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RECOMMENDATIONS ON THE TRANSPORT OF DANGEROUS GOODS

NATURE, PURPOSE AND SIGNIFICANCE OF THE RECOMMENDATIONS

1. These Recommendations have been developed by the United Nations Economic and Social Council's Committee of Experts on the Transport of Dangerous Goods[1] in the light of technical progress, the advent of new substances and materials, the exigencies of modern transport systems and, above all, the requirement to ensure the safety of people, property and the environment. They are addressed to governments and international organizations concerned with the regulation of the transport of dangerous goods. They do not apply to the bulk transport of dangerous goods in sea-going or inland navigation bulk carriers or tank-vessels, which is subject to special international or national regulations.

2. The recommendations concerning the transport of dangerous goods are presented in the form of "Model Regulations on the Transport of Dangerous Goods", which are presented as an annex to this document. The Model Regulations aim at presenting a basic scheme of provisions that will allow uniform development of national and international regulations governing the various modes of transport; yet they remain flexible enough to accommodate any special requirements that might have to be met. It is expected that governments, intergovernmental organizations and other international organizations, when revising or developing regulations for which they are responsible, will conform to the principles laid down in these Model Regulations, thus contributing to worldwide harmonization in this field. Furthermore, the new structure, format and content should be followed to the greatest extent possible in order to create a more user-friendly approach, to facilitate the work of enforcement bodies and to reduce the administrative burden. Although only a recommendation, the Model Regulations have been drafted in the mandatory sense (i.e., the word "shall" is employed throughout the text rather than "should") in order to facilitate direct use of the Model Regulations as a basis for national and international transport regulations.

3. The scope of the Model Regulations should ensure their value for all who are directly or indirectly concerned with the transport of dangerous goods. Amongst other aspects, the Model Regulations cover principles of classification and definition of classes, listing of the principal dangerous goods, general packing requirements, testing procedures, marking, labelling or placarding, and transport documents. There are, in addition, special requirements related to particular classes of goods. With this system of classification, listing, packing, marking, labelling, placarding and documentation in general use, carriers, consignors and inspecting authorities will benefit from simplified transport, handling and control and from a reduction in time-consuming formalities. In general, their task will be facilitated and obstacles to the international transport of such goods reduced accordingly. At the same time, the advantages will become increasingly evident as trade in goods categorized as "dangerous" steadily grows.

PRINCIPLES UNDERLYING THE REGULATION OF THE TRANSPORT OF DANGEROUS GOODS

4. Transport of dangerous goods is regulated in order to prevent, as far as possible, accidents to persons or property and damage to the environment, the means of transport employed or to other goods. At the same time, regulations should be framed so as not to impede the movement of such goods, other than those too dangerous to be accepted for transport. With this exception, the aim of regulations is to make transport feasible by eliminating risks or reducing them to a minimum. It is a matter therefore of safety no less than one of facilitating transport.

5. The Model Regulations annexed to this document are addressed to all modes of transport. Modal transport regulations may occasionally apply other requirements for operational reasons.

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[1] *In 2001, the Committee was reconfigured and renamed "Committee of Experts on the Transport of Dangerous Goods and on the Globally Harmonized System of Classification and Labelling of Chemicals" (see resolution 1999/65 of 26 October 1999 of the Economic and Social Council).*

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CLASSIFICATION AND DEFINITIONS OF CLASSES OF DANGEROUS GOODS

6. The classification of goods by type of risk involved has been drawn up to meet technical conditions while at the same time minimizing interference with existing regulations. It should be noted that the numerical order of the classes is not that of the degree of danger.

7. The objective of the recommended definitions is to indicate which goods are dangerous and in which class, according to their specific characteristics, they should be included. These definitions have been devised so as to provide a common pattern which it should prove possible to follow in the various national and international regulations. Used with the list of dangerous goods, the definitions should provide guidance to those who have to use such regulations; and they present a notable degree of standardization while retaining a flexibility that allows diverse situations to be taken into account. Classifications for substances in the Model Regulations are made on the basis of consideration of data submitted to the Committee by governments, intergovernmental organizations and other international organizations in the form recommended in Figure 1. However the actual data submitted are not formally endorsed by the Committee.

8. The Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria (ST/SG/AC.10/11/Rev.5 and Amend.1) present the United Nations schemes for the classification of certain types of dangerous goods and gives descriptions of the test methods and procedures, considered to be the most useful, for providing competent authorities with the necessary information to arrive at a proper classification of substances and articles for transport. It should be noted that the Manual is not a concise formulation of testing procedures that will unerringly lead to a proper classification of products and it assumes, therefore, competence on the part of the testing authority and leaves responsibility for classification with them. The competent authority has discretion to dispense with certain tests, to vary the details of tests and to require additional tests, when this is justified, to obtain a reliable and realistic assessment of the hazard of a product.

9. Wastes should be transported under the requirements of the appropriate class considering their hazards and the criteria presented in the Model Regulations. Wastes not otherwise subject to these Regulations but covered under the Basel Convention[2] may be transported under Class 9.

10. Many of the substances listed in Classes 1 to 9 are deemed as being dangerous to the environment. Additional labelling is not always specified except for transport by sea. Criteria for substances and mixtures dangerous to the aquatic environment are given in Chapter 2.9 of the Model Regulations.

11. Many consignments of goods are treated with fumigants that pose a risk during transport, in particular to workers who may be exposed unknowingly when they open cargo transport units. The Model Regulations address fumigated cargo transport units as consignments that are subject to special documentation and warning sign requirements in the consignment procedures of Part 5.

CONSIGNMENT PROCEDURES

12. Whenever dangerous goods are offered for transport certain measures should be taken to ensure that the potential risks of the dangerous goods offered are adequately communicated to all who may come in contact with the goods in the course of transport. This has traditionally been accomplished through special marking and labelling of packages to indicate the hazards of a consignment and through the inclusion of relevant information in the transport documents and by placarding of cargo transport units. Requirements in this regard are provided in the Model Regulations annexed to this document.

13. The labels recommended in 5.2.2.2 of the Model Regulations should be affixed on goods or packages. The labelling system is based on the classification of dangerous goods and was established with the following aims in mind:

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[2] *Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989).*

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(a) To make dangerous goods easily recognizable from a distance by the general appearance (symbol, colour and shape) of the labels they bear;

(b) To provide, by means of colours on the labels, a useful first guide for handling, stowage and segregation.

14. In certain cases, where the danger of an item of dangerous goods is considered low, or the goods are packed in a limited quantity, exemptions from labelling may be provided. In such cases, marking of packages with the class or division and the packing group number may be required.

15. One of the primary requirements of the transport document for dangerous goods is to convey the fundamental information relative to the hazard of the goods being offered for transport. To achieve this end, it is considered necessary to include certain basic information in the transport document for the dangerous goods consignment unless otherwise exempted in the Model Regulations. It is recognized that individual national authorities or international organizations may consider it necessary to require additional information. However, the basic items of information considered necessary for each dangerous substance, material or article offered for transport by any mode are identified in the Model Regulations.

EMERGENCY RESPONSE

16. The relevant national and/or international organizations should establish emergency provisions to be taken in the event of accidents or incidents during the transport of dangerous goods in order to protect persons, property and the environment. For radioactive material appropriate guidelines for such provisions are contained in “Planning and Preparing for Emergency Response to Transport Accidents Involving Radioactive Material”, Safety Standard Series No. TS-G-1.2 (ST-3), IAEA, Vienna (2002).

COMPLIANCE ASSURANCE

17. The competent authority should ensure compliance with these Regulations. Means to discharge this responsibility include the establishment and execution of a programme for monitoring the design, manufacture, testing, inspection and maintenance of packaging, the classification of dangerous goods and the preparation, documentation, handling and stowage of packages by consignors and carriers, to provide evidence that the provisions of the Model Regulations are being met in practice.

TRANSPORT OF RADIOACTIVE MATERIAL

18. The Competent Authority should ensure that the consignment, acceptance for transport and transport of radioactive material is subject to a Radiation Protection Programme as described in the Model Regulations. The competent authority should arrange for periodic assessments of the radiation doses to persons due to the transport of radioactive material, to ensure that the system of protection and safety complies with the “International Basic Safety Standards for Protection against Ionizing Radiation and for the safety of Radiation Sources”, Safety Series No. 115, IAEA, Vienna (1996).

REPORTING OF ACCIDENTS AND INCIDENTS

19. The relevant national and international organizations should establish provisions for the reporting of accidents and incidents involving dangerous goods in transport. Basic provisions in this connection are recommended in 7.1.9 of the Model Regulations. Reports or summaries of reports that the States or international organizations deem relevant to the work of the Sub-Committee of Experts on the Transport of Dangerous Goods (e.g., reports involving packaging and tank failures, major release) should be submitted to the Sub-Committee for its consideration and action, as appropriate.

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Figure 1

DATA SHEET TO BE SUBMITTED TO THE UNITED NATIONS FOR NEW OR AMENDED CLASSIFICATION OF SUBSTANCES

Submitted by.... ..... Date .....

Supply all relevant information including sources of basic classification data. Data should relate to the product in the form to be transported. State test methods. Answer all questions - if necessary state "not known" or "not applicable" - If data is not available in the form requested, provide what is available with details. Delete inappropriate words.

Section 1. SUBSTANCE IDENTITY

1.1 Chemical name

1.2 Chemical formula

1.3 Other names/synonyms

1.4.1 UN number .....1.4.2 CAS number .....

1.5 Proposed classification for the Recommendations

1.5.1 proper shipping name (3.1.2[1])... .....

1.5.2 class/division .....subsidiary risk(s) .....
packing group .....

1.5.3 proposed special provisions, if any .....

1.5.4 proposed packing instruction(s).....

Section 2. PHYSICAL PROPERTIES

2.1 Melting point or range.....°C

2.2 Boiling point or range .....°C

2.3 Relative density at :

2.3.1 15 °C .....

2.3.2 20 °C .....

2.3.3 50 °C .....

2.4 Vapour pressure at :

2.4.1 50 °C ..... kPa

2.4.2 65 °C ..... kPa

2.5 Viscosity at 20 °C[2] ..... m^2/s

2.6 Solubility in water at 20 °C ..... g/100 ml

2.7 Physical state at 20°C (2.2.1.1[1]) solid/liquid/gas[2]

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[1] *This and similar references are to chapters and paragraphs in the Model Regulations on the Transport of Dangerous Goods.*

[2] *See definition of "liquid" in 1.2.1 of the Model Regulations on the Transport of Dangerous Goods.*

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2.8 Appearance at normal transport temperatures, including colour and odour .....

.....

2.9 Other relevant physical properties .....

.....

.....

Section 3. FLAMMABILITY

3.1 Flammable vapour

3.1.1 Flash point (2.3.3[1]) ..... °C oc/cc

3.1.2 Is combustion sustained? (2.3.1.3[1]) yes/no

3.2 Autoignition temperature .....°C

3.3 Flammability range (LEL/UEL) ..... %

3.4 Is the substance a flammable solid? (2.4.2[1]) yes/no

3.4.1 If yes, give details .....

.....

.....

.....

Section 4. CHEMICAL PROPERTIES

4.1 Does the substance require inhibition/stabilization or other treatment such as nitrogen blanket to prevent hazardous reactivity ? yes/no

If yes, state:

4.1.1 Inhibitor/stabilizer used . .....

4.1.2 Alternative method .....

4.1.3 Time effective at 55 °C .....

4.1.4 Conditions rendering it ineffective .....

4.2 Is the substance an explosive according to paragraph 2.1.1.1? (2.1[1]) yes/no

4.2.1 If yes, give details .....

.....

.....

.....

[1] *This and similar references are to chapters and paragraphs in the Model Regulations on the Transport of Dangerous Goods.*

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4.3 Is the substance a desensitized explosive? (2.4.2.4[1]) yes/no

4.3.1 If yes, give details .....

.....

.....

4.4 Is the substance a self-reactive substance? (2.4.1[1]) yes/no

If yes, state:

4.4.1 exit box of flow chart... .....

What is the self-accelerating decomposition temperature (SADT) for a 50 kg package? ..... °C

Is the temperature control required? (2.4.2.3.4[1]) yes/no

4.4.2 proposed control temperature for a 50 kg package ..... °C

4.4.3 proposed emergency temperature for a 50 kg package ..... °C

4.5 Is the substance pyrophoric? (2.4.3[1]) yes/no

4.5.1 If yes, give details .....

.....

.....

.....

4.6 Is the substance liable to self-heating? (2.4.3[1]) yes/no

4.6.1 If yes, give details .....

.....

.....

.....

4.7 Is the substance an organic peroxide (2.5.1[1]) yes/no

If yes state:

4.7.1 exit box of flow chart... .....

What is the self accelerating decomposition temperature (SADT) for a 50 kg package?..... °C

Is temperature control required? (2.5.3.4.1[1]) yes/no

4.7.2 proposed control temperature for a 50 kg package ..... °C

4.7.3 proposed emergency temperature for a 50 kg package ..... °C

4.8 Does the substance in contact with water emit flammable gases? (2.4.4[1]) yes/no

4.8.1 If yes, give details .....

.....

.....

.....

[1] *This and similar references are to chapters and paragraphs in the Model Regulations on the Transport of Dangerous Goods.*

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4.9 Does the substance have oxidizing properties (2.5.1[1]) yes/no

4.9.1 If yes, give details .....
.....
.....
.....

4.10 Corrosivity (2.8[1]) to:

4.10.1 mild steel .....mm/year at ..... °C

4.10.2 aluminium.....mm/year at..... °C

4.10.3 other packaging materials (specify)

..... mm/year at..... °C

..... mm/year at..... °C

4.11 Other relevant chemical properties .....
.....
.....
.....

Section 5. HARMFUL BIOLOGICAL EFFECTS

5.1 LD_{50}, oral (2.6.2.1.1[1])... .....mg/kg Animal species .....

5.2 LD_{50}, dermal (2.6.2.1.2[1]).....mg/kg Animal species .....

5.3 LC_{50}, inhalation (2.6.2.1.3[1]) ... .mg/litre Exposure time..... hours

or ....ml/m^3 Animal species .....

5.4 Saturated vapour concentration at 20 °C (2.6.2.2.4.3[1]) .....ml/m^3

5.5 Skin exposure (2.8[1]) results Exposure time ..... hours/minutes

Animal species.....

5.6 Other data .....
.....
.....

5.7 Human experience .....
.....
.....

Section 6. SUPPLEMENTARY INFORMATION

6.1 Recommended emergency action

6.1.1 Fire (include suitable and unsuitable extinguishing agents)
.....

6.1.2 Spillage .....

[1] *This and similar references are to chapters and paragraphs in the Model Regulations on the Transport of Dangerous Goods.*

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6.2 Is it proposed to transport the substance in:

6.2.1 Bulk Containers (6.8[1]) yes/no

6.2.2 Intermediate Bulk Containers (6.5[1])? yes/no

6.2.3 Portable tanks (6.7[1])? yes/no

If yes, give details in Sections 7, 8 and/or 9.

Section 7. BULK CONTAINERS (only complete if yes in 6.2.1)

7.1 Proposed type(s) .....

Section 8. INTERMEDIATE BULK CONTAINERS (IBCs) (only complete if yes in 6.2.2)

8.1 Proposed type(s).....

Section 9. MULTIMODAL TANK TRANSPORT (only complete if yes in 6.2.3)

9.1 Description of proposed tank (including IMO tank type if known).....

9.2 Minimum test pressure .....

9.3 Minimum shell thickness .....

9.4 Details of bottom openings, if any .....

9.5 Pressure relief arrangements .....

9.6 Degree of filling .....

9.7 Unsuitable construction materials .....

[1] *This and similar references are to chapters and paragraphs in the Model Regulations on the Transport of Dangerous Goods.*