIN) has been applied:

- OIN 5 - The classification as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) needs not apply if it can be shown that the substance contains less than 3 % w/w toluene (EINECS No 203-625-9).

Except for EC 295-418-5, 613-683-0 and 614-725-0, the following Note has been applied:

- Note P - The classification as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0,1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-)P260-P262-P301 + P310-P331 (Table 3.1) shall apply. This note applies only to certain complex oil-derived substances in Part 3 of Annex VI of CLP.

For EC 295-418-5, 613-683-0 and 614-725-0, the following Oil industry Note (OIN) has been applied instead of Note P:

- OIN P - The classifications as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0.1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-) P260-P262-P301+P310-P331 shall apply.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 3 | H226: Flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Fertility | H361f: Suspected of damaging fertility. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H361f: Suspected of damaging fertility.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer/supplier to specify type of equipment.)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.). Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Full list of Precautionary statements

General:

P102: Keep out of reach of children. (In case of consumer use P102 should be added on the label)

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (...
Manufacturer/supplier to specify other equipment.)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P262: Do not get in eyes, on skin, or on clothing

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (... *Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... *in accordance with local/regional/national/international regulation (to be specified).*)

CLP 22. Naphtha (Benzene < 0.1% w/w; Toluene < 3% w/w; n-hexane < 3% w/w; Flashpoint < 23 °C and Initial boiling point ≤ 35 °C)

The following Oil Industry Notes (OIN) have been applied:

- OIN 5 - The classification as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) needs not apply if it can be shown that the substance contains less than 3 % w/w toluene (EINECS No 203-625-9).
- OIN 6 - The classification as a reproductive toxicant category 2; H361f (Suspected of damaging fertility) needs not apply if it can be shown that the substance contains less than 3 % w/w n-hexane (EINECS No 203-777-6).

Except for EC 295-418-5, 613-683-0 and 614-725-0, the following Note has been applied:

- Note P - The classification as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0,1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-)P260-P262-P301 + P310-P331 (Table 3.1) shall apply. This note applies only to certain complex oil-derived substances in Part 3 of Annex VI of CLP.

For EC 295-418-5, 613-683-0 and 614-725-0, the following Oil industry Note (OIN) has been applied instead of Note P:

- OIN P - The classifications as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0.1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-) P260-P262-P301+P310-P331 shall apply.





Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 1 | H224: Extremely flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

| | | | |
|---|--|--|---|
| GHS02: flame  | GHS07: exclamation mark  | GHS08: health hazard  | GHS09: environment  |
|---|--|--|---|

Hazard statements:

H224: Extremely flammable liquid and vapour.
 H304: May be fatal if swallowed and enters airways.
 H315: Causes skin irritation.
 H336: May cause drowsiness or dizziness.
 H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P273: Avoid release to the environment.
 P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)
 P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*). Do NOT induce vomiting.
 P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Full list of Precautionary statements

General:

P102: Keep out of reach of children. (*In case of consumer use P102 should be added on the label*)

Prevention:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P233: Keep container tightly closed.
 P240: Ground and bond container and receiving equipment.
 P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)
 P242: Use non-sparking tools.
 P243: Take action to prevent static discharges.
 P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)
 P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)
 P262: Do not get in eyes, on skin, or on clothing
 P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)
 P271: Use only outdoors or in a well-ventilated area.
 P273: Avoid release to the environment.
 P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)
 P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (... *Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (...*Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... *in accordance with local/regional/national/international regulation (to be specified).*)

CLP 23. Naphtha (Benzene < 0.1% w/w; Toluene < 3% w/w; n-hexane < 3% w/w; Flashpoint < 23 °C and Initial boiling point > 35 °C)

The following Oil Industry Notes (OIN) have been applied:

- OIN 5 - The classification as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) needs not apply if it can be shown that the substance contains less than 3 % w/w toluene (EINECS No 203-625-9).
- OIN 6 - The classification as a reproductive toxicant category 2; H361f (Suspected of damaging fertility) needs not apply if it can be shown that the substance contains less than 3 % w/w n-hexane (EINECS No 203-777-6).

Except for EC 295-418-5, 613-683-0 and 614-725-0, the following Note has been applied:

- Note P - The classification as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0,1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-)P260-P262-P301 + P310-P331 (Table 3.1) shall apply. This note applies only to certain complex oil-derived substances in Part 3 of Annex VI of CLP.

For EC 295-418-5, 613-683-0 and 614-725-0, the following Oil industry Note (OIN) has been applied instead of Note P:

- OIN P - The classifications as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0.1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-) P260-P262-P301+P310-P331 shall apply.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 2 | H225: Highly flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H225: Highly flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*). Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Full list of Precautionary statements

General:

P102: Keep out of reach of children. (*In case of consumer use P102 should be added on the label*)

Prevention:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P262: Do not get in eyes, on skin, or on clothing

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (... *Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (...*Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... *in accordance with local/regional/national/international regulation (to be specified).*)

CLP 24. Naphtha (Benzene < 0.1% w/w; Toluene < 3% w/w; n-hexane < 3% w/w; Flashpoint ≥ 23 °C and ≤ 60 °C)

The following Oil Industry Notes (OIN) have been applied:

- OIN 5 - The classification as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) needs not apply if it can be shown that the substance contains less than 3 % w/w toluene (EINECS No 203-625-9).
- OIN 6 - The classification as a reproductive toxicant category 2; H361f (Suspected of damaging fertility) needs not apply if it can be shown that the substance contains less than 3 % w/w n-hexane (EINECS No 203-777-6).

Except for EC 295-418-5, 613-683-0 and 614-725-0, the following Note has been applied:

- Note P - The classification as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0,1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-)P260-P262-P301 + P310-P331 (Table 3.1) shall apply. This note applies only to certain complex oil-derived substances in Part 3 of Annex VI of CLP.

For EC 295-418-5, 613-683-0 and 614-725-0, the following Oil industry Note (OIN) has been applied instead of Note P:

- OIN P - The classifications as a carcinogen or mutagen need not apply if it can be shown that the substance contains less than 0.1 % w/w benzene (EINECS No 200-753-7). When the substance is not classified as a carcinogen at least the precautionary statements (P102-) P260-P262-P301+P310-P331 shall apply.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 3 | H226: Flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310 + P331: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*) Do NOT induce vomiting.

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

Full list of Precautionary statements

General:

P102: Keep out of reach of children. (*In case of consumer use P102 should be added on the label*)

Prevention:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P262: Do not get in eyes, on skin, or on clothing

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (... *Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (...*Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... *in accordance with local/regional/national/international regulation (to be specified).*)

KEROSINES (Kerosine)

The Table below should be used to find the applicable C&L permutation according to the values of the relevant C&L drivers determined by each manufacturer/supplier; in the absence of information on the C&L drivers, the worst-case classification (permutation CLP 1. Kerosine) must be applied.

| C&L drivers | C&L permutation |
|--|-----------------|
| Flashpoint $\geq 23^{\circ}\text{C}$ and $\leq 60^{\circ}\text{C}$ | CLP 1. Kerosine |
| Flashpoint $> 60^{\circ}\text{C}$ | CLP 2. Kerosine |

| KEROSINES | | |
|-----------|-------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 232-366-4 | 8008-20-6 | CLP 1, CLP 2 |
| 265-132-5 | 64742-31-0 | CLP 2 |
| 265-149-8 | 64742-47-8 | CLP 1, CLP 2 |
| 265-184-9 | 64742-81-0 | CLP 1, CLP 2 |
| 265-198-5 | 64742-94-5 | CLP 1, CLP 2 |
| 265-200-4 | 64742-96-7 | CLP 2 |
| 294-799-5 | 91770-15-9 | CLP 1, CLP 2 |
| 297-854-1 | 93763-35-0 | CLP 1 |
| 309-881-9 | 101316-80-7 | CLP 1 |

CLP 1. Kerosine (Flashpoint $\geq 23^{\circ}\text{C}$ and $\leq 60^{\circ}\text{C}$)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Flammable liquids: | Flam. Liquid 3 | H226: Flammable liquid and vapour. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P102: Keep out of reach of children. *(In case of consumer use P102 should be added on the label)*

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. *(Manufacturer/supplier to specify type of equipment.)*

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... *(...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)*

P331: Do NOT induce vomiting.

Additional labelling requirements:

Where the substance is sold to the general public (Consumers) for use in grill lighters or lamp oils, then container labels should be visibly, legibly and indelibly marked as follows, in accordance with REACH Annex XVII:

Lamp oils

- Keep lamps filled with this liquid out of the reach of children.
- Just a sip of lamp oil - or even sucking the wick of lamps may lead to life-threatening lung damage.

Grill lighter fluids

- Just a sip of grill lighter may lead to life-threatening lung damage.

Full list of Precautionary statements

General:

P102: Keep out of reach of children. *(In case of consumer use P102 should be added on the label)*

Prevention:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. *(... Manufacturer/supplier to specify other equipment.)*

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. *(Manufacturer/supplier to specify applicable conditions.)*

P264: Wash ... thoroughly after handling. *(Manufacturer/supplier to specify parts of the body to be washed after handling.)*

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection.
(*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/...
(*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 2. Kerosine (Flashpoint > 60 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P102: Keep out of reach of children. *(In case of consumer use P102 should be added on the label)*

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. *(Manufacturer/supplier to specify type of equipment.)*

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... *(...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)*

P331: Do NOT induce vomiting.

Additional labelling requirements:

Where the substance is sold to the general public (Consumers) for use in grill lighters or lamp oils, then container labels should be visibly, legibly and indelibly marked as follows, in accordance with REACH Annex XVII:

Lamp oils

- Keep lamps filled with this liquid out of the reach of children.
- Just a sip of lamp oil - or even sucking the wick of lamps may lead to life-threatening lung damage.

Grill lighter fluids

- Just a sip of grill lighter may lead to life-threatening lung damage.

Full list of Precautionary statements

General:

P102: Keep out of reach of children. *(In case of consumer use P102 should be added on the label)*

Prevention:

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. *(Manufacturer/supplier to specify applicable conditions.)*

P264: Wash ... thoroughly after handling. *(Manufacturer/supplier to specify parts of the body to be washed after handling.)*

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. *(Manufacturer/supplier to specify type of equipment.)*

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... *(...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)*

P302 + P352: IF ON SKIN: Wash with plenty of water/... *(...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.)*

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. *(...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)*

P321: Specific treatment (see ... on this label). *(... Reference to supplemental first aid instruction.)*

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... *(... in accordance with local/regional/national/international regulation (to be specified).)*

MK1 DIESEL FUEL (MK1)

There is one single C&L permutation for MK1.

| MK1 DIESEL FUEL | | |
|-----------------|-------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 931-250-7 | None | CLP 1 |

CLP 1. MK1

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Specific target organ toxicity - single exposure: | STOT Single Exp. 3 Affected organs: Central nervous system Route of exposure: Inhalation | H336: May cause drowsiness or dizziness. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H336: May cause drowsiness or dizziness.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection.
(Manufacturer/supplier to specify type of equipment.)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/...
(...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

Full list of Precautionary statements

Prevention:

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P391: Collect spillage.

Storage:

P403 + P233: Store in a well-ventilated place. Keep container tightly closed.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

STRAIGHT-RUN GAS OILS (SRGO)

The Table below should be used to find the applicable C&L permutation according to the values of the relevant C&L drivers determined by each manufacturer/supplier; in the absence of information on the C&L drivers, the worst-case classification (permutation CLP 1. SRGO) must be applied.

| C&L drivers | | C&L permutation |
|---|---|-----------------|
| Viscosity \leq 20.5 mm ² /s at 40 °C | Flash point \geq 23 °C and \leq 75 °C | CLP 1. SRGO |
| | Flash point $>$ 75 °C | CLP 2. SRGO |
| Viscosity $>$ 20.5 mm ² /s at 40 °C | Flash point \geq 23 °C and \leq 75 °C | CLP 3. SRGO |
| | Flash point $>$ 75 °C | CLP 4. SRGO |

| STRAIGHT-RUN GAS OILS | | |
|-----------------------|------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 265-043-1 | 64741-43-1 | CLP 1, CLP 2, CLP 3, CLP 4 |
| 265-044-7 | 64741-44-2 | CLP 1, CLP 2 |
| 272-341-5 | 68814-87-9 | CLP 1, CLP 2 |
| 272-817-2 | 68915-96-8 | CLP 1, CLP 2, CLP 4 |

CLP 1. SRGO (Viscosity \leq 20.5 mm²/s at 40 °C; Flash point \geq 23 °C and \leq 75 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Flammable liquids: | Flam. Liquid 3 * | H226: Flammable liquid and vapour. |
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Liver, spleen, bone marrow | H373: May cause damage to liver, spleen and bone marrow through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

* For the purpose of CLP gas oils, diesel and light heating oils having a flash point between \geq 55 °C and \leq 75 °C may be regarded as Category 3.

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H332: Harmful if inhaled.

H373: May cause damage to liver, spleen and bone marrow through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Full list of Precautionary statements

Prevention:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

P370 + P378: In case of fire: Use ... to extinguish. (...*Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... *in accordance with local/regional/national/international regulation (to be specified).*)

CLP 2. SRGO (Viscosity ≤ 20.5 mm²/s at 40 °C; Flash point > 75 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Liver, spleen, bone marrow | H373: May cause damage to liver, spleen and bone marrow through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H332: Harmful if inhaled.

H373: May cause damage to liver, spleen and bone marrow through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Full list of Precautionary statements

Prevention:

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

P391: Collect spillage.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 3. SRGO (Viscosity > 20.5 mm²/s at 40 °C; Flash point ≥ 23 °C and ≤ 75 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Flammable liquids: | Flam. Liquid 3 * | H226: Flammable liquid and vapour. |
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Liver, spleen, bone marrow | H373: May cause damage to liver, spleen and bone marrow through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

* For the purpose of CLP gas oils, diesel and light heating oils having a flash point between ≥ 55 °C and ≤ 75 °C may be regarded as Category 3.

Labelling

Signal word: Warning

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H332: Harmful if inhaled.

H373: May cause damage to liver, spleen and bone marrow through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Full list of Precautionary statements

Prevention:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (... *Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P370 + P378: In case of fire: Use ... to extinguish. (...*Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P235: Store in a well-ventilated place. Keep cool.

Disposal:

P501: Dispose of contents/container to ... (... *in accordance with local/regional/national/international regulation (to be specified).*)

CLP 4. SRGO (Viscosity > 20.5 mm²/s at 40 °C; Flash point > 75 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Liver, spleen, bone marrow | H373: May cause damage to liver, spleen and bone marrow through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Warning

Hazard pictogram:

GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H332: Harmful if inhaled.

H373: May cause damage to liver, spleen and bone marrow through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Full list of Precautionary statements

Prevention:

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

Response:

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P391: Collect spillage.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CRACKED GAS OILS (CrackedGO)

The Table below should be used to find the applicable C&L permutation according to the values of the relevant C&L drivers determined by each manufacturer/supplier; in the absence of information on the C&L drivers, the worst-case classification (permutation CLP 1. CrackedGO) must be applied.

| C&L drivers | C&L permutation |
|---|------------------|
| Flash point $\geq 23^{\circ}\text{C}$ and $\leq 75^{\circ}\text{C}$ | CLP 1. CrackedGO |
| Flash point $> 75^{\circ}\text{C}$ | CLP 2. CrackedGO |

| CRACKED GAS OILS | | |
|------------------|-------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 265-060-4 | 64741-59-9 | CLP 1, CLP 2 |
| 265-062-5 | 64741-60-2 | CLP 1, CLP 2 |
| 265-084-5 | 64741-82-8 | CLP 1, CLP 2 |
| 269-781-5 | 68333-25-5 | CLP 2 |
| 272-930-7 | 68921-07-3 | CLP 1, CLP 2 |
| 285-505-6 | 85116-53-6 | CLP 1 |
| 295-411-7 | 92045-29-9 | CLP 1, CLP 2 |
| 309-865-1 | 101316-59-0 | CLP 2 |

CLP 1. CrackedGO (Flash point $\geq 23^{\circ}\text{C}$ and $\leq 75^{\circ}\text{C}$)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Flammable liquids: | Flam. Liquid 3 * | H226: Flammable liquid and vapour. |
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, thymus, liver | H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure. |
| Hazards to the aquatic environment (acute/short-term): | Aquatic Acute 1 | H400: Very toxic to aquatic life (M-Factor =1). |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 1 | H410: Very toxic to aquatic life with long lasting effects (M-Factor =1). |

* For the purpose of CLP gas oils, diesel and light heating oils having a flash point between $\geq 55^{\circ}\text{C}$ and $\leq 75^{\circ}\text{C}$ may be regarded as Category 3.

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H332: Harmful if inhaled.

H350: May cause cancer.

H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure.

H410: Very toxic to aquatic life with long lasting effects (M-Factor =1).

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

Additional labelling requirements:

Restricted to professional users due to classification as carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P314: Get medical advice/attention if you feel unwell.

P321: Specific treatment (see ... on this label). (... Reference to supplemental first aid instruction.)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (...Manufacturer/supplier to specify appropriate media. – if water increases risk.)

P391: Collect spillage.

Storage:

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

CLP 2. CrackedGO (Flash point > 75 °C)
Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, thymus, liver | H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure. |
| Hazards to the aquatic environment (acute/short-term): | Aquatic Acute 1 | H400: Very toxic to aquatic life (M-Factor =1). |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 1 | H410: Very toxic to aquatic life with long lasting effects (M-Factor =1). |

Labelling

Signal word: Danger

Hazard pictogram:

GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H332: Harmful if inhaled.

H350: May cause cancer.

H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure.

H410: Very toxic to aquatic life with long lasting effects (M-Factor =1).

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

Additional labelling requirements:

Restricted to professional users due to classification as carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/...
(...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (...*Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P321: Specific treatment (see ... on this label). (... *Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P391: Collect spillage.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... *in accordance with local/regional/national/international regulation (to be specified).*)

VACUUM GAS OILS, HYDROCRACKED GAS OILS & DISTILLATE FUELS (VHGO)

Although Part 3 of Annex VI of CLP includes Note N (“The classification as a carcinogen need not apply if the full refining history is known and it can be shown that the substance from which it is produced is not a carcinogen. This note applies only to certain complex oil derived substances in Part 3.”) for the VHGO substance with EC 269-822-7, this Note is not applied in any of the C&L permutations and, therefore, all VHGO substances are classified as Carcinogenic Cat. 2.

The Table below should be used to find the applicable C&L permutation according to the values of the relevant C&L drivers determined by each manufacturer/supplier; in the absence of information on the C&L drivers, the worst-case classification (permutation CLP 1. VHGO) must be applied.

| C&L drivers | | C&L permutation |
|---|---|-----------------|
| Viscosity ≤ 20.5 mm ² /s at 40 °C | Flash point ≥ 23 °C and ≤ 75 °C | CLP 1. VHGO |
| | Flash point > 75 °C | CLP 2. VHGO |
| Viscosity > 20.5 mm ² /s at 40 °C | Flash point ≥ 23 °C and ≤ 75 °C | CLP 3. VHGO |
| | Flash point > 75 °C | CLP 4. VHGO |

| VACUUM GAS OILS, HYDROCRACKED GAS OILS & DISTILLATE FUELS | | |
|---|------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 265-049-4 | 64741-49-7 | CLP 1, CLP 2, CLP 3, CLP 4 |
| 265-059-9 | 64741-58-8 | CLP 1, CLP 2, CLP 3, CLP 4 |
| 265-078-2 | 64741-77-1 | CLP 1, CLP 2, CLP 3, CLP 4 |
| 265-190-1 | 64742-87-6 | CLP 1, CLP 2 |
| 269-822-7 | 68334-30-5 | CLP 1, CLP 2 |
| 270-671-4 | 68476-30-2 | CLP 1, CLP 2, CLP 4 |
| 270-673-5 | 68476-31-3 | CLP 1, CLP 2 |
| 270-676-1 | 68476-34-6 | CLP 1 |
| 295-407-5 | 92045-24-4 | CLP 4 |

CLP 1. VHGO (Viscosity ≤ 20.5 mm²/s at 40 °C; Flash point ≥ 23 °C and ≤ 75 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Flammable liquids: | Flam. Liquid 3 * | H226: Flammable liquid and vapour. |
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Carcinogenicity: | Carc. 2 | H351: Suspected of causing cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Thymus, liver, bone marrow | H373: May cause damage to thymus, liver and bone marrow through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

* For the purpose of CLP gas oils, diesel and light heating oils having a flash point between ≥ 55 °C and ≤ 75 °C may be regarded as Category 3.

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H332: Harmful if inhaled.

H351: Suspected of causing cancer.

H373: May cause damage to thymus, liver and bone marrow through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (...*Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P321: Specific treatment (see ... on this label). (... *Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (...*Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... *in accordance with local/regional/national/international regulation (to be specified).*)

CLP 2. VHGO (Viscosity ≤ 20.5 mm²/s at 40 °C; Flash point > 75 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Carcinogenicity: | Carc. 2 | H351: Suspected of causing cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Thymus, liver, bone marrow | H373: May cause damage to thymus, liver and bone marrow through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H332: Harmful if inhaled.

H351: Suspected of causing cancer.

H373: May cause damage to thymus, liver and bone marrow through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting. P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P391: Collect spillage.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 3. VHGO (Viscosity > 20.5 mm²/s at 40 °C; Flash point ≥ 23 °C and ≤ 75 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Flammable liquids: | Flam. Liquid 3 * | H226: Flammable liquid and vapour. |
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Carcinogenicity: | Carc. 2 | H351: Suspected of causing cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Thymus, liver, bone marrow | H373: May cause damage to thymus, liver and bone marrow through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

* For the purpose of CLP gas oils, diesel and light heating oils having a flash point between ≥ 55 °C and ≤ 75 °C may be regarded as Category 3.

Labelling

Signal word: Warning

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H315: Causes skin irritation.

H332: Harmful if inhaled.

H351: Suspected of causing cancer.

H373: May cause damage to thymus, liver and bone marrow through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P332 + P313: If skin irritation occurs: Get medical advice/attention.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (...*Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P302 + P352: IF ON SKIN: Wash with plenty of water/... (...*Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.
 P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)
 P314: Get medical advice/attention if you feel unwell.
 P321: Specific treatment (see ... on this label). (... *Reference to supplemental first aid instruction.*)
 P332 + P313: If skin irritation occurs: Get medical advice/attention.
 P362 + P364: Take off contaminated clothing and wash it before reuse.
 P370 + P378: In case of fire: Use ... to extinguish. (...*Manufacturer/supplier to specify appropriate media. – if water increases risk.*)
 P391: Collect spillage.

Storage:

P403 + P235: Store in a well-ventilated place. Keep cool.
 P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... *in accordance with local/regional/national/international regulation (to be specified).*)

CLP 4. VHGO (Viscosity > 20.5 mm²/s at 40 °C; Flash point > 75 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Carcinogenicity: | Carc. 2 | H351: Suspected of causing cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Thymus, liver, bone marrow | H373: May cause damage to thymus, liver and bone marrow through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Warning

Hazard pictogram:

GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H315: Causes skin irritation.
 H332: Harmful if inhaled.
 H351: Suspected of causing cancer.
 H373: May cause damage to thymus, liver and bone marrow through prolonged or repeated exposure.
 H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection.
(*Manufacturer/supplier to specify type of equipment.*)

P332 + P313: If skin irritation occurs: Get medical advice/attention.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection.
(*Manufacturer/supplier to specify type of equipment.*)

Response:

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P391: Collect spillage.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

OTHER GAS OILS (OtherGO)

The Table below should be used to find the applicable C&L permutation according to the values of the relevant C&L drivers determined by each manufacturer/supplier; in the absence of information on the C&L drivers, the worst-case classification (permutation CLP 1. OtherGO) must be applied.

| C&L drivers | | C&L permutation |
|------------------------------------|---|-----------------|
| Carcinogenic or unknown feed-stock | Flash point $\geq 23^{\circ}\text{C}$ and $\leq 75^{\circ}\text{C}$ | CLP 1. OtherGO |
| | Flash point $> 75^{\circ}\text{C}$ | CLP 2. OtherGO |
| Non-carcinogenic feed-stock | Flash point $\geq 23^{\circ}\text{C}$ and $\leq 75^{\circ}\text{C}$ | CLP 3. OtherGO |
| | Flash point $> 75^{\circ}\text{C}$ | CLP 4. OtherGO |

| OTHER GAS OILS | | |
|----------------|------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 265-148-2 | 64742-46-7 | CLP 1, CLP 2, CLP 3, CLP 4 |
| 265-182-8 | 64742-79-6 | CLP 1, CLP 2, CLP 3, CLP 4 |
| 265-183-3 | 64742-80-9 | CLP 1, CLP 2, CLP 3, CLP 4 |

CLP 1. OtherGO (Carcinogenic or unknown feed-stock; Flash point $\geq 23^{\circ}\text{C}$ and $\leq 75^{\circ}\text{C}$)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Flammable liquids: | Flam. Liquid 3 * | H226: Flammable liquid and vapour. |
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, thymus, liver | H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

* For the purpose of CLP gas oils, diesel and light heating oils having a flash point between $\geq 55^{\circ}\text{C}$ and $\leq 75^{\circ}\text{C}$ may be regarded as Category 3.

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H332: Harmful if inhaled.

H350: May cause cancer.

H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

Additional labelling requirements:

Restricted to professional users due to classification as carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (*...Manufacturer/supplier to specify other equipment.*)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/...
(...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (...*Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (...*Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P321: Specific treatment (see ... on this label). (... *Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (...*Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... *in accordance with local/regional/national/international regulation (to be specified).*)

CLP 2. OtherGO (Carcinogenic or unknown feed-stock; Flash point > 75 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, thymus, liver | H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H332: Harmful if inhaled.

H350: May cause cancer.

H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

Additional labelling requirements:

Restricted to professional users due to classification as carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P391: Collect spillage.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 3. OtherGO (Non-carcinogenic feed-stock; Flash point $\geq 23^{\circ}\text{C}$ and $\leq 75^{\circ}\text{C}$)

The following Note has been applied:

- Note N - The classification as a carcinogen need not apply if the full refining history is known and it can be shown that the substance from which it is produced is not a carcinogen. This note applies only to certain complex oil derived substances in Part 3.

The following Oil Industry Note (OIN) has been applied:

- OIN 14 - The classification as a specific target organ toxicant category 2; H373 (May cause damage to organs through prolonged or repeated exposure) needs not apply if the substance is not classified as carcinogenic.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|-------------------|--|
| Flammable liquids: | Flam. Liquid 3 * | H226: Flammable liquid and vapour. |
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

* For the purpose of CLP gas oils, diesel and light heating oils having a flash point between $\geq 55^{\circ}\text{C}$ and $\leq 75^{\circ}\text{C}$ may be regarded as Category 3.

Labelling

Signal word: Danger

Hazard pictogram:

GHS02: flame



GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H226: Flammable liquid and vapour.

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H332: Harmful if inhaled.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (Manufacturer/supplier to specify applicable conditions.)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer/supplier to specify type of equipment.)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P331: Do NOT induce vomiting.

Full list of Precautionary statements

Prevention:

P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P233: Keep container tightly closed.

P240: Ground and bond container and receiving equipment.

P241: Use explosion-proof [electrical/ventilating/lighting/...] equipment. (...Manufacturer/supplier to specify other equipment.)

P242: Use non-sparking tools.

P243: Take action to prevent static discharges.

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P303 + P361 + P353: IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water [or shower].

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P370 + P378: In case of fire: Use ... to extinguish. (*...Manufacturer/supplier to specify appropriate media. – if water increases risk.*)

P391: Collect spillage.

Storage:

P403 + P235: Store in a well-ventilated place. Keep cool.

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 4. OtherGO (Non-carcinogenic feed-stock; Flash point > 75 °C)

The following Note has been applied:

- Note N - The classification as a carcinogen need not apply if the full refining history is known and it can be shown that the substance from which it is produced is not a carcinogen. This note applies only to certain complex oil derived substances in Part 3.

The following Oil Industry Note (OIN) has been applied:

- OIN 14 - The classification as a specific target organ toxicant category 2; H373 (May cause damage to organs through prolonged or repeated exposure) needs not apply if the substance is not classified as carcinogenic.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|-------------------|--|
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H315: Causes skin irritation.

H332: Harmful if inhaled.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

Full list of Precautionary statements

Prevention:

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (*...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.*)

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P321: Specific treatment (see ... on this label). (*... Reference to supplemental first aid instruction.*)

P331: Do NOT induce vomiting.

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

P391: Collect spillage.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

HEAVY FUEL OIL COMPONENTS (HFO)

The Table below should be used to find the applicable C&L permutation according to the values of the relevant C&L drivers determined by each manufacturer/supplier; in the absence of information on the C&L drivers, the worst-case classification (permutation CLP 1. HFO) must be applied.

| C&L drivers | C&L permutation |
|--|-----------------|
| Viscosity \leq 20.5 mm ² /s at 40°C | CLP 1. HFO |
| Viscosity $>$ 20.5 mm ² /s at 40°C | CLP 2. HFO |

| HEAVY FUEL OIL COMPONENTS | | |
|---------------------------|------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 265-045-2 | 64741-45-3 | CLP 1, CLP 2 |
| 265-058-3 | 64741-57-7 | CLP 1, CLP 2 |
| 265-063-0 | 64741-61-3 | CLP 1, CLP 2 |
| 265-064-6 | 64741-62-4 | CLP 1, CLP 2 |
| 265-069-3 | 64741-67-9 | CLP 1, CLP 2 |
| 265-076-1 | 64741-75-9 | CLP 1, CLP 2 |
| 265-081-9 | 64741-80-6 | CLP 1, CLP 2 |
| 265-082-4 | 64741-81-7 | CLP 1, CLP 2 |
| 265-162-9 | 64742-59-2 | CLP 1, CLP 2 |
| 265-181-2 | 64742-78-5 | CLP 2 |
| 265-189-6 | 64742-86-5 | CLP 1, CLP 2 |
| 269-777-3 | 68333-22-2 | CLP 1, CLP 2 |
| 270-674-0 | 68476-32-4 | CLP 1 |
| 270-675-6 | 68476-33-5 | CLP 1, CLP 2 |
| 270-796-4 | 68478-17-1 | CLP 1, CLP 2 |
| 270-984-6 | 68512-62-9 | CLP 1, CLP 2 |
| 271-384-7 | 68553-00-4 | CLP 2 |
| 271-763-7 | 68607-30-7 | CLP 1, CLP 2 |
| 272-184-2 | 68783-08-4 | CLP 1, CLP 2 |
| 273-263-4 | 68955-27-1 | CLP 1, CLP 2 |
| 274-683-0 | 70592-76-6 | CLP 2 |
| 274-684-6 | 70592-77-7 | CLP 1, CLP 2 |
| 274-685-1 | 70592-78-8 | CLP 1, CLP 2 |
| 292-658-2 | 90669-76-4 | CLP 2 |
| 295-396-7 | 92045-14-2 | CLP 2 |
| 295-511-0 | 92061-97-7 | CLP 1, CLP 2 |
| 298-754-0 | 93821-66-0 | CLP 1, CLP 2 |

CLP 1. HFO (Viscosity \leq 20.5 mm²/s at 40°C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|------------------------------|--|---|
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, thymus, liver | H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure. |
| Hazards to the aquatic environment (acute/short-term): | Aquatic Acute 1 | H400: Very toxic to aquatic life (M-Factor =1). |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 1 | H410: Very toxic to aquatic life with long lasting effects (M-Factor =1). |

Labelling

Signal word: Danger

Hazard pictogram:

GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H332: Harmful if inhaled.

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure.

H410: Very toxic to aquatic life with long lasting effects (M-Factor =1).

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection.
(*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/...
(*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

P391: Collect spillage.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 2. HFO (Viscosity > 20.5 mm²/s at 40 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Acute toxicity - inhalation: | Acute Tox. 4 | H332: Harmful if inhaled. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 2 Affected organs: Blood, thymus, liver | H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure. |
| Hazards to the aquatic environment (acute/short-term): | Aquatic Acute 1 | H400: Very toxic to aquatic life (M-Factor =1). |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 1 | H410: Very toxic to aquatic life with long lasting effects (M-Factor =1). |

Labelling

Signal word: Danger

Hazard pictogram:

GHS07: exclamation mark



GHS08: health hazard



GHS09: environment



Hazard statements:

H332: Harmful if inhaled.

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H373: May cause damage to blood, thymus and liver through prolonged or repeated exposure.

H410: Very toxic to aquatic life with long lasting effects (M-Factor =1).

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B, except for fuel uses.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P261: Avoid breathing dust/fume/ gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P271: Use only outdoors or in a well-ventilated area.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P312: Call a POISON CENTRE/doctor/... if you feel unwell. (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P314: Get medical advice/attention if you feel unwell.

P391: Collect spillage.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

UNREFINED / ACID TREATED OILS (UATO)

The Table below should be used to find the applicable C&L permutation according to the values of the relevant C&L drivers determined by each manufacturer/supplier; in the absence of information on the C&L drivers, the worst-case classification (permutation CLP 1. UATO) must be applied.

| C&L drivers | C&L permutation |
|--|-----------------|
| Viscosity \leq 20.5 mm ² /s at 40°C | CLP 1. UATO |
| Viscosity > 20.5 mm ² /s at 40°C | CLP 2. UATO |

| UNREFINED / ACID TREATED OILS | | |
|-------------------------------|------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 265-051-5 | 64741-50-0 | CLP 1, CLP 2 |
| 265-052-0 | 64741-51-1 | CLP 1, CLP 2 |

CLP 1. UATO (Viscosity \leq 20.5 mm²/s at 40°C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|--|
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Carcinogenicity: | Carc. 1A | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, liver, lymph nodes, kidney, stomach, thymus Route of exposure: Oral and dermal | H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by oral and dermal routes. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard GHS09: environment



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by oral and dermal routes.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1A.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

P391: Collect spillage.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 2. UATO (Viscosity > 20.5 mm²/s at 40 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|--|
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Carcinogenicity: | Carc. 1A | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, liver, lymph nodes, kidney, stomach, thymus Route of exposure: Oral and dermal | H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by oral and dermal routes. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard GHS09: environment



Hazard statements:

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by oral and dermal routes.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1A.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

P391: Collect spillage.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

HIGHLY REFINED BASE OILS (HRBO)

The Table below should be used to find the applicable C&L permutation according to the values of the relevant C&L drivers determined by each manufacturer/supplier; in the absence of information on the C&L drivers, the worst-case classification (permutation CLP 1. HRBO) must be applied.

| C&L drivers | C&L permutation |
|---|-----------------|
| Viscosity \leq 20.5 mm ² /s at 40 °C | CLP 1. HRBO |
| Viscosity > 20.5 mm ² /s at 40 °C | CLP 2. HRBO |

| HIGHLY REFINED BASE OILS | | |
|--------------------------|-----------|--------------|
| EC # | CAS # | EC name |
| 232-455-8 | 8042-47-5 | CLP 1, CLP 2 |

CLP 1. HRBO (Viscosity \leq 20.5 mm²/s at 40 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|--------------------|-----------------|---|
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard



Hazard statements:

H304: May be fatal if swallowed and enters airways.

Precautionary statements:

P102: Keep out of reach of children. *(In case of consumer use P102 should be added on the label)*

*

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... *(...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)*

P331: Do NOT induce vomiting.

P405: Store locked up. *

P501: Dispose of contents/container to ... *(... in accordance with local/regional/national/international regulation (to be specified).)*

***This P-statement is not automatically triggered by the classification and labelling rules for these substances, however based on its physical chemical properties having a viscosity \leq 20.5 mm²/s @ 40 °C it is advised when used in consumer products.**

Full list of Precautionary statements

General:

P102: Keep out of reach of children. *(In case of consumer use P102 should be added on the label)*
*

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/...
(...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P331: Do NOT induce vomiting.

Storage:

P405: Store locked up. *

Disposal:

P501: Dispose of contents/container to ... *(... in accordance with local/regional/national/international regulation (to be specified).)*

***This P-statement is not automatically triggered by the classification and labelling rules for these substances, however based on its physical chemical properties having a viscosity $\leq 20.5 \text{ mm}^2/\text{s}$ @ 40°C it is advised when used in consumer products.**

CLP 2. HRBO (Viscosity > 20.5 mm²/s at 40 °C)

The substance is not classified.

OTHER LUBRICANT BASE OILS (LBO)

The Table below should be used to find the applicable C&L permutation according to the values of the relevant C&L drivers determined by each manufacturer/supplier; in the absence of information on the C&L drivers, the worst-case classification (permutation CLP 1. LBO) must be applied.

| C&L drivers | | C&L permutation |
|--------------------|--|-----------------|
| IP 346 ≥ 3% w/w | Viscosity ≤ 20.5 mm ² /s at 40° C | CLP 1. LBO |
| | Viscosity > 20.5 mm ² /s at 40° C | CLP 2. LBO |
| IP 346 < 3% w/w | Viscosity ≤ 20.5 mm ² /s at 40° C | CLP 3. LBO |
| | Viscosity > 20.5 mm ² /s at 40° C | CLP 4. LBO |

| OTHER LUBRICANT BASE OILS | | |
|---------------------------|-------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 265-077-7 | 64741-76-0 | CLP 1, CLP 3, CLP 4 |
| 265-090-8 | 64741-88-4 | CLP 1, CLP 2, CLP 3, CLP 4 |
| 265-091-3 | 64741-89-5 | CLP 3, CLP 4 |
| 265-096-0 | 64741-95-3 | CLP 2, CLP 3, CLP 4 |
| 265-097-6 | 64741-96-4 | CLP 2, CLP 4 |
| 265-098-1 | 64741-97-5 | CLP 3 |
| 265-101-6 | 64742-01-4 | CLP 3, CLP 4 |
| 265-146-1 | 64742-44-5 | CLP 4 |
| 265-155-0 | 64742-52-5 | CLP 2, CLP 3, CLP 4 |
| 265-156-6 | 64742-53-6 | CLP 1, CLP 3, CLP 4 |
| 265-157-1 | 64742-54-7 | CLP 2, CLP 3, CLP 4 |
| 265-158-7 | 64742-55-8 | CLP 1, CLP 3, CLP 4 |
| 265-159-2 | 64742-56-9 | CLP 1, CLP 3, CLP 4 |
| 265-160-8 | 64742-57-0 | CLP 2, CLP 4 |
| 265-166-0 | 64742-62-7 | CLP 3, CLP 4 |
| 265-169-7 | 64742-65-0 | CLP 3, CLP 4 |
| 265-174-4 | 64742-70-7 | CLP 3, CLP 4 |
| 265-176-5 | 64742-71-8 | CLP 3, CLP 4 |
| 276-736-3 | 72623-85-9 | CLP 3, CLP 4 |
| 276-737-9 | 72623-86-0 | CLP 3, CLP 4 |
| 276-738-4 | 72623-87-1 | CLP 3, CLP 4 |
| 278-012-2 | 74869-22-0 | CLP 3, CLP 4 |
| 295-301-9 | 91995-40-3 | CLP 1, CLP 3, CLP 4 |
| 297-474-6 | 93572-43-1 | CLP 4 |
| 305-588-5 | 94733-08-1 | CLP 4 |
| 305-594-8 | 94733-15-0 | CLP 3, CLP 4 |
| 309-874-0 | 101316-69-2 | CLP 4 |
| 309-877-7 | 101316-72-7 | CLP 3, CLP 4 |

CLP 1. LBO (IP 346 \geq 3% w/w; Viscosity \leq 20.5 mm²/s at 40 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child Route of exposure: Dermal | H361d: Suspected of damaging the unborn child by dermal route. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, liver, lymph nodes, kidney, stomach, thymus Route of exposure: Dermal | H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by dermal route. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H350: May cause cancer.

H361d: Suspected of damaging the unborn child by dermal route.

H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by dermal route.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Additional labelling requirements:

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 2. LBO (IP 346 \geq 3% w/w; Viscosity > 20.5 mm²/s at 40 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|--|
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child Route of exposure: Dermal | H361d: Suspected of damaging the unborn child by dermal route. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, liver, lymph nodes, kidney, stomach, thymus Route of exposure: Dermal | H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by dermal route. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard



Hazard statements:

H350: May cause cancer.

H361d: Suspected of damaging the unborn child by dermal route.

H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by dermal route.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Additional labelling requirements:

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 3. LBO (IP 346 < 3% w/w; Viscosity ≤ 20.5 mm²/s at 40 °C)

The following Oil Industry Note (OIN) has been applied:

- OIN 8 - The classifications as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) and specific target organ toxicant category 1; H372 (Causes damage to organs through prolonged or repeated exposure) need not apply if the substance is not classified as carcinogenic.

The following Note has been applied:

- Note L - The classification as a carcinogen need not apply if it can be shown that the substance contains less than 3 % DMSO extract as measured by IP 346 "Determination of polycyclic aromatics in unused lubricating base oils and asphaltene free petroleum fractions - Dimethyl sulphoxide extraction refractive index method", Institute of Petroleum, London. This note applies only to certain complex oil-derived substances in Part 3.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|--------------------|-----------------|---|
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard



Hazard statements:

H304: May be fatal if swallowed and enters airways.

Precautionary statements:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P331: Do NOT induce vomiting.

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P331: Do NOT induce vomiting.

Full list of Precautionary statements

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P331: Do NOT induce vomiting.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

CLP 4. LBO (IP 346 < 3% w/w; Viscosity > 20.5 mm²/s at 40 °C)

The following Oil Industry Note (OIN) has been applied:

- OIN 8 - The classifications as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) and specific target organ toxicant category 1; H372 (Causes damage to organs through prolonged or repeated exposure) need not apply if the substance is not classified as carcinogenic.

The following Note has been applied:

- Note L - The classification as a carcinogen need not apply if it can be shown that the substance contains less than 3 % DMSO extract as measured by IP 346 "Determination of polycyclic aromatics in unused lubricating base oils and asphaltene free petroleum fractions - Dimethyl sulphoxide extraction refractive index method", Institute of Petroleum, London. This note applies only to certain complex oil-derived substances in Part 3.

Classification and labelling according to CLP / GHS

The substance is not classified.

UNTREATED DISTILLATE AROMATIC EXTRACTS (UDAE)

The Table below should be used to find the applicable C&L permutation according to the values of the relevant C&L drivers determined by each manufacturer/supplier; in the absence of information on the C&L drivers, the worst-case classification (permutation CLP 1. UDAE) must be applied.

| C&L drivers | C&L permutation |
|---|-----------------|
| Viscosity \leq 20.5 mm ² /s at 40 °C | CLP 1. UDAE |
| Viscosity $>$ 20.5 mm ² /s at 40 °C | CLP 2. UDAE |

| UNTREATED DISTILLATE AROMATIC EXTRACTS | | |
|--|------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 265-103-7 | 64742-04-7 | CLP 1, CLP 2 |
| 265-104-2 | 64742-05-8 | CLP 1, CLP 2 |
| 265-111-0 | 64742-11-6 | CLP 2 |

CLP 1. UDAE (Viscosity \leq 20.5 mm²/s at 40 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|--|
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, liver, lymph nodes, kidney, stomach, thymus | H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard GHS09: environment



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements**Prevention:**

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

P391: Collect spillage.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 2. UDAE (Viscosity > 20.5 mm²/s at 40 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|--|
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, liver, lymph nodes, kidney, stomach, thymus | H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure. |
| Hazards to the aquatic environment (chronic/long-term): | Aquatic Chronic 2 | H411: Toxic to aquatic life with long lasting effects. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard GHS09: environment



Hazard statements:

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure.

H411: Toxic to aquatic life with long lasting effects.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P273: Avoid release to the environment.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

P391: Collect spillage.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

TREATED DISTILLATE AROMATIC EXTRACTS (TDAE)

The Table below should be used to find the applicable C&L permutation according to the values of the relevant C&L drivers determined by each manufacturer/supplier; in the absence of information on the C&L drivers, the worst-case classification (permutation CLP 1. TDAE) must be applied.

| C&L drivers | | C&L permutation |
|--------------------|--|-----------------|
| IP 346 ≥ 3% w/w | Viscosity ≤ 20.5 mm ² /s at 40 °C | CLP 1. TDAE |
| | Viscosity > 20.5 mm ² /s at 40 °C | CLP 2. TDAE |
| IP 346 < 3% w/w | Viscosity ≤ 20.5 mm ² /s at 40 °C | CLP 3. TDAE |
| | Viscosity > 20.5 mm ² /s at 40 °C | CLP 4. TDAE |

| TREATED DISTILLATE AROMATIC EXTRACTS | | |
|--------------------------------------|------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 272-180-0 | 68783-04-0 | CLP 1, CLP 2, CLP 3, CLP 4 |

CLP 1. TDAE (IP 346 ≥ 3% w/w, Viscosity ≤ 20.5 mm²/s at 40 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|--|
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, liver, lymph nodes, kidney, stomach, thymus | H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and/or thymus through prolonged or repeated exposure.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 2. TDAE (IP 346 \geq 3% w/w, Viscosity > 20.5 mm²/s at 40 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|--|
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, liver, lymph nodes, kidney, stomach, thymus | H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard



Hazard statements:

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 3. TDAE (IP 346 < 3% w/w, Viscosity ≤ 20.5 mm²/s at 40 °C)

The following Oil Industry Note (OIN) has been applied:

- OIN 8 - The classifications as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) and specific target organ toxicant category 1; H372 (Causes damage to organs through prolonged or repeated exposure) need not apply if the substance is not classified as carcinogenic.

The following Note has been applied:

- Note L - The classification as a carcinogen need not apply if it can be shown that the substance contains less than 3 % DMSO extract as measured by IP 346 "Determination of polycyclic aromatics in unused lubricating base oils and asphaltene free petroleum fractions - Dimethyl sulphoxide extraction refractive index method", Institute of Petroleum, London. This note applies only to certain complex oil-derived substances in Part 3.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|--------------------|-----------------|---|
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard



Hazard statements:

H304: May be fatal if swallowed and enters airways.

Precautionary statements:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P331: Do NOT induce vomiting.

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

Additional labelling requirements:

EUH066: Repeated exposure may cause skin dryness or cracking.

Full list of Precautionary statements

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/...
(...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P331: Do NOT induce vomiting.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

CLP 4. TDAE (IP 346 < 3% w/w, Viscosity > 20.5 mm²/s at 40 °C)

The following Oil Industry Note (OIN) has been applied:

- OIN 8 - The classifications as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) and specific target organ toxicant category 1; H372 (Causes damage to organs through prolonged or repeated exposure) need not apply if the substance is not classified as carcinogenic.

The following Note has been applied:

- Note L - The classification as a carcinogen need not apply if it can be shown that the substance contains less than 3 % DMSO extract as measured by IP 346 "Determination of polycyclic aromatics in unused lubricating base oils and asphaltene free petroleum fractions - Dimethyl sulphoxide extraction refractive index method", Institute of Petroleum, London. This note applies only to certain complex oil-derived substances in Part 3.

Classification and labelling according to CLP / GHS

The substance is not classified.

RESIDUAL AROMATIC EXTRACTS (RAE)

The Table below should be used to find the applicable C&L permutation according to the values of the relevant C&L drivers determined by each manufacturer/supplier; in the absence of information on the C&L drivers, the worst-case classification (permutation CLP 1. RAE) must be applied.

| C&L drivers | C&L permutation |
|-------------------------------|-----------------|
| Mutagenicity Index ≥ 0.4 | CLP 1. RAE |
| Mutagenicity Index < 0.4 | CLP 2. RAE |

| RESIDUAL AROMATIC EXTRACTS | | |
|----------------------------|------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 265-110-5 | 64742-10-5 | CLP 1, CLP 2 |
| 295-332-8 | 91995-70-9 | CLP 1, CLP 2 |

CLP 1. RAE (Mutagenicity Index ≥ 0.4)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|------------------|-----------------|------------------------------------|
| Carcinogenicity: | Carc. 2 | H351: Suspected of causing cancer. |

Labelling

Signal word: Warning

Hazard pictogram:

GHS08: health hazard



Hazard statements:

H351: Suspected of causing cancer.

Precautionary statements:

P201: Obtain special instructions before use.

P280: Wear protective gloves/protective clothing/eye protection/face protection.
(Manufacturer/supplier to specify type of equipment.)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P280: Wear protective gloves/protective clothing/eye protection/face protection.
(Manufacturer/supplier to specify type of equipment.)

Response:

P308 + P313: IF exposed or concerned: Get medical advice/attention.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

CLP 2. RAE (Mutagenicity Index < 0.4)

The following Oil Industry Note (OIN) has been applied:

- OIN 10 - The classification as a carcinogen needs not apply if it can be shown that the substance has mutagenicity index (MI) less than 0.4 as measured by the test method described in ASTM E 1687-04 or if another predictive test demonstrates the substance is not a carcinogen.

Classification and labelling according to CLP / GHS

The substance is not classified.

SLACK WAXES (Slackwax)

The Table below should be used to find the applicable C&L permutation according to the values of the relevant C&L drivers determined by each manufacturer/supplier; in the absence of information on the C&L drivers, the worst-case classification (permutation CLP 1. Slackwax) must be applied.

| C&L drivers | C&L permutation |
|------------------------------------|-----------------|
| Carcinogenic or unknown feed-stock | CLP 1. Slackwax |
| Non-carcinogenic feed-stock | CLP 2. Slackwax |

| SLACK WAXES | | |
|-------------|------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 265-165-5 | 64742-61-6 | CLP 2 |
| 292-660-3 | 90669-78-6 | CLP 2 |
| 295-523-6 | 92062-09-4 | CLP 2 |

CLP 1. Slackwax (Carcinogenic or unknown feed-stock)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|---|
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child Route of exposure: Dermal | H361d: Suspected of damaging the unborn child by dermal route. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, liver, lymph nodes, kidney, stomach, thymus Route of exposure: Oral and dermal | H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by oral and dermal route. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard



Hazard statements:

H350: May cause cancer.

H361d: Suspected of damaging the unborn child by dermal route.

H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by oral and dermal route.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Additional labelling requirements:

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 2. Slackwax (Non-carcinogenic feed-stock)

The following Oil Industry Note (OIN) has been applied:

- OIN 8 - The classifications as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) and specific target organ toxicant category 1; H372 (Causes damage to organs through prolonged or repeated exposure) need not apply if the substance is not classified as carcinogenic.

The following Note has been applied:

- Note N - The classification as a carcinogen need not apply if the full refining history is known and it can be shown that the substance from which it is produced is not a carcinogen. This note applies only to certain complex oil derived substances in Part 3.

Classification and labelling according to CLP / GHS

The substance is not classified.

PARAFFIN AND HYDROCARBON WAXES (Paraffinwax)

There is one single C&L Permutation for Paraffinwax substances.

| PARAFFIN AND HYDROCARBON WAXES | | |
|--------------------------------|------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 232-315-6 | 8002-74-2 | CLP 1 |
| 264-038-1 | 63231-60-7 | CLP 1 |
| 265-144-0 | 64742-42-3 | CLP 1 |
| 265-145-6 | 64742-43-4 | CLP 1 |
| 265-154-5 | 64742-51-4 | CLP 1 |
| 265-163-4 | 64742-60-5 | CLP 1 |
| 295-458-3 | 92045-76-6 | CLP 1 |

CLP 1. Paraffinwax

Classification and labelling according to CLP / GHS

The substance is not classified.

FOOTS OILS (Footsoil)

The Table below should be used to find the applicable C&L permutation according to the values of the relevant C&L drivers determined by each manufacturer/supplier; in the absence of information on the C&L drivers, the worst-case classification (permutation CLP 1. Footsoil) must be applied.

| C&L drivers | | C&L permutation |
|--------------------|--|-----------------|
| IP 346 ≥ 3% w/w | Viscosity ≤ 20.5 mm ² /s at 40 °C | CLP 1. Footsoil |
| | Viscosity > 20.5 mm ² /s at 40 °C | CLP 2. Footsoil |
| IP 346 < 3% w/w | Viscosity ≤ 20.5 mm ² /s at 40 °C | CLP 3. Footsoil |
| | Viscosity > 20.5 mm ² /s at 40 °C | CLP 4. Footsoil |

| FOOTS OILS | | |
|------------|------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 265-171-8 | 64742-67-2 | CLP 3, CLP 4 |
| 295-394-6 | 92045-12-0 | CLP 3, CLP 4 |
| 300-226-2 | 93924-32-4 | CLP 4 |

CLP 1. Footsoil (IP 346 ≥ 3% w/w; Viscosity ≤ 20.5 mm²/s at 40 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|--|
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, liver, lymph nodes, kidney, stomach, thymus | H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard



Hazard statements:

H304: May be fatal if swallowed and enters airways.

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P331: Do NOT induce vomiting.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Additional labelling requirements:

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (*...Manufacturer/supplier to specify the appropriate source of emergency medical advice.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

P331: Do NOT induce vomiting.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 2. Footsoil (IP 346 \geq 3% w/w; Viscosity > 20.5 mm²/s at 40 °C)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|---|--|
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child | H361d: Suspected of damaging the unborn child. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, liver, lymph nodes, kidney, stomach, thymus | H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard



Hazard statements:

H350: May cause cancer.

H361d: Suspected of damaging the unborn child.

H372: Causes damage to adrenals, bone marrow, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Additional labelling requirements:

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

CLP 3. Footsoil (IP 346 < 3% w/w; Viscosity ≤ 20.5 mm²/s at 40 °C)

The following Oil Industry Note (OIN) has been applied:

- OIN 8 - The classifications as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) and specific target organ toxicant category 1; H372 (Causes damage to organs through prolonged or repeated exposure) need not apply if the substance is not classified as carcinogenic.

The following Note has been applied:

- Note L - The classification as a carcinogen need not apply if it can be shown that the substance contains less than 3 % DMSO extract as measured by IP 346 "Determination of polycyclic aromatics in unused lubricating base oils and asphaltene free petroleum fractions - Dimethyl sulphoxide extraction refractive index method", Institute of Petroleum, London. This note applies only to certain complex oil-derived substances in Part 3.

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|--------------------|-----------------|---|
| Aspiration hazard: | Asp. Tox. 1 | H304: May be fatal if swallowed and enters airways. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard


Hazard statements:

H304: May be fatal if swallowed and enters airways.

Precautionary statements:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/... (...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P331: Do NOT induce vomiting.

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

Full list of Precautionary statements

Response:

P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER/doctor/...
(...Manufacturer/supplier to specify the appropriate source of emergency medical advice.)

P331: Do NOT induce vomiting.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (... in accordance with local/regional/national/international regulation (to be specified).)

CLP 4. Footsoil (IP 346 < 3% w/w; Viscosity > 20.5 mm²/s at 40 °C)

The following Oil Industry Note (OIN) has been applied:

- OIN 8 - The classifications as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) and specific target organ toxicant category 1; H372 (Causes damage to organs through prolonged or repeated exposure) need not apply if the substance is not classified as carcinogenic.

The following Note has been applied:

- Note L - The classification as a carcinogen need not apply if it can be shown that the substance contains less than 3 % DMSO extract as measured by IP 346 "Determination of polycyclic aromatics in unused lubricating base oils and asphaltene free petroleum fractions - Dimethyl sulphoxide extraction refractive index method", Institute of Petroleum, London. This note applies only to certain complex oil-derived substances in Part 3.

Classification and labelling according to CLP / GHS

The substance is not classified.

PETROLATUMS (Petrolatum)

The Table below should be used to find the applicable C&L permutation according to the values of the relevant C&L drivers determined by each manufacturer/supplier; in the absence of information on the C&L drivers, the worst-case classification (permutation CLP 1. Petrolatum) must be applied.

| C&L drivers | C&L permutation |
|------------------------------------|-------------------|
| Carcinogenic or unknown feed-stock | CLP 1. Petrolatum |
| Non-carcinogenic feed-stock | CLP 2. Petrolatum |

| PETROLATUMS | | |
|-------------|-------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 232-373-2 | 8009-03-8 | CLP 2 |
| 265-206-7 | 64743-01-7 | CLP 2 |
| 295-459-9 | 92045-77-7 | CLP 2 |
| 309-706-6 | 100684-33-1 | CLP 2 |

CLP 1. Petrolatum (Carcinogenic or unknown feed-stock)

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|---|--|---|
| Reproductive Toxicity: | Repr. 2 Specific effect: Unborn child Route of exposure: Dermal | H361d: Suspected of damaging the unborn child by dermal route. |
| Carcinogenicity: | Carc. 1B | H350: May cause cancer. |
| Specific target organ toxicity - repeated exposure: | STOT Rep. Exp. 1 Affected organs: Adrenals, bone marrow, blood, liver, lymph nodes, kidney, stomach, thymus Route of exposure: Oral and dermal | H372: Causes damage to adrenals, bone marrow, blood, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by oral and dermal routes. |

Labelling

Signal word: Danger

Hazard pictogram:

GHS08: health hazard



Hazard statements:

H350: May cause cancer.

H361d: Suspected of damaging the unborn child by dermal route.

H372: Causes damage to adrenals, bone marrow, blood, liver, lymph nodes, kidney, stomach and thymus through prolonged or repeated exposure by oral and dermal routes.

Precautionary statements:

P201: Obtain special instructions before use.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

Additional labelling requirements:

Restricted to professional users due to classification as carcinogenic Category 1B.

Full list of Precautionary statements

Prevention:

P201: Obtain special instructions before use.

P202: Do not handle until all safety precautions have been read and understood.

P260: Do not breathe dust/fume/gas/mist/vapours/spray. (*Manufacturer/supplier to specify applicable conditions.*)

P264: Wash ... thoroughly after handling. (*Manufacturer/supplier to specify parts of the body to be washed after handling.*)

P270: Do not eat, drink or smoke when using this product.

P280: Wear protective gloves/protective clothing/eye protection/face protection. (*Manufacturer/supplier to specify type of equipment.*)

Response:

P308 + P313: IF exposed or concerned: Get medical advice/attention.

P314: Get medical advice/attention if you feel unwell.

Storage:

P405: Store locked up.

Disposal:

P501: Dispose of contents/container to ... (*... in accordance with local/regional/national/international regulation (to be specified).*)

CLP 2. Petrolatum (Non-carcinogenic feed-stock)

The following Oil Industry Note (OIN) has been applied:

- OIN 8 - The classifications as a reproductive toxicant category 2; H361d (Suspected of damaging the unborn child) and specific target organ toxicant category 1; H372 (Causes damage to organs through prolonged or repeated exposure) need not apply if the substance is not classified as carcinogenic.

The following Note has been applied:

- Note N - The classification as a carcinogen need not apply if the full refining history is known and it can be shown that the substance from which it is produced is not a carcinogen. This note applies only to certain complex oil-derived substances in Part 3.

Classification and labelling according to CLP / GHS

The substance is not classified.

BITUMENS (Bitumen)

There is one single C&L Permutation for Bitumen substances.

| BITUMENS | | |
|-----------|------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 232-490-9 | 8052-42-4 | CLP 1 |
| 265-057-8 | 64741-56-6 | CLP 1 |
| 265-188-0 | 64742-85-4 | CLP 1 |
| 295-518-9 | 92062-05-0 | CLP 1 |

CLP 1. Bitumen**Classification and labelling according to CLP / GHS**

The substance is not classified.

OXIDIZED ASPHALT (OxiAsph)

There is one single C&L Permutation for OxiAsph.

| OXIDIZED ASPHALT | | |
|------------------|------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 265-196-4 | 64742-93-4 | CLP 1 |

CLP 1. OxiAsph

Classification and labelling according to CLP / GHS

The substance is not classified.

PETROLEUM COKES (PetCoke)

PetCoke substances are not classified and not subject to CLP notification.

| PETROLEUM COKES | | |
|-----------------|------------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 265-080-3 | 64741-79-3 | N/A |
| 265-209-3 | 64743-04-0 | N/A |
| 265-210-9 | 64743-05-1 | N/A |

SULFUR (Sulfur)

There is one single C&L permutation for Sulfur.

| SULFUR | | |
|-----------|-----------|-----------------------------|
| EC # | CAS # | Acceptable C&L permutations |
| 231-722-6 | 7704-34-9 | CLP 1 |

CLP 1. Sulfur

Classification and labelling according to CLP / GHS

| Hazard class | Hazard category | Hazard statement |
|------------------------------|-----------------|-------------------------------|
| Skin corrosion / irritation: | Skin Irrit. 2 | H315: Causes skin irritation. |

Labelling

Signal word: Warning

Hazard pictogram:

GHS07: exclamation mark



Hazard statements:

H315: Causes skin irritation.

Precautionary statements:

P280: Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer/supplier to specify type of equipment.)

P302 + P352: IF ON SKIN: Wash with plenty of water/... (...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.)

P332 + P313: If skin irritation occurs: Get medical advice/attention.

Full list of Precautionary statements

Prevention:

P264: Wash ... thoroughly after handling. (Manufacturer/supplier to specify parts of the body to be washed after handling.)

P280: Wear protective gloves/protective clothing/eye protection/face protection. (Manufacturer/supplier to specify type of equipment.)

Response:

P302 + P352: IF ON SKIN: Wash with plenty of water/... (...Manufacturer/supplier may specify a cleansing agent if appropriate, or may recommend an alternative agent in exceptional cases if water is clearly inappropriate.)

P321: Specific treatment (see ... on this label). (... Reference to supplemental first aid instruction.)

P332 + P313: If skin irritation occurs: Get medical advice/attention.

P362 + P364: Take off contaminated clothing and wash it before reuse.

APPENDIX 7: HISTORICAL CONTENT OUTLINING THE CHANGES FROM PREVIOUS LEGISLATION TO THE CLP REGULATION

Two key regulatory instruments which set out the long standing EU system on classification, packaging and labelling of chemicals have been developed over the last 50 years:

- Dangerous Substances Directive (67/548/EEC), 'DSD' (EU, 1967);
- Dangerous Preparations (i.e. mixtures of chemicals) Directive (1999/45/EC), 'DPD' (EU, 1999)

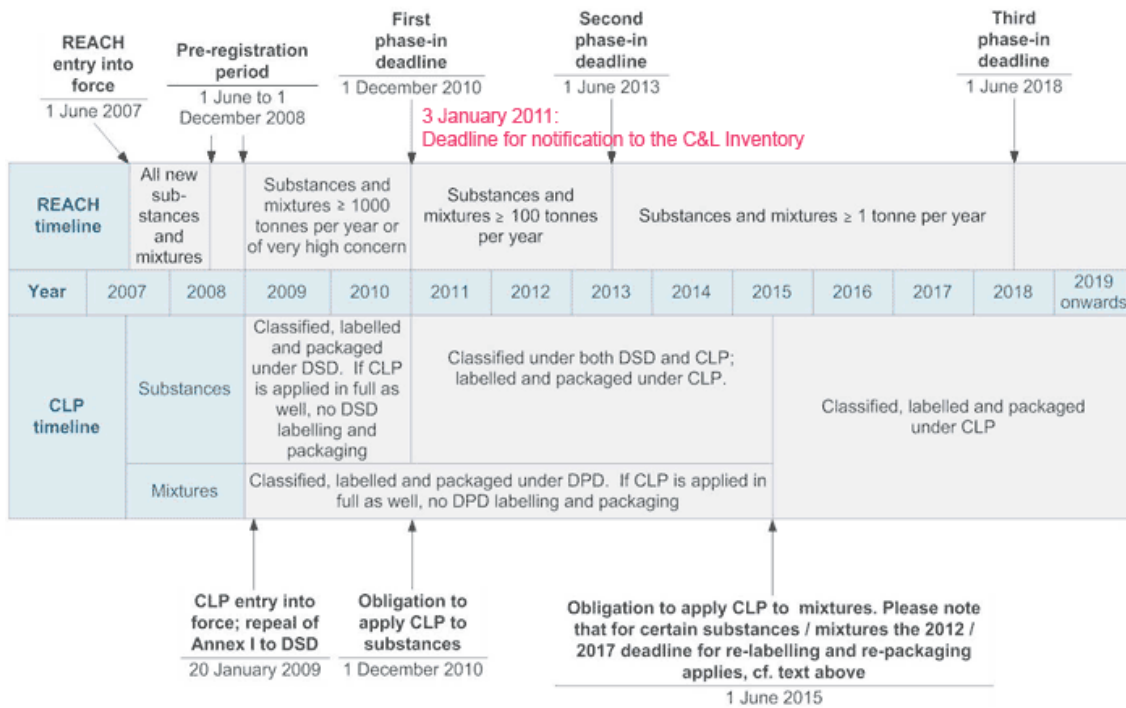
CLP was introduced alongside the REACH regulation (EU, 2006) which entered into force on 1st of June 2007 consolidating the former legislative framework on chemicals of the EU. Although REACH does not include criteria for classification and labelling, it does refer to the above EC Directives and CLP. Furthermore elements of REACH, such as registration and supply chain communication together with the classification and labelling inventory (now part of CLP), are driven by hazard classification.

In terms of timing, the provisions of CLP were subject to a phased introduction. As from 1st June 2015, all hazard classifications are conducted under the provisions of CLP.

A further provision of CLP is that by 3rd of January 2011 industry had to send notifications of their classification and labelling of substances to the European Chemical Agency (ECHA). The notifications were incorporated into a Classification and Labelling Inventory ('C&L Inventory') made publicly available on ECHA's website.

Mixtures classified, labelled and packaged in accordance with DPD and placed on the market before 1st of June 2015 are not required to be relabelled and repackaged in accordance with CLP until 1st of June 2017.

A schematic, summarising the key timelines arising from REACH and CLP is shown below:



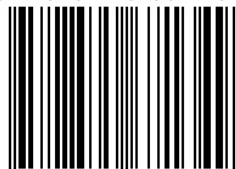
Manufacturers and importers (or groups of manufacturers and importers) who place hazardous substances on the market, will also have to notify ECHA of certain information, in particular the substance identity and the classification and labelling of each hazardous substance, unless this information has already been submitted as part of a registration dossier under REACH. ECHA will then include the notified information in the C&L Inventory.

Implementation of CLP also impacts downstream legislation, which relies on DSD and DPD hazard classifications. Consequently, the EU is amending downstream legislation, such as that on worker safety, major accidents and consumer products.

Concawe
Boulevard du Souverain 165
B-1160 Brussels
Belgium

Tel: +32-2-566 91 60
Fax: +32-2-566 91 81
e-mail: info@concawe.org
<http://www.concawe.eu>

ISBN 978-2-87567-134-9



9 782875 671349 >