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PART 7

PROVISIONS CONCERNING TRANSPORT OPERATIONS

Introductory note

NOTE: *In general, development of the detailed provisions of this Part would be left to national, modal or regional authorities. For the purposes of these Regulations, Chapter 7.1 contains operational provisions that are applicable to all modes of transport. An additional chapter is provided, but generally reserved, for additional provisions applicable to the individual modes of transport that may be added by national, modal or regional authorities.*

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CHAPTER 7.1

PROVISIONS CONCERNING TRANSPORT OPERATIONS BY ALL MODES OF TRANSPORT

7.1.1 Application, general provisions and loading requirements

7.1.1.1 This Chapter contains provisions applicable to dangerous goods transport operations by all modes of transport.

7.1.1.2 Unless otherwise specified in these Regulations, dangerous goods shall not be offered for transport unless:

(a) goods have been properly classified, packed, marked, labelled and described and certified on a dangerous goods transport document; and

(b) goods are in a fit condition for transport as required by these Regulations, and no dangerous residue of the dangerous goods adheres to the outside of the package.

7.1.1.3 *Acceptance of dangerous goods by carriers*

7.1.1.3.1 Unless otherwise specified in these Regulations, a carrier shall not accept dangerous goods for transport unless:

(a) A copy of the dangerous goods transport document and other documents or information as required by these Regulations are provided; or

(b) The information applicable to the dangerous goods is provided in electronic form.

7.1.1.3.2 The information applicable to the dangerous goods shall accompany the dangerous goods to final destination. This information may be on the dangerous goods transport document or may be on another document. This information shall be given to the consignee when the dangerous goods are delivered.

7.1.1.3.3 When the information applicable to the dangerous goods is given to the carrier in electronic form, the information shall be available to the carrier at all times during transport to final destination. The information shall be able to be produced without delay as a paper document.

7.1.1.4 Unless otherwise specified in these Regulations, dangerous goods shall not be transported unless:

(a) Cargo transport units have been appropriately marked, labelled and placarded; and

(b) Cargo transport units are otherwise in a condition for transport as required by these Regulations.

7.1.1.5 Packages containing dangerous goods shall only be loaded in cargo transport units that are strong enough to withstand the shocks and loadings normally encountered during transport, having regard to the conditions to be expected during the anticipated journey. The cargo transport unit shall be constructed in such a way as to prevent the loss of contents. Where appropriate the cargo transport unit shall be fitted with devices to facilitate securing and handling of the dangerous goods.

7.1.1.6 The interior and exterior of a cargo transport unit shall be inspected prior to loading to ensure that there is no damage that could affect its integrity or that of the packages to be loaded in it.

7.1.1.7 Cargo transport units shall be loaded so that incompatible dangerous or other goods are segregated in accordance with this Chapter. Specific loading instructions such as orientation arrows, not to be double stacked, keep dry or temperature control requirements shall be met. Liquid dangerous goods shall be loaded below dry dangerous goods whenever possible.

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7.1.1.8 Packages containing dangerous goods and unpackaged dangerous articles shall be secured by suitable means capable of restraining the goods (such as fastening straps, sliding slatboards, adjustable brackets) in the cargo transport unit in a manner that will prevent any movement during transport which would change the orientation of the packages or cause them to be damaged. When dangerous goods are transported with other goods (e.g. heavy machinery or crates), all goods shall be securely fixed or packed in the cargo transport units so as to prevent the release of dangerous goods. Movement of packages may also be prevented by filling any voids by the use of dunnage or by blocking and bracing. Where restraints such as banding or straps are used, these shall not be over-tightened to cause damage or deformation of the package.

7.1.1.9 Packages shall not be stacked unless designed for that purpose. Where different design types of packages that have been designed for stacking are to be loaded together, consideration shall be given to their compatibility for stacking with each other. Where necessary, stacked packages shall be prevented from damaging the package below by the use of load-bearing devices.

7.1.1.10 During loading and unloading, packages containing dangerous goods shall be protected from being damaged. Particular attention shall be paid to the handling of packages during their preparation for transport, the type of cargo transport unit on which they are to be carried and to the method of loading or unloading, so that accidental damage is not caused through dragging or mishandling the packages. Packages that appear to be leaking or damaged so that the contents may escape shall not be accepted for transport. If a package is found to be damaged so that the contents leak, the damaged package shall not be transported but moved to a safe place in accordance with instructions given by a competent authority or a designated responsible person who is familiar with the dangerous goods, the risks involved and the measures that should be taken in an emergency.

NOTE 1: *Additional operational requirements for the transport of packagings and IBCs are provided in the special packing provisions for packagings and IBCs (see Chapter 4.1).*

NOTE 2: *Additional guidance on the packing of cargo transport units can be found in the IMO/ILO/UNECE Guidelines for Packing Cargo Transport Units (CTUs) contained in the supplement to the International Maritime Dangerous Goods Code. Modal and National Codes of Practice (such as the Agreement governing the exchange and use of Wagons between Railway Undertakings (RIV 2000) Appendix II loading guidelines published by the International Union of Railways (UIC)) or the United Kingdom Department for Transport Code of Practice on Safety of Loads on Vehicles) may also be available.*

7.1.1.11 Flexible bulk containers shall be transported within a conveyance with rigid sides and ends that extend at least two-thirds of the height of the flexible bulk container.

NOTE: *When loading flexible bulk containers in a freight container as defined in 5.4.2 particular attention shall be paid to the guidance on the packing of cargo transport units referred to in 7.1.1.10, Note 2 and notably to the IMO/ILO/UNECE Guidelines for Packing Cargo Transport Units (CTUs) contained in the supplement to the International Maritime Dangerous Goods Code.*

7.1.1.11.1 Flexible bulk containers shall be secured by suitable means capable of restraining the container in the conveyance in a manner that will prevent any movement during transport which would change the orientation of the container or cause the container to be damaged. Movement of the containers may also be prevented by filling any voids by the use of dunnage or by blocking and bracing. Where restraints such as banding or straps are used, these shall not be over-tightened to cause damage or deformation to the flexible bulk containers.

7.1.1.11.2 Flexible bulk containers shall not be stacked for road or rail transport.

7.1.2 Segregation of dangerous goods

7.1.2.1 Incompatible goods shall be segregated from one another during transport. For the purposes of segregation, two substances or articles are considered mutually incompatible when their stowing together may result in undue hazards in the case of leakage, spillage, or any other accident. In this regard, detailed segregation requirements for substances and articles of Class 1 are provided in 7.1.3.1 and 7.1.3.2.

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7.1.2.2 The extent of the hazard arising from possible reactions between incompatible dangerous goods may vary and the segregation arrangements required shall also vary as appropriate. In some instances such segregation may be obtained by requiring certain distances between incompatible dangerous goods. Intervening spaces between such dangerous goods may be filled with cargo compatible with the dangerous substances or articles in question.

7.1.2.3 The provisions of these Regulations are general in nature. The segregation provisions for each particular mode of transport shall be based on the following principles:

(a) Incompatible dangerous goods shall be segregated from one another so as to effectively minimize hazards in the event of accidental leakage or spillage or any other accident;

(b) Whenever dangerous goods are stowed together, the most stringent segregation provisions for any of the goods shall be applied;

(c) For packages required to bear a subsidiary risk label, the segregation appropriate to the subsidiary hazard shall be applied when it is more stringent than that required by the primary hazard.

7.1.2.4 An overpack shall not contain dangerous goods which react dangerously with one another.

7.1.3 Special provisions applicable to the transport of explosives

7.1.3.1 *Separation of goods of Class 1 of different compatibility groups*

NOTE: *The safety of explosive substances and articles would be enhanced by transporting each kind separately, but considerations of practicability and economics preclude such an ideal. In practice, a proper balance of the interest of safety against the other relevant factors necessitates a degree of mixing in the transport of explosive substances and articles of several kinds.*

7.1.3.1.1 The extent to which goods of Class 1 may be loaded together in transport is determined by the "compatibility" of the explosives. Goods of Class 1 are considered to be "compatible" if they can be transported together without significantly increasing either the probability of an accident or, for a given quantity, the magnitude of the effects of such an accident.

7.1.3.1.2 Goods in Compatibility Groups A to K and N may be transported in accordance with the following provisions:

(a) Packages bearing the same compatibility group letter and the same division number may be transported together;

(b) Goods of the same compatibility group but different divisions may be transported together provided that the whole is treated as belonging to the division having the smaller number. However, when goods of Division 1.5, Compatibility Group D, are transported together with goods of Division 1.2, Compatibility Group D, the total of the consignment shall be treated as Division 1.1, Compatibility Group D, for the purposes of transport;

(c) Packages bearing different compatibility group letters shall not in general be transported together (regardless of the division number) except in the case of compatibility group letters C, D, E and S as explained in 7.1.3.1.3 and 7.1.3.1.4.

NOTE: *Other combinations of Compatibility Groups A to K and N may be permitted under provisions applicable to the individual mode of transport.*

7.1.3.1.3 Goods in Compatibility Groups C, D and E are permitted to be carried together in the same unit load or cargo transport unit provided the over-all classification code is determined in accordance with the classification procedures in 2.1.3. The appropriate division is determined in accordance with 7.1.3.1.2 (b). Any combination of articles in Compatibility Groups C, D and E is assigned to Compatibility Group E. Any combination of substances in Compatibility Groups C and D shall be assigned to the most appropriate of the compatibility groups shown in 2.1.2.1.1, taking cognizance of the predominant characteristics of the combined load.

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7.1.3.1.4 Goods in Compatibility Group S may be transported with goods in all compatibility groups other than A and L.

7.1.3.1.5 Goods in Compatibility Group L shall not be transported with goods in other compatibility groups. Furthermore, goods in Compatibility Group L may only be transported with the same type of goods within Compatibility Group L.

7.1.3.1.6 Goods of Compatibility Group N shall not in general (see 7.1.3.1.2 (b)) be transported with goods in other compatibility groups except S. However, if these goods are transported together with goods of Compatibility Groups C, D and E the goods of Compatibility Group N shall be considered as goods having Compatibility Group D (see also 7.1.3.1.3).

7.1.3.2 ***Mixed transport of goods of Class 1 with dangerous goods of other classes in freight containers, vehicles or wagons***

7.1.3.2.1 Except where otherwise specially provided for in these Regulations, goods of Class 1 shall not be transported together in freight containers, vehicles or wagons with dangerous goods of other classes.

7.1.3.2.2 Goods in Division 1.4, compatibility group S, may be transported together with dangerous goods of other classes.

7.1.3.2.3 Blasting explosives (except UN 0083 Explosive, blasting, type C) may be transported together with ammonium nitrate (UN Nos. 1942 and 2067) and alkali metal nitrates (e.g. UN 1486) and alkaline earth metal nitrates (e.g. UN 1454) provided the aggregate is treated as blasting explosives under Class 1 for the purposes of placarding, segregation, stowage and maximum permissible load.

NOTE: *Alkali metal nitrates include caesium nitrate (UN 1451), lithium nitrate (UN 2722), potassium nitrate (UN 1486), rubidium nitrate (UN 1477) and sodium nitrate (UN 1498). Alkaline earth metal nitrates include barium nitrate (UN 1446), beryllium nitrate (UN 2464), calcium nitrate (UN 1454), magnesium nitrate (UN 1474) and strontium nitrate (UN 1507).*

7.1.3.2.4 Life-saving appliances (UN Nos. 3072 and 2990) containing Class 1 goods as equipment may be transported together with the same dangerous goods as contained in the appliances.

7.1.3.2.5 Air bag inflators, or air bag modules, or seat-belt pretensioners, of Division 1.4, compatibility group G, (UN 0503) may be transported with air bag inflators or air bag modules or seat-belt pretensioners of Class 9 (UN 3268).

7.1.3.3 ***Transport of explosives in freight containers, road vehicles and rail wagons***

7.1.3.3.1 Freight containers, road vehicles and rail wagons shall not be offered for the transport of explosive substances and articles of Class 1, unless the freight container, road vehicle or rail wagon is structurally serviceable as witnessed by a current International Convention for Safe Containers (CSC) approval plate (applicable to freight containers only) and a detailed visual examination as follows:

(a) Prior to loading a freight container, road vehicle or rail wagon with explosives, it shall be checked to ensure it is free of any residue of previous cargo and to ensure it is structurally serviceable and the interior floor and walls are free from protrusions;

(b) *Structurally serviceable* means that the freight container, road vehicle or rail wagon is free from major defects in its structural components, e.g. top and bottom side rails, top and bottom end rails, door sill and header, floor cross members, corner posts, and corner fittings in a freight container. Major defects are dents or bends in structural members greater than 19 mm in depth, regardless of length; cracks or breaks in structural members; more than one splice or an improper splice (e.g. a lapped splice) in top or bottom end rails, or door headers or more than two splices in any one top or bottom side rail or any splice in a door sill or corner post; door hinges and hardware that are seized, twisted,

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broken, missing or otherwise inoperative, gaskets and seals that do not seal; or for freight containers, any distortion of the over-all configuration great enough to prevent proper alignment of handling equipment, mounting and securing on chassis, vehicle or wagon, or insertion into ships' cells;

(c) In addition, deterioration in any component of the container, road vehicle or rail wagon, regardless of the material of construction, such as rusted-out metal in sidewalls or disintegrated fibreglass is unacceptable. Normal wear, however, including oxidization (rust), slight dents and scratches and other damage that do not affect serviceability or the weather-tight integrity of the units is acceptable.

7.1.3.3.2 For free-flowing powdery substances of 1.1C, 1.1D, 1.1G, 1.3C and 1.3G and fireworks of 1.1G, 1.2G and 1.3G, the floor of a freight container shall have a non-metallic surface or covering.

7.1.4 Special provisions applicable to the transport of gases

7.1.4.1 Aerosols transported for the purposes of reprocessing or disposal under the provisions of special provision 327 shall only be transported in well-ventilated cargo transport units other than closed freight containers.

7.1.5 Special provisions applicable to the transport of self-reactive substances of Division 4.1 and organic peroxides of Division 5.2

7.1.5.1 Where a number of packages are assembled in a freight container, closed road vehicle or unit load, the total quantity of substance, the type and number of packages and the stacking arrangement shall not create an explosion hazard.

7.1.5.2 All self-reactive substances and organic peroxides shall be protected from direct sunlight and all sources of heat, and placed in adequately ventilated areas.

7.1.5.3 Certain self-reactive substances when required by 2.4.2.3.4, and certain organic peroxides when required by 2.5.3.4.1, may only be transported under conditions where the temperature is controlled. In addition, if a self-reactive substance or organic peroxide which is not normally required to be transported under temperature control is transported under conditions where the temperature may exceed 55 °C, it may require temperature control. The requirements of 7.1.5.3.1 and 7.1.5.3.2 apply to the transport of such substances.

7.1.5.3.1 *Temperature control provisions*

7.1.5.3.1.1 The “control temperature” is the maximum temperature at which the substance can be safely transported. It is assumed that during transport the temperature of the immediate surroundings of the package does not exceed 55 °C and attains this value for a relatively short time only during each period of 24 hours. In the event of loss of temperature control, it may be necessary to implement emergency procedures. The “emergency temperature” is the temperature at which such procedures shall be implemented.

7.1.5.3.1.2 Derivation of control and emergency temperatures

Type of receptacle	SADT[a]	Control temperature	Emergency temperature
Single packagings and IBCs	20 °C or less over 20 °C to 35 °C over 35 °C	20 °C below SADT 15 °C below SADT 10 °C below SADT	10 °C below SADT 10 °C below SADT 5 °C below SADT
Portable tanks	< 50 °C	10 °C below SADT	5 °C below SADT

[a] *i.e. the SADT of the substance as packaged for transport.*

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7.1.5.3.1.3 The control and emergency temperatures are derived using the table in 7.1.5.3.1.2 from the self-accelerating decomposition temperature (SADT) which is defined as the lowest temperature at which self-accelerating decomposition may occur with a substance in the packaging as used in transport. An SADT shall be determined in order to decide if a substance shall be subjected to temperature control during transport. Provisions for the determination of the SADT are given in 2.4.2.3.4 and 2.5.3.4.2 for self-reactive substances and organic peroxides, respectively.

7.1.5.3.1.4 Control and emergency temperatures, where appropriate, are provided for currently assigned self-reactive substances in 2.4.2.3.2.3 and for currently assigned organic peroxide formulations in 2.5.3.2.4. The actual transport temperature may be lower than the control temperature but shall be selected so as to avoid dangerous separation of phases.

7.1.5.3.2 *Transport under temperature control*

NOTE: *Since the circumstances to be taken into account differ for the various modes of transport, only general guidance is provided.*

7.1.5.3.2.1 Maintenance of the prescribed temperature is an essential feature of the safe transport of many self-reactive substances and organic peroxides. In general, there shall be:

(a) Thorough inspection of the cargo transport unit prior to loading;

(b) Instructions to the carrier about the operation of the refrigeration system;

(c) Procedures to be followed in the event of loss of control;

(d) Regular monitoring of operating temperatures; and

(e) Provision of a back-up refrigeration system or spare parts.

7.1.5.3.2.2 Any control and temperature sensing devices in the refrigeration system shall be readily accessible and all electrical connections weather-proof. The temperature of air space within the cargo transport unit shall be measured by two independent sensors and the output shall be recorded so that temperature changes are readily detectable. The temperature shall be checked every four to six hours and logged. When substances having a control temperature of less than +25 °C are carried, the cargo transport unit shall be equipped with visible and audible alarms, powered independently of the refrigeration system, set to operate at or below the control temperature.

7.1.5.3.2.3 If during transport the control temperature is exceeded, an alert procedure shall be initiated involving any necessary repairs to the refrigeration equipment or an increase in the cooling capacity (e.g. by adding liquid or solid refrigerants). The temperature shall also be checked frequently and preparations made for implementation of the emergency procedures. If the emergency temperature is reached, the emergency procedures shall be initiated.

7.1.5.3.2.4 The suitability of a particular means of temperature control for transport depends on a number of factors. Factors to be considered include:

(a) The control temperature(s) of the substance(s) to be transported;

(b) The difference between the control temperature and the anticipated ambient temperature conditions;

(c) The effectiveness of the thermal insulation;

(d) The duration of transport; and

(e) Allowance of a safety margin for delays.

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7.1.5.3.2.5 Suitable methods for preventing the control temperature being exceeded are, in order of increasing control capability:

(a) Thermal insulation; provided that the initial temperature of the organic peroxide(s) is sufficiently below the control temperature;

(b) Thermal insulation with coolant system; provided that:

(i) An adequate quantity of coolant (e.g. liquid nitrogen or solid carbon dioxide), allowing a reasonable margin for delay, is carried;

(ii) Liquid oxygen or air is not used as coolant;

(iii) There is a uniform cooling effect even when most of the coolant has been consumed; and

(iv) The need to ventilate the unit before entering is clearly indicated by a warning on the door(s) of the unit;

(c) Single mechanical refrigeration; provided that for organic peroxides with a flash point lower than the sum of the emergency temperature plus 5 °C explosion-proof electrical fittings are used within the cooling compartment to prevent ignition of flammable vapours from the organic peroxides;

(d) Combined mechanical refrigeration system with coolant system; provided that:

(i) The two systems are independent of one another;

(ii) The provisions in (b) and (c) are complied with;

(e) Dual mechanical refrigeration system; provided that:

(i) Apart from the integral power supply unit, the two systems are independent of one another;

(ii) Each system alone is capable of maintaining adequate temperature control; and

(iii) For organic peroxides with a flash point lower than the sum of the emergency temperature plus 5 °C explosion-proof electrical fittings are used within the cooling compartment to prevent ignition of flammable vapours from the organic peroxides.

7.1.6 Special provisions applicable to the transport of substances stabilized by temperature control (other than self-reactive substances and organic peroxides)

7.1.6.1 These provisions apply to the transport of substances for which:

(a) The proper shipping name contains the word “STABILIZED”; and

(b) The SADT (see 7.1.5.3.1.3) as presented for transport in the package, IBC or tank is 50 °C or lower.

When chemical inhibition is not used to stabilize a reactive substance which may generate dangerous amounts of heat and gas, or vapour, under normal transport conditions, these substances need to be transported under temperature control. These provisions do not apply to substances which are stabilized by the addition of chemical inhibitors such that the SADT is greater than 50 °C.

NOTE: *Some substances which are transported under temperature control are prohibited from transport by certain modes.*

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7.1.6.2 The provisions in 7.1.5.3.1.1 to 7.1.5.3.1.3 and 7.1.5.3.2 apply to substances meeting criteria (a) and (b) in 7.1.6.1.

7.1.6.3 The actual transport temperature may be lower than the control temperature (see 7.1.5.3.1.1) but shall be selected so as to avoid dangerous separation of phases.

7.1.6.4 When these substances are transported in IBCs or portable tanks, the provisions for a SELF-REACTIVE LIQUID TYPE F, TEMPERATURE CONTROLLED shall apply. For transport in IBCs, see the special provisions in 4.1.7.2 and the "Additional requirements" in packing instruction IBC520; for transport in portable tanks, see the additional provisions in 4.2.1.13.

7.1.6.5 If a substance the proper shipping name of which contains the word "STABILIZED" and which is not normally required to be transported under temperature control is transported under conditions where the temperature may exceed 55 °C, it may require temperature control.

7.1.7 Special provisions applicable to the transport of Division 6.1 (toxic) and Division 6.2 (infectious) substances

7.1.7.1 *Division 6.1 (toxic) substances*

7.1.7.1.1 *Segregation from foodstuffs*

Substances marked as or known to be toxic (packing groups I, II and III) shall not be carried in the same railway wagon, lorry, hold of a ship, compartment of an aircraft or other cargo transport unit with substances marked as or known to be foodstuffs, feeds or other edible substances intended for consumption by humans or animals. Relaxation of this position may be allowed for substances of packing groups II and III provided the competent authority is satisfied that the packing and segregation are adequate to prevent the contamination of foodstuffs, feeds or other edible substances intended for consumption by humans or animals.

7.1.7.1.2 *Decontamination of cargo transport units*

A railway wagon, lorry, cargo space of a ship, compartment of an aircraft or other cargo transport unit which has been used to carry substances marked as or known to be toxic (packing groups I, II and III) shall, before re-use, be inspected for contamination. A railway wagon, lorry, hold of a ship, compartment of an aircraft or other cargo transport unit which has been contaminated shall not be returned to service until such contamination has been removed.

7.1.7.2 *Division 6.2 (infectious) substances*

7.1.7.2.1 *Responsibility of carrier*

Carriers and their staff shall fully understand all applicable regulations for the packing, labelling, transport and documentation of consignments of infectious substances. The carrier shall accept and expedite the transport of consignments conforming to the rules in force. If the carrier finds any error in the labelling or documentation, he shall immediately notify the consignor or consignee so that the appropriate corrective measures may be taken.

7.1.7.2.2 *Action to be taken in the event of damage or leakage*

Any person responsible for the carriage of packages containing infectious substances who becomes aware of damage to or leakage from such packages shall:

(a) Avoid handling the package or keep handling to a minimum;

(b) Inspect adjacent packages for contamination and put aside any that may have been contaminated;

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(c) Inform the appropriate public health authority or veterinary authority, and provide information on any other countries of transit where persons may have been exposed to danger; and

(d) Notify the consignor and/or the consignee.

7.1.7.2.3 *Decontamination of cargo transport units*

A railway wagon, road vehicle, cargo space of a ship, compartment of an aircraft or other cargo transport unit which has been used to transport infectious substances shall be inspected for release of the substance before re-use. If the infectious substances were released during transport, the cargo transport unit shall be decontaminated before it is re-used. Decontamination may be achieved by any means which effectively inactivates the released infectious substance.

7.1.8 Special provisions applicable to the transport of radioactive material

7.1.8.1 *Segregation*

7.1.8.1.1 Packages, overpacks and freight containers containing radioactive material and unpackaged radioactive material shall be segregated during transport and during storage in transit:

(a) From workers in regularly occupied working areas by distances calculated using a dose criterion of 5 mSv in a year and conservative model parameters;

(b) From members of the critical group of the public, in areas where the public has regular access, by distances calculated using a dose criterion of 1 mSv in a year and conservative model parameters;

(c) From undeveloped photographic film by distances calculated using a radiation exposure criterion for undeveloped photographic film due to the transport of radioactive material for 0.1 mSv per consignment of such film; and

(d) From other dangerous goods in accordance with 7.1.2 and 7.1.3.2.

7.1.8.1.2 Category II-YELLOW or III-YELLOW packages or overpacks shall not be carried in compartments occupied by passengers, except those exclusively reserved for couriers specially authorized to accompany such packages or overpacks.

7.1.8.2 *Activity limits*

The total activity in a single hold or compartment of an inland waterway craft, or in another conveyance, for carriage of LSA material or SCO in Type IP-1, Type IP-2, Type IP-3 or unpackaged, shall not exceed the limits shown in Table 7.1.8.2.

Table 7.1.8.2: Conveyance activity limits for LSA material and SCO in industrial packages or unpackaged

Nature of material	Activity limit for conveyances other than by inland waterway	Activity limit for a hold or compartment of an inland waterway craft
LSA-I	No limit	No limit
LSA-II and LSA-III non-combustible solids	No limit	100 A_2
LSA-II and LSA-III combustible solids, and all liquids and gases	100 A_2	10 A_2
SCO	100 A_2	10 A_2

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7.1.8.3 ***Stowage during transport and storage in transit***

7.1.8.3.1 Consignments shall be securely stowed.

7.1.8.3.2 Provided that its average surface heat flux does not exceed 15 W/m^2 and that the immediately surrounding cargo is not in sacks or bags, a package or overpack may be carried or stored among packaged general cargo without any special stowage provisions except as may be specifically required by the competent authority in an applicable approval certificate.

7.1.8.3.3 Loading of freight containers and accumulation of packages, overpacks and freight containers shall be controlled as follows:

(a) Except under the condition of exclusive use, and for consignments of LSA-I material, the total number of packages, overpacks and freight containers aboard a single conveyance shall be so limited that the total sum of the transport indexes aboard the conveyance does not exceed the values shown in Table 7.1.8.3.3;

(b) The radiation level under routine conditions of transport shall not exceed 2 mSv/h at any point on, and 0.1 mSv/h at 2 m from, the external surface of the conveyance, except for consignments transported under exclusive use by road or rail, for which the radiation limits around the vehicle are set forth in 7.2.3.1.2 (b) and (c);

(c) The total sum of the criticality safety indexes in a freight container and aboard a conveyance shall not exceed the values shown in Table 7.1.8.4.2.

Table 7.1.8.3.3: TI limits for freight containers and conveyances not under exclusive use

Type of freight container or conveyance	**Limit on total sum of transport indexes in a freight container or aboard a conveyance**
Freight container – Small	50
Freight container – Large	50
Vehicle	50
Aircraft	
Passenger	50
Cargo	200
Inland waterway vessel	50
Seagoing vessel[a]	
(1) Hold, compartment or defined deck area:	
Packages, overpacks, small freight containers	50
Large freight containers	200
(2) Total vessel:	
Packages, overpacks, small freight containers	200
Large freight containers	no limit

[a] *Packages or overpacks carried in or on a vehicle which are in accordance with the provisions of 7.2.3.1.3 may be transported by vessels provided that they are no removed from the vehicle at any time while on board the vessel.*

7.1.8.3.4 Any package or overpack having either a transport index greater than 10, or any consignment having a criticality safety index greater than 50, shall be transported only under exclusive use.

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7.1.8.4 ***Segregation of packages containing fissile material during transport and storage in transit***

7.1.8.4.1 Any group of packages, overpacks, and freight containers containing fissile material stored in transit in any one storage area shall be so limited that the total sum of the criticality safety indexes in the group does not exceed 50. Each group shall be stored so as to maintain a spacing of at least 6 m from other such groups.

7.1.8.4.2 Where the total sum of the criticality safety indexes on board a conveyance or in a freight container exceeds 50, as permitted in Table 7.1.8.4.2, storage shall be such as to maintain a spacing of at least 6 m from other groups of packages, overpacks or freight containers containing fissile material or other conveyances carrying radioactive material.

Table 7.1.8.4.2: CSI limits for freight containers and conveyances containing fissile material

Type of freight container or conveyance	Limit on total sum of criticality safety indexes in a freight container or aboard a conveyance	
	Not under exclusive use	Under exclusive use
Freight container – Small	50	n.a.
Freight container – Large	50	100
Vehicle	50	100
Aircraft		
Passenger	50	n.a.
Cargo	50	100
Inland waterway vessel	50	100
Seagoing vessel[a]		
(1) Hold, compartment or defined deck area:		
Packages, overpacks, small freight containers	50	100
Large freight containers	50	100
(2) Total vessel:		
Packages, overpacks, small freight containers	200[b]	200[c]
Large freight containers	No limit[b]	No limit[c]

[a] *Packages of overpacks carried in or on a vehicle which are in accordance with the provisions of 7.2.3.1.2 may be transported by vessels provided that they are not removed from the vehicle at any time while on board the vessel. In that case the entries under the heading "under exclusive use" apply.*

[b] *The consignment shall be so handled and stowed that the total sum of CSI's in any group does not exceed 50, and that each group is handled and stowed so that the groups are separated from each other by at least 6 m.*

[c] *The consignment shall be so handled and stowed that the total sum of CSI's in any group does not exceed 100, and that each group is handled and stowed so that the groups are separated from each other by at least 6 m. For transport under exclusive use, the intervening space between groups may be occupied by other compatible cargo.*

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7.1.8.5 ***Damaged or leaking packages, contaminated packagings***

7.1.8.5.1 If it is evident that a package is damaged or leaking, or if it is suspected that the package may have leaked or been damaged, access to the package shall be restricted and a qualified person shall, as soon as possible, assess the extent of contamination and the resultant radiation level of the package. The scope of the assessment shall include the package, the conveyance, the adjacent loading and unloading areas, and, if necessary, all other material which has been carried in the conveyance. When necessary, additional steps for the protection of persons property and the environment, in accordance with provisions established by the relevant competent authority, shall be taken to overcome and minimize the consequences of such leakage or damage.

7.1.8.5.2 Packages damaged or leaking radioactive contents in excess of allowable limits for normal conditions of transport may be removed to an acceptable interim location under supervision, but shall not be forwarded until repaired or reconditioned and decontaminated.

7.1.8.5.3 A conveyance and equipment used regularly for the transport of radioactive material shall be periodically checked to determine the level of contamination. The frequency of such checks shall be related to the likelihood of contamination and the extent to which radioactive material is transported.

7.1.8.5.4 Except as provided in 7.1.8.5.5, any conveyance, or equipment or part thereof which has become contaminated above the limits specified in 4.1.9.1.2 in the course of the transport of radioactive material, or which shows a radiation level in excess of 5 μSv/h at the surface, shall be decontaminated as soon as possible by a qualified person and shall not be re-used unless the non-fixed contamination does not exceed the limits specified in 4.1.9.1.2, and the radiation level resulting from the fixed contamination on surfaces after decontamination is less than 5 μSv/h at the surface.

7.1.8.5.5 A freight container, tank, intermediate bulk container or conveyance dedicated to the transport of unpackaged radioactive material under exclusive use shall be excepted from the requirements of 4.1.9.1.4 and 7.1.8.5.4 solely with regard to its internal surfaces and only for as long as it remains under that specific exclusive use.

7.1.8.6 ***Other requirements***

7.1.8.6.1 Where a consignment is undeliverable, the consignment shall be placed in a safe location and the appropriate competent authority shall be informed as soon as possible and a request made for instructions on further action.

7.1.9 Reporting of accidents or incidents involving dangerous goods in transport

7.1.9.1 Accidents and incidents involving the transport of dangerous goods shall be reported to the competent authority of the State in which they occurred in accordance with the reporting requirements of that State and applicable international law.

7.1.9.2 Information reported shall include at least the description of the goods as provided in 5.4.1.4, description of the accident/incident, date and location, estimated loss of dangerous goods, containment information (e.g., packaging or tank type, identification markings, capacity and quantity) and cause and type of any packaging or tank failure that resulted in a release of dangerous goods.

7.1.9.3 Certain types of dangerous goods, as determined by the competent authority or established under applicable international law, may be excepted from these requirements for reporting of accidents or incidents.

7.1.10 Retention of dangerous goods transport information

7.1.10.1 The carrier shall retain a copy of the dangerous goods transport document and additional information and documentation as specified in these Regulations, for a minimum period of three months.

7.1.10.2 When the documents are kept electronically or in a computer system, the carrier shall be capable of reproducing them in a printed form.

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CHAPTER 7.2

MODAL PROVISIONS

7.2.1 Application and general provisions

7.2.1.1 This Chapter requires provisions applicable to dangerous goods transport operations by individual modes of transport. These provisions are in addition to those applicable to all modes of transport as provided in Chapter 7.1.

7.2.2 Special provisions applicable to the transport of portable tanks on vehicles

Portable tanks may only be transported on vehicles whose fastenings are capable, in conditions of maximum permissible loading of the portable tanks, of absorbing the forces specified in 6.7.2.2.12, 6.7.3.2.9 or 6.7.4.2.12, as appropriate.

7.2.3 Special provisions applicable to the transport of radioactive material

7.2.3.1 *Transport by rail and by road*

7.2.3.1.1 Rail and road vehicles carrying packages, overpacks or freight containers labelled with any of the labels shown in 5.2.2.2.2 as models No. 7A, 7B, 7C or 7E or carrying consignments under exclusive use, shall display the placard shown in Figure 5.3.1 (Model 7D) on each of:

(a) The two external lateral walls in the case of a rail vehicle;

(b) The two external lateral walls and the external rear wall in the case of a road vehicle.

In the case of a vehicle without sides the placards may be affixed directly on the cargo-carrying unit provided that they are readily visible; in the case of physically large tanks or freight containers, the placards on the tanks or freight containers shall suffice. In the case of vehicles which have insufficient area to allow the fixing of larger placards, the dimensions of the placard as described in Figure 5.3.1 may be reduced to 100 mm. Any placards which do not relate to the contents shall be removed.

7.2.3.1.2 For consignments under exclusive use, the radiation level shall not exceed:

(a) 10 mSv/h at any point on the external surface of any package or overpack, and may only exceed 2 mSv/h provided that:

(i) The vehicle is equipped with an enclosure which, during routine conditions of transport, prevents the access of unauthorized persons to the interior of the enclosure, and

(ii) Provisions are made to secure the package or overpack so that its position within the vehicle enclosure remains fixed during routine conditions of transport, and

(iii) There is no loading or unloading during the shipment;

(b) 2 mSv/h at any point on the outer surfaces of the vehicle, including the upper and lower surfaces, or, in the case of an open vehicle, at any point on the vertical planes projected from the outer edges of the vehicle, on the upper surface of the load, and on the lower external surface of the vehicle; and

(c) 0.1 mSv/h at any point 2 m from the vertical planes represented by the outer lateral surfaces of the vehicle, or, if the load is transported in an open vehicle, at any point 2 m from the vertical planes projected from the outer edges of the vehicle.

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7.2.3.1.3 In the case of road vehicles, no persons other than the driver and assistants shall be permitted in vehicles carrying packages, overpacks or freight containers bearing category II-YELLOW or III-YELLOW labels.

7.2.3.2 ***Transport by vessels***

7.2.3.2.1 Packages or overpacks having a surface radiation level greater than 2 mSv/h, unless being carried in or on a vehicle under exclusive use in accordance with Table 7.1.8.3.3, footnote (a), shall not be transported by vessel except under special arrangement.

7.2.3.2.2 The transport of consignments by means of a special use vessel which, by virtue of its design, or by reason of its being chartered, is dedicated to the purpose of carrying radioactive material, shall be excepted from the requirements specified in 7.1.8.3.3 provided that the following conditions are met:

(a) A radiation protection programme for the shipment shall be approved by the competent authority of the flag state of the vessel and, when requested, by the competent authority at each port of call;

(b) Stowage arrangements shall be predetermined for the whole voyage including any consignments to be loaded at ports of call en route; and

(c) The loading, carriage and unloading of the consignments shall be supervised by persons qualified in the transport of radioactive material.

7.2.3.3 ***Transport by air***

7.2.3.3.1 Type B(M) packages and consignments under exclusive use shall not be transported on passenger aircraft.

7.2.3.3.2 Vented Type B(M) packages, packages which require external cooling by an ancillary cooling system, packages subject to operational controls during transport, and packages containing liquid pyrophoric materials shall not be transported by air.

7.2.3.3.3 Packages or overpacks having a surface radiation level greater than 2 mSv/h shall not be transported by air except by special arrangement.

7.2.4 Security provisions for transport by road, rail and inland waterway

NOTE: *These provisions are in addition to those applicable to all modes of transport as provided in Chapter 1.4.*

7.2.4.1 Each crew member of road vehicles, trains and inland waterway craft transporting dangerous goods shall carry with them means of identification, which includes their photograph, during transport.

7.2.4.2 When appropriate and already fitted, the use of transport telemetry or other tracking methods or devices shall be used to monitor the movement of high consequence dangerous goods (see Table 1.4.1 in Chapter 1.4.).

7.2.4.3 The carrier shall ensure the application to vehicles and inland waterway craft transporting high consequence dangerous goods (see Table 1.4.1 in Chapter 1.4) of devices, equipment or arrangements to prevent the theft of the vehicle or inland waterway craft or its cargo and shall ensure that these are operational and effective at all times.

7.2.4.4 Safety inspections on cargo transport units shall cover appropriate security measures.