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PART 1

GENERAL PROVISIONS, DEFINITIONS, TRAINING AND SECURITY

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CHAPTER 1.1

GENERAL PROVISIONS

Introductory notes

NOTE 1: *Recommendations on Tests and Criteria, which are incorporated by reference into certain provisions of these Regulations, are published as a separate Manual ("Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria") (ST/SG/AC.10/11/Rev.5 and Amend.1), the contents of which are:*

Part I: Classification procedures, test methods and criteria relating to explosives of Class 1

Part II: Classification procedures, test methods and criteria relating to self-reactive substances of Division 4.1 and organic peroxides of Division 5.2

Part III: Classification procedures, test methods and criteria relating to Class 2, Class 3, Class 4, Division 5.1, Class 8 and Class 9

Part IV: Test methods concerning transport equipment

Appendices: Information common to a number of different types of tests and national contacts for test details.

NOTE 2: *Part III of the Manual of Tests and Criteria contains some classification procedures, test methods and criteria which are also given in these Regulations.*

1.1.1 Scope and application

1.1.1.1 These Regulations prescribe detailed requirements applicable to the transport of dangerous goods. Except as otherwise provided in these Regulations, no person may offer or accept dangerous goods for transport unless those goods are properly classified, packaged, marked, labelled, placarded, described and certified on a transport document, and otherwise in a condition for transport as required by these Regulations.

1.1.1.2 These Regulations do not apply to the transport of:

(a) Dangerous goods that are required for the propulsion of the means of transport or the operation of its specialised equipment during transport (e.g. refrigeration units) or that are required in accordance with the operating regulations (e.g. fire extinguishers); and

(b) Dangerous goods, packaged for retail sale, that are carried by individuals for their own use.

NOTE 1: *Specific modal provisions for the transport of dangerous goods as well as derogations from these general requirements can be found in the modal regulations.*

NOTE 2: *Certain special provisions of Chapter 3.3 also indicate substances and articles which are not subject to these Regulations.*

1.1.1.3 In certain parts of these Regulations, a particular action is prescribed, but the responsibility for carrying out the action is not specifically assigned to any particular person. Such responsibility may vary according to the laws and customs of different countries and the international conventions into which these countries have entered. For the purposes of these Regulations, it is not necessary to make this assignment, but only to identify the action itself. It remains the prerogative of each government to assign this responsibility.

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1.1.1.4 In the transport of dangerous goods, the safety of persons and protection of property and the environment are assured when these Regulations are complied with. Confidence in this regard is achieved through quality assurance and compliance assurance programmes.

1.1.1.5 ***Exceptions for dangerous goods packed in limited quantities***

Certain dangerous goods packed in limited quantities are exempted from certain requirements of these regulations subject to the conditions laid down in Chapter 3.4.

1.1.1.6 ***Transport of dangerous goods by post***

In accordance with the Universal Postal Union Convention, dangerous goods as defined in these Regulations, with the exception of those listed below, are not permitted in mail transported internationally. Appropriate national authorities should ensure that provisions are complied with in relation to the international transport of dangerous goods. The following dangerous goods may be acceptable in international mail subject to the provisions of the appropriate national authorities:

(a) Infectious substances, assigned to Category B (UN 3373) only, and solid carbon dioxide (dry ice) when used as a refrigerant for UN 3373; and

(b) Radioactive material in an excepted package conforming to the requirements of 1.5.1.5, the activity of which does not exceed one tenth of that listed in Table 2.7.2.4.1.2.

For international movement by post additional requirements as prescribed by the Acts of the Universal Postal Union apply.

NOTE: *The Acts of the Universal Postal Union do not apply to the domestic transport of dangerous goods by mail. Domestic transport of dangerous goods in the mail is subject to the provisions of the appropriate national authorities.*

1.1.1.7 ***Application of standards***

Where the application of a standard is required and there is any conflict between the standard and these Regulations, the Regulations take precedence.

1.1.1.8 ***Transport of dangerous goods used as a coolant or conditioner***

Dangerous goods, that are only asphyxiant (which dilute or replace the oxygen normally in the atmosphere), when used in cargo transport units for cooling or conditioning purposes are only subject to the provisions of section 5.5.3.

1.1.2 Dangerous goods forbidden from transport

1.1.2.1 Unless provided otherwise by these Regulations, the following are forbidden from transport:

Any substance or article which, as presented for transport, is liable to explode, dangerously react, produce a flame or dangerous evolution of heat or dangerous emission of toxic, corrosive or flammable gases or vapours under normal conditions of transport.

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CHAPTER 1.2

DEFINITIONS AND UNITS OF MEASUREMENT

1.2.1 Definitions

NOTE: *This Chapter provides definitions of general applicability that are used throughout these Regulations. Additional definitions of a highly specific nature (e.g., terms relating to construction of intermediate bulk containers or portable tanks) are presented in the relevant chapters.*

For the purposes of these Regulations:

Aerosol or aerosol dispenser means a non-refillable receptacle meeting the requirements of 6.2.4, made of metal, glass or plastics and containing a gas, compressed, liquefied or dissolved under pressure, with or without a liquid, paste or powder, and fitted with a release device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or in a gaseous state;

Aircraft

Cargo aircraft means any aircraft, other than a passenger aircraft, which is carrying goods or property;

Passenger aircraft means an aircraft that carries any person other than a crew member, a carrier's employee in an official capacity, an authorized representative of an appropriate national authority, or a person accompanying a consignment or other cargo;

Alternative arrangement means an approval granted by the competent authority for a portable tank or MEGC that has been designed, constructed or tested to technical requirements or testing methods other than those specified in these regulations (see, for instance, 6.7.5.11.1);

Animal material means animal carcasses, animal body parts, or animal foodstuffs;

Approval

Multilateral approval, for the transport of Class 7 material, means approval by the relevant competent authority of the country of origin of the design or shipment, as applicable, and also, where the consignment is to be transported through or into any other country, approval by the competent authority of that country;

Unilateral approval, for the transport of Class 7 material, means an approval of a design which is required to be given by the competent authority of the country of origin of the design only;

ASTM means the American Society for Testing and Materials (ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428-2959, United States of America);

Bag means a flexible packaging made of paper, plastics film, textiles, woven material or other suitable materials;

Box means a packaging with complete rectangular or polygonal faces, made of metal, wood, plywood, reconstituted wood, fibreboard, plastics or other suitable material. Small holes for purposes such as ease of handling or opening, or to meet classification requirements, are permitted as long as they do not compromise the integrity of the packaging during transport;

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Bulk container means a containment system (including any liner or coating) intended for the transport of solid substances which are in direct contact with the containment system. Packagings, intermediate bulk containers (IBCs), large packagings and portable tanks are not included.

A bulk container is:

- of a permanent character and accordingly strong enough to be suitable for repeated use;
- specially designed to facilitate the transport of goods by one or more means of transport without intermediate reloading;
- fitted with devices permitting its ready handling;
- of a capacity of not less than 1.0 m^3.

Examples of bulk containers are freight containers, offshore bulk containers, skips, bulk bins, swap bodies, trough-shaped containers, roller containers, load compartments of vehicles, flexible bulk containers (FBCs);

Bundle of cylinders means an assembly of cylinders that are fastened together and which are interconnected by a manifold and transported as a unit. The total water capacity shall not exceed 3 000 litres except that bundles intended for the transport of gases of Division 2.3 shall be limited to 1 000 litres water capacity;

Cargo transport unit means a road transport tank or freight vehicle, a railway transport tank or freight wagon, a multimodal freight container or portable tank, or a MEGC;

Carrier means any person, organization or government undertaking the transport of dangerous goods by any means of transport. The term includes both carriers for hire or reward (known as common or contract carriers in some countries) and carriers on own account (known as private carriers in some countries);

CGA means the Compressed Gas Association (CGA, 4221 Walney Road, 5th Floor, Chantilly VA 20151-2923, United States of America);

Closed cargo transport unit means a cargo transport unit which totally encloses the contents by permanent structures with complete and rigid surfaces. Cargo transport units with fabric sides or tops are not considered closed cargo transport units;

Closure means a device which close an opening in a receptacle;

Combination packaging means a combination of packagings for transport purposes, consisting of one or more inner packagings secured in an outer packaging in accordance with 4.1.1.5;

Competent authority means any body or authority designated or otherwise recognized as such for any purpose in connection with these Regulations;

Compliance assurance means a systematic programme of measures applied by a competent authority which is aimed at ensuring that the provisions of these Regulations are met in practice;

Composite packaging means a packaging consisting of an outer packaging and an inner receptacle so constructed that the inner receptacle and the outer packaging form an integral packaging. Once assembled it remains thereafter an integrated single unit; it is filled, stored, transported and emptied as such;

Confinement system, for the transport of Class 7 material, means the assembly of fissile material and packaging components specified by the designer and agreed to by the competent authority as intended to preserve criticality safety;

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Consignee means any person, organization or government which is entitled to take delivery of a consignment;

Consignment means any package or packages, or load of dangerous goods, presented by a consignor for transport;

Consignor means any person, organization or government which prepares a consignment for transport;

Containment system, for the transport of Class 7 material, means the assembly of components of the packaging specified by the designer as intended to retain the radioactive material during transport;

Conveyance means

(a) For transport by road or rail: any vehicle;

(b) For transport by water: any vessel, or any hold, compartment, or defined deck area of a vessel; and

(c) For transport by air: any aircraft;

Crate means an outer packaging with incomplete surfaces;

Criticality safety index (CSI) assigned to a package, overpack or freight container containing fissile material, for the transport of Class 7 material, means a number which is used to provide control over the accumulation of packages, overpacks or freight containers containing fissile material;

Critical temperature means the temperature above which the substance cannot exist in the liquid state;

Cryogenic receptacle means a transportable thermally insulated receptacle for refrigerated liquefied gases, of a water capacity of not more than 1 000 litres;

Cylinder means a transportable pressure receptacle of a water capacity not exceeding 150 litres;

Defined deck area means the area of the weather deck of a vessel, or of a vehicle deck of a roll-on/roll-off ship or a ferry, which is allocated for the stowage of dangerous goods;

Design, for the transport of Class 7 material, means the description of special form radioactive material, low dispersible radioactive material, package or packaging which enables such an item to be fully identified. The description may include specifications, engineering drawings, reports demonstrating compliance with regulatory requirements, and other relevant documentation;

Drum means a flat-ended or convex-ended cylindrical packaging made of metal, fibreboard, plastics, plywood or other suitable materials. This definition also includes packagings of other shapes e.g. round taper-necked packagings, or pail-shaped packagings. Wooden barrels or jerricans are not covered by this definition;

Elevated temperature substance means a substance which is transported or offered for transport:

- in the liquid state at a temperature at or above 100 °C;
- in the liquid state with a flashpoint above 60 °C and which is intentionally heated to a temperature above its flashpoint; or
- in a solid state and at a temperature at or above 240 °C;

EN (standard) means a European standard published by the European Committee for Standardization (CEN) (CEN – 36 rue de Stassart, B-1050 Brussels, Belgium);

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Exclusive use, for the transport of Class 7 material, means the sole use, by a single consignor, of a conveyance or of a large freight container, in respect of which all initial, intermediate and final loading and unloading is carried out in accordance with the directions of the consignor or consignee;

Filling ratio means the ratio of the mass of gas to the mass of water at 15 °C that would fill completely a pressure receptacle fitted ready for use;

Freight container means an article of transport equipment that is of a permanent character and accordingly strong enough to be suitable for repeated use; specially designed to facilitate the transport of goods, by one or other modes of transport, without intermediate reloading: designed to be secured and/or readily handled, having fittings for these purposes, and approved in accordance with the International Convention for Safe Containers (CSC), 1972, as amended. The term "freight container" includes neither vehicle nor packaging. However a freight container that is carried on a chassis is included. For freight containers for the transport of Class 7 material, a freight container may be used as a packaging.

A small freight container is that which has either any overall outer dimension less than 1.5 m, or an internal volume of not more than 3 m^3. Any other freight container is considered to be a large freight container;

Fuel cell means an electrochemical device that converts the chemical energy of a fuel to electrical energy, heat and reaction products;

Fuel cell engine means a device used to power equipment and which consists of a fuel cell and its fuel supply, whether integrated with or separate from the fuel cell, and includes all appurtenances necessary to fulfil its function;

GHS means the fourth revised edition of the Globally Harmonized System of classification and labelling of chemicals, published by the United Nations as document ST/SG/AC.10/30/Rev.4;

IAEA means the International Atomic Energy Agency (IAEA, P.O. Box 100 – A -1400 Vienna, Austria);

ICAO means the International Civil Aviation Organization (ICAO, 999 University Street, Montreal, Quebec H3C 5H7, Canada);

IMO means the International Maritime Organization (IMO, 4 Albert Embankment, London SE1 7SR, United Kingdom);

Inspection body means an independent inspection and testing body approved by the competent authority;

Intermediate Bulk Container (IBC)

IBC means any rigid or flexible portable packaging, other than those specified in Chapter 6.1, that:

(a) has a capacity of:

(i) not more than 3.0 m^3 (3 000 litres) for solids and liquids of packing groups II and III;

(ii) not more than 1.5 m^3 for solids of packing group I when packed in flexible, rigid plastics, composite, fibreboard and wooden IBCs;

(iii) not more than 3.0 m^3 for solids of packing group I when packed in metal IBCs;

(iv) not more than 3.0 m^3 for radioactive material of Class 7;

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(b) is designed for mechanical handling;

(c) is resistant to the stresses produced in handling and transport, as determined by tests;

Remanufactured IBC means a metal, rigid plastics or composite IBC that:

(a) is produced as a UN type from a non-UN type; or

(b) is converted from one UN design type to another UN design type.

Remanufactured IBCs are subject to the same requirements of these Regulations that apply to new IBCs of the same type (see also design type definition in 6.5.6.1.1);

Repaired IBC means a metal, rigid plastics or composite IBC that, as a result of impact or for any other cause (e.g. corrosion, embrittlement or other evidence of reduced strength as compared to the design type) is restored so as to conform to the design type and to be able to withstand the design type tests. For the purposes of these Regulations, the replacement of the rigid inner receptacle of a composite IBC with a receptacle conforming to the original design type from the same manufacturer is considered repair. However, routine maintenance of rigid IBCs (see definition below) is not considered repair. The bodies of rigid plastics IBCs and the inner receptacles of composite IBCs are not repairable. Flexible IBCs are not reparable unless approved by the competent authority;

Routine maintenance of flexible IBCs means the routine performance on plastics or textile flexible IBCs of operations, such as:

(a) Cleaning; or

(b) Replacement of non-integral components, such as non-integral liners and closure ties, with components conforming to the original manufacturer's specification;

provided that these operations do not adversely affect the containment function of the flexible IBC or alter the design type;

NOTE: *For rigid IBCs, see* "*Routine maintenance of rigid IBCs*".

Routine maintenance of rigid IBCs means the routine performance on metal, rigid plastics or composite IBCs of operations such as:

(a) Cleaning;

(b) Removal and reinstallation or replacement of body closures (including associated gaskets), or of service equipment, conforming to the original manufacturer's specifications, provided that the leaktightness of the IBC is verified; or

(c) Restoration of structural equipment not directly performing a dangerous goods containment or discharge pressure retention function so as to conform to the design type (e.g. the straightening of legs or lifting attachments) provided that the containment function of the IBC is not affected;

NOTE: *For flexible IBCs, see* "*Routine maintenance of flexible IBCs*".

Inner packaging means a packaging for which an outer packaging is required for transport;

Inner receptacle means a receptacle which require an outer packaging in order to perform its containment function;

Intermediate packaging means a packaging placed between inner packagings, or articles, and an outer packaging;

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ISO (standard) means an international standard published by the International Organization for Standardization (ISO - 1, ch. de la Voie-Creuse, CH-1211 Geneva 20, Switzerland);

Jerrican means a metal or plastics packaging of rectangular or polygonal cross-section;

Large packaging means a packaging consisting of an outer packaging which contains articles or inner packagings and which

(a) is designed for mechanical handling; and

(b) exceeds 400 kg net mass or 450 litres capacity but has a volume of not more than 3 m^3;

Liner means a separate tube or bag inserted into a packaging, (including IBCs and large packagings) but not forming an integral part of it, including the closures of its openings;

Liquid means a dangerous good which at 50 °C have a vapour pressure of not more than 300 kPa (3 bar), which is not completely gaseous at 20 °C and at a pressure of 101.3 kPa, and which has a melting point or initial melting point of 20 °C or less at a pressure of 101.3 kPa. A viscous substance for which a specific melting point cannot be determined shall be subjected to the ASTM D 4359-90 test; or to the test for determining fluidity (penetrometer test) prescribed in section 2.3.4 of Annex A of the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)[1];

Manual of Tests and Criteria means the fifth revised edition of the United Nations publication entitled "*Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria*" (ST/SG/AC.10/11/Rev.5 and Amend.1);

Maximum capacity as used in 6.1.4 means the maximum inner volume of receptacles or packagings expressed in litres;

Maximum net mass means the maximum net mass of contents in a single packaging or maximum combined mass of inner packagings and the contents thereof and is expressed in kg;

Maximum normal operating pressure, for the transport of Class 7 material, means the maximum pressure above atmospheric pressure at mean sea-level that would develop in the containment system in a period of one year under the conditions of temperature and solar radiation corresponding to environmental conditions in the absence of venting, external cooling by an ancillary system, or operational controls during transport;

Metal hydride storage system means a single complete hydrogen storage system, including a receptacle, metal hydride, pressure relief device, shut-off valve, service equipment and internal components used for the transport of hydrogen only;

Multiple-element gas container (MEGC) means a multimodal assembly of cylinders, tubes and bundles of cylinders which are interconnected by a manifold and which are assembled within a framework. The MEGC includes service equipment and structural equipment necessary for the transport of gases;

Net explosive mass (NEM) means the total mass of the explosive substances, without the packagings, casings, etc. *(Net explosive quantity (NEQ), net explosive contents (NEC), or net explosive weight (NEW) are often used to convey the same meaning.);*

Offshore bulk container means a bulk container specially designed for repeated use for transport of dangerous goods to, from and between offshore facilities. An offshore bulk container is designed and constructed in accordance with the Guidelines for the approval of offshore containers handled in open seas specified by the International Maritime Organization (IMO) in document MSC/Circ.860;

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[1] *United Nations publication: ECE/TRANS/215 (Sales No. E.10.VIII.4).*

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Open cryogenic receptacle means a transportable thermally insulated receptacle for refrigerated liquefied gases maintained at atmospheric pressure by continuous venting of the refrigerated liquefied gas;

Outer packaging means the outer protection of a composite or combination packaging together with any absorbent materials, cushioning and any other components necessary to contain and protect inner receptacles or inner packagings;

Overpack means an enclosure used by a single consignor to contain one or more packages and to form one unit for convenience of handling and stowage during transport. Examples of overpacks are a number of packages either:

(a) Placed or stacked on to a load board such as a pallet and secured by strapping, shrink wrapping, stretch wrapping, or other suitable means; or

(b) Placed in a protective outer packaging such as a box or crate;

Package means the complete product of the packing operation, consisting of the packaging and its contents prepared for transport;

Packaging means one or more receptacles and any other components or materials necessary for the receptacles to perform their containment and other safety functions;

Portable tank means:

(a) For the purposes of the transport of substances of Class 1 and Classes 3 to 9, a multimodal portable tank. It includes a shell fitted with service equipment and structural equipment necessary for the transport of dangerous substances;

(b) For the purposes of transport of non-refrigerated, liquefied gases of Class 2, a multimodal tank having a capacity of more than 450 litres. It includes a shell fitted with service equipment and structural equipment necessary for the transport of gases;

(c) For the purposes of transport of refrigerated liquefied gases, a thermally insulated tank having a capacity of more than 450 litres fitted with service equipment and structural equipment necessary for the transport of refrigerated liquefied gases;

The portable tank shall be capable of being loaded and discharged without the need of removal of its structural equipment. It shall possess stabilizing members external to the shell, and shall be capable of being lifted when full. It shall be designed primarily to be loaded on to a vehicle or vessel and is equipped with skids, mountings or accessories to facilitate mechanical handling. Road tank-vehicles, rail tank-wagons, non-metallic tanks, gas cylinders, large receptacles, and intermediate bulk containers (IBCs) are not considered to fall within this definition;

Pressure drum means a welded transportable pressure receptacle of a water capacity exceeding 150 litres and of not more than 1 000 litres, (e.g. cylindrical receptacles equipped with rolling hoops, spheres on skids);

Pressure receptacle is a collective term that includes cylinders, tubes, pressure drums, closed cryogenic receptacles, metal hydride storage system, bundles of cylinders and salvage pressure receptacles;

Quality assurance means a systematic programme of controls and inspections applied by any organization or body which is aimed at providing adequate confidence that the standard of safety prescribed in these Regulations is achieved in practice;

Radiation level, for the transport of Class 7 material, means the corresponding dose rate expressed in millisieverts per hour;

Radioactive contents, for the transport of Class 7 material, mean the radioactive material together with any contaminated or activated solids, liquids, and gases within the packaging;

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Receptacle means a containment vessel for receiving and holding substances or articles, including any means of closing;

Reconditioned packagings include:

(a) Metal drums that:

(i) are cleaned to original materials of construction, with all former contents, internal and external corrosion, and external coatings and labels removed;

(ii) are restored to original shape and contour, with chimes (if any) straightened and sealed, and all non-integral gaskets replaced; and

(iii) are inspected after cleaning but before painting, with rejection of packagings with visible pitting, significant reduction in material thickness, metal fatigue, damage threads or closures, or other significant defects; or

(b) Plastics drums and jerricans that:

(i) are cleaned to original materials of construction, with all former contents, external coatings and labels removed;

(ii) have all non-integral gaskets replaced; and

(iii) are inspected after cleaning with rejection of packagings with visible damage such as tears, creases or cracks, or damaged threads, or closures, or other significant defects;

Recycled plastics material means material recovered from used industrial packagings that has been cleaned and prepared for processing into new packagings. The specific properties of the recycled material used for production of new packagings shall be assured and documented regularly as part of a quality assurance programme recognized by the competent authority. The quality assurance programme shall include a record of proper pre-sorting and verification that each batch of recycled plastics material has the proper melt flow rate, density, and tensile yield strength, consistent with that of the design type manufactured from such recycled material. This necessarily includes knowledge about the packaging material from which the recycled plastics have been derived, as well as awareness of the prior contents of those packagings if those prior contents might reduce the capability of new packagings produced using that material. In addition, the packaging manufacturer's quality assurance programme under 6.1.1.4 shall include performance of the mechanical design type test in 6.1.5 on packagings manufactured from each batch of recycled plastics material. In this testing, stacking performance may be verified by appropriate dynamic compression testing rather than static load testing;

NOTE: *ISO 16103:2005 "Packaging – Transport packages for dangerous goods – Recycled plastics material", provides additional guidance on procedures to be followed in approving the use of recycled plastics material.*

Remanufactured IBC (see "*Intermediate Bulk Container (IBC)*").

Remanufactured large packaging means a metal or rigid plastics large packaging that:

(a) Is produced as a UN type from a non-UN type; or

(b) Is converted from one UN design type to another UN design type.

Remanufactured large packagings are subject to the same requirements of these Regulations that apply to new large packagings of the same type (see also design type definition in 6.6.5.1.2);

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Remanufactured packagings include:

(a) Metal drums that:

(i) are produced as a UN type from a non-UN type;

(ii) are converted from one UN type to another UN type; or

(iii) undergo the replacement of integral structural components (such as non-removable heads); or

(b) Plastics drums that:

(i) are converted from one UN type to another UN type (e.g. 1H1 to 1H2); or

(ii) undergo the replacement of integral structural components;

Remanufactured drum is subject to the same requirements of these Regulations that apply to a new drum of the same type;

Repaired IBC (see "Intermediate Bulk Container (IBC)");

Reused large packaging means a large packaging to be refilled which has been examined and found free of defects affecting the ability to withstand the performance tests: the term includes those which are refilled with the same or similar compatible contents and are transported within distribution chains controlled by the consignor of the product;

Reused packaging means a packaging to be refilled which has been examined and found free of defects affecting the ability to withstand the performance tests: the term includes those which are refilled with the same or similar compatible contents and are transported within distribution chains controlled by the consignor of the product;

Routine maintenance of flexible IBC (see "Intermediate Bulk Container (IBC)");

Routine maintenance of rigid IBC (see "Intermediate Bulk Container (IBC)");

Salvage packaging means a special packaging into which damaged, defective, leaking or non-conforming dangerous goods packages, or dangerous goods that have spilled or leaked, are placed for purposes of transport for recovery or disposal;

Salvage pressure receptacle means a pressure receptacle with a water capacity not exceeding 1 000 litres into which are placed damaged, defective, leaking or non-conforming pressure receptacle(s) for the purpose of transport e.g. for recovery or disposal;

Settled pressure means the pressure of the contents of a pressure receptacle in thermal and diffusive equilibrium;

Shipment means the specific movement of a consignment from origin to destination;

Siftproof packaging means a packaging impermeable to dry contents including fine solid material produced during transport;

Solid means a dangerous good, other than a gas, that do not meet the definition of liquid in this section;

Tank means a portable tank (see 6.7.2.1), including a tank container, a road tank-vehicle, a rail tank-wagon or a receptacle to contain solids, liquids, or gases, having a capacity of not less than 450 litres when used for the transport of gases as defined in 2.2.1.1;

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Test pressure means the required pressure applied during a pressure test for qualification or requalification;

Through or into means through or into the countries in which a consignment is transported but specifically excludes countries "over" which a consignment is carried by air, provided that there are no scheduled stops in those countries;

Transport index (TI) assigned to a package, overpack or freight container, or to unpackaged LSA-I or SCO-I, for the transport of Class 7 material, means a number which is used to provide control over radiation exposure;

Tube means a seamless transportable pressure receptacle of a water capacity exceeding 150 litres but not more than 3 000 litres;

UNECE means the United Nations Economic Commission for Europe (UNECE, Palais des Nations, 8-14 avenue de la Paix, CH-1211 Geneva 10, Switzerland);

Vehicle means a road vehicle (including an articulated vehicle, i.e. a tractor and semi-trailer combination), railroad car or railway wagon. Each trailer shall be considered as a separate vehicle;

Vessel means any seagoing vessel or inland waterway craft used for carrying cargo;

Wooden barrel means a packaging made of natural wood, of round cross-section, having convex walls, consisting of staves and heads and fitted with hoops;

Working pressure means the settled pressure of a compressed gas at a reference temperature of 15 °C in a full pressure receptacle;

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Clarifying examples for certain defined terms

The following explanations and examples are meant to assist in clarifying the use of the some of the packaging terms defined in this section.

The definitions in this section are consistent with the use of the defined terms throughout the Regulations. However, some of the defined terms are commonly used in other ways. This is particularly evident in respect of the term “inner receptacle” which has often been used to describe the “inners” of a combination packaging.

The “inners” of “combination packagings” are always termed “inner packagings” not “inner receptacles”. A glass bottle is an example of such an “inner packaging”.

The “inners” of “composite packagings” are normally termed “inner receptacles”. For example, the “inner” of a 6HA1 composite packaging (plastics material) is such an “inner receptacle” since it is normally not designed to perform a containment function without its “outer packaging” and is not therefore an “inner packaging”.

1.2.2 Units of measurement

1.2.2.1 The following units of measurement [a] are applicable in these Regulations:

Measurement of	SI Unit [b]	Acceptable alternative unit		Relationship between units		
Length	m (metre)	--		--		
Area	m^2 (square metre)	--		--		
Volume	m^3 (cubic metre)	1 [c]	(litre)	1 l	=	10^{-3} m^3
Time	s (second)	min	(minute)	1 min	=	60 s
		h	(hour)	1 h	=	3 600 s
		d	(day)	1 d	=	86 400 s
Mass	kg (kilogramme)	g	(gramme)	1 g	=	10^{-3} kg
		t	(ton)	1 t	=	10^3 kg
Mass density	kg/m^3	kg/l		1 kg/l	=	10^3 kg/m^3
Temperature	K (kelvin)	°C	(degree Celsius)	0 °C	=	273.15 K
Difference of temperature	K (kelvin)	°C	(degree Celsius)	1 °C	=	1 K
Force	N (newton)	--		1 N	=	1 kg · m/s^2
Pressure	Pa (pascal)	bar	(bar)	1 bar	=	10^5 Pa
				1 Pa	=	1 N/m^2
Stress	N/m^2	N/mm^2		1 N/mm^2	=	1 MPa
Work	J (joule)	KWh	(kilowatt hour)	1 kWh	=	3.6 MJ
Energy				1 J	=	1 N · m = 1 W · s
Quantity of heat		eV	(electronvolt)	1 eV	=	0.1602 · 10^{-18}J
Power	W (watt)	--		1 W	=	1 J/s = 1 N · m/s
Kinematic viscosity	m^2/s	mm^2/s		1 mm^2/s	=	10^{-6} m^2/s
Dinamic viscosity	Pa · s	mPa · s		1 mPa · s	=	10^{-3} Pa · s
Activity	Bq (becquerel)					
Dose equivalent	Sv (sievert)					

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Notes to 1.2.2.1:

[a] *The following round figures are applicable for the conversion of the units hitherto used into SI Units.*

Force	*Stress*
$1\ kg = 9.807\ N$	$1\ kg/mm^2 = 9.807\ N/mm^2$
$1\ N = 0.102\ kg$	$1\ N/mm^2 = 0.102\ kg/mm^2$

Pressure

$1\ Pa$	=	$1\ N/m^2 = 10^{-5}\ bar$	=	$1.02 \times 10^{-5}\ kg/cm^2$	=	$0.75 \times 10^{-2}\ torr$
$1\ bar$	=	$10^5\ Pa$	=	$1.02\ kg/cm^2$	=	$750\ torr$
$1\ kg/cm^2$	=	$9.807 \times 10^4\ Pa$	=	$0.9807\ bar$	=	$736\ torr$
$1\ torr$	=	$1.33 \times 10^2\ Pa$	=	$1.33 \times 10^{-3}\ bar$	=	$1.36 \times 10^{-3} kg/cm^2$

Energy, Work, Quantity of heat

$1\ J = 1\ Nm$	=	$0.278 \times 10^{-6}\ kWh$	=	$0.102\ kgm$	=	$0.239 \times 10^{-3}\ kcal$
$1\ kWh$	=	$3.6 \times 10^6\ J$	=	$367 \times 10^3\ kgm$	=	$860\ kcal$
$1\ kgm$	=	$9.807\ J$	=	$2.72 \times 10^{-6}\ kWh$	=	$2.34 \times 10^{-3}\ kcal$
$1\ kcal$	=	$4.19 \times 10^3 J$	=	$1.16 \times 10^{-3}\ kWh$	=	$427\ kgm$

Power

$1\ W$	=	$0.102\ kgm/s$	=	$0.86\ kcal/h$
$1\ kgm/s$	=	$9.807\ W$	=	$8.43\ kcal/h$
$1\ kcal/h$	=	$1.16\ W$	=	$0.119\ kgm/s$

Kinematic viscosity

$1\ m^2/s$	=	$10^4\ St$ (Stokes)
$1\ St$	=	$10^{-4}\ m^2/s$

Dynamic viscosity

$1\ Pa \cdot s$	=	$1\ Ns/m^2$	=	$10\ P$ (poise)	=	$0.102\ kgs/m^2$
$1\ P$	=	$0.1\ Pa \cdot s$	=	$0.1\ Ns/m^2$	=	$1.02 \times 10^{-2}\ kgs/m^2$
$1\ kgs/m^2$	=	$9.807\ Pa \cdot s$	=	$9.807\ Ns/m^2$	=	$98.07\ P$

[b] *The International System of Units (SI) is the result of decisions taken at the General Conference on Weights and Measures (Address: Pavillon de Breteuil, Parc de St-Cloud, F-92310 Sèvres).*

[c] *The abbreviation "L" for litre may also be used in place of the abbreviation "l" when a typewriter cannot distinguish between figure "1" and letter "l".*

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The decimal multiples and sub-multiples of a unit may be formed by prefixes or symbols, having the following meanings, placed before the name or symbol of the unit:

Factor				Prefix	Symbol
1 000 000 000 000 000 000	=	10^{18}	quintillion	exa	E
1 000 000 000 000 000	=	10^{15}	quadrillion	peta	P
1 000 000 000 000	=	10^{12}	trillion	tera	T
1 000 000 000	=	10^{9}	billion	giga	G
1 000 000	=	10^{6}	million	mega	M
1 000	=	10^{3}	thousand	kilo	k
100	=	10^{2}	hundred	hecto	h
10	=	10^{1}	ten	deca	da
0.1	=	10^{-1}	tenth	deci	d
0.01	=	10^{-2}	hundredth	centi	c
0.001	=	10^{-3}	thousandth	milli	m
0.000 001	=	10^{-6}	millionth	micro	µ
0.000 000 001	=	10^{-9}	billionth	nano	n
0.000 000 000 001	=	10^{-12}	trillionth	pico	p
0.000 000 000 000 001	=	10^{-15}	quadrillionth	femto	f
0.000 000 000 000 000 001	=	10^{-18}	quintillionth	atto	a

NOTE: *10^9= 1 billion is United Nations usage in English. By analogy, so is 10^{-9} = 1 billionth.*

1.2.2.2 *Deleted.*

1.2.2.3 Whenever the mass of a package is mentioned, the gross mass is meant unless otherwise stated. The mass of containers or tanks used for the transport of goods is not included in the gross mass.

1.2.2.4 Unless expressly stated otherwise, the sign "%" represents:

(a) In the case of mixtures of solids or of liquids, and also in the case of solutions and of solids wetted by a liquid: a percentage mass based on the total mass of the mixture, the solution or the wetted solid;

(b) In the case of mixtures of compressed gases: when filled by pressure, the proportion of the volume indicated as a percentage of the total volume of the gaseous mixture, or, when filled by mass, the proportion of the mass indicated as a percentage of the total mass of the mixture.

In the case of mixtures of liquefied gases and gases dissolved under pressure: the proportion of the mass indicated as a percentage of the total mass of the mixture.

1.2.2.5 Pressures of all kinds relating to receptacles (such as test pressure, internal pressure, safety-valve opening pressure) are always indicated in gauge pressure (pressure in excess of atmospheric pressure); however, the vapour pressure of substances is always expressed in absolute pressure.

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CHAPTER 1.3

TRAINING

1.3.1 Persons engaged in the transport of dangerous goods shall be trained in the contents of dangerous goods requirements commensurate with their responsibilities. Employees shall be trained in accordance with 1.3.2 before assuming responsibilities and shall only perform functions, for which required training has not yet been provided, under the direct supervision of a trained person. Training requirements specific to security of dangerous goods in Chapter 1.4 shall also be addressed.

1.3.2 Individuals such as those who classify dangerous goods; pack dangerous goods; mark and label dangerous goods; prepare transport documents for dangerous goods; offer or accept dangerous goods for transport; carry or handle dangerous goods in transport; mark or placard or load or unload packages of dangerous goods into or from transport vehicles, bulk packagings or freight containers; or are otherwise directly involved in the transport of dangerous goods as determined by the competent authority; shall be trained in the following:

(a) *General awareness/familiarization training*:

(i) Each person shall be trained in order to be familiar with the general provisions of dangerous goods transport requirements;

(ii) Such training shall include a description of the classes of dangerous goods; labelling, marking, placarding and packaging, segregation and compatibility requirements; a description of the purpose and content of the dangerous goods transport document; and a description of available emergency response documents;

(b) *Function-specific training*: Each person shall be trained in specific dangerous goods transport requirements which are applicable to the function that person performs;

(c) *Safety training*: Commensurate with the risk of exposure in the event of a release and the functions performed, each person shall be trained in:

(i) Methods and procedures for accident avoidance, such as proper use of package-handling equipment and appropriate methods of stowage of dangerous goods;

(ii) Available emergency response information and how to use it;

(iii) General dangers presented by the various classes of dangerous goods and how to prevent exposure to those hazards, including if appropriate the use of personal protective clothing and equipment; and

(iv) Immediate procedures to be followed in the event of an unintentional release of dangerous goods, including any emergency response procedures for which the person is responsible and personal protection procedures to be followed.

1.3.3 Records of training received according to this Chapter shall be kept by the employer and made available to the employee or competent authority, upon request. Records shall be kept by the employer for a period of time established by the competent authority.

1.3.4 The training required by 1.3.2 shall be provided or verified upon employment in a position involving dangerous goods transport and shall be periodically supplemented with retraining as deemed appropriate by the competent authority.

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CHAPTER 1.4

SECURITY PROVISIONS

Introductory notes

NOTE 1: *This Chapter provides requirements intended to address the security of dangerous goods in transport in all modes. Mode specific security provisions can be found in Chapter 7.2. National and modal authorities may apply additional security provisions which should be considered when offering or transporting dangerous goods.*

NOTE 2: *For the purposes of this Chapter security means measures or precautions to be taken to minimise theft or misuse of dangerous goods that may endanger persons or property.*

1.4.1 General provisions

1.4.1.1 All persons engaged in the transport of dangerous goods shall consider security requirements for the transport of dangerous goods commensurate with their responsibilities.

1.4.1.2 Consignors shall only offer dangerous goods to carriers that have been appropriately identified.

1.4.1.3 Transit sites, such as airside warehouses, marshalling yards and other temporary storage areas shall be properly secured, well lit and, where possible, not be accessible to the general public.

1.4.1.4 The provisions of this Chapter do not apply to:

(a) UN 2908 and UN 2909 excepted packages;

(b) UN 2910 and UN 2911 excepted packages with an activity level not exceeding the A_2 value; and

(c) UN 2912 LSA-I and UN 2913 SCO-I.

1.4.2 Security training

1.4.2.1 The training specified for individuals in 1.3.2 (a), (b) or (c) shall also include elements of security awareness.

1.4.2.2 Security awareness training shall address the nature of security risks, recognising security risks, methods to address and reduce such risks and actions to be taken in the event of a security breach. It shall include awareness of security plans (if appropriate) commensurate with the responsibilities of individuals and their part in implementing security plans.

1.4.2.3 Such training shall be provided or verified upon employment in a position involving dangerous goods transport and shall be periodically supplemented with retraining.

1.4.2.4 Records of all security training received shall be kept by the employer and made available to the employee or competent authority, upon request. Records shall be kept by the employer for a period of time established by the competent authority.

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1.4.3 Provisions for high consequence dangerous goods

1.4.3.1 *Definition of high consequence dangerous goods*

1.4.3.1.1 High consequence dangerous goods are those which have the potential for misuse in a terrorist event and which may, as a result, produce serious consequences such as mass casualties, mass destruction or, particularly for Class 7, mass socio-economic disruption.

1.4.3.1.2 An indicative list of high consequence dangerous goods in classes and divisions other than Class 7 is given in Table 1.4.1 below.

Table 1.4.1: Indicative list of high consequence dangerous goods

Class 1, Division 1.1	explosives
Class 1, Division 1.2	explosives
Class 1, Division 1.3	compatibility group C explosives
Class 1, Division 1.4	UN Nos. 0104, 0237, 0255, 0267, 0289, 0361, 0365, 0366, 0440, 0441, 0455, 0456 and 0500
Class 1, Division 1.5	explosives
Division 2.1	flammable gases in bulk
Division 2.3	toxic gases (excluding aerosols)
Class 3	flammable liquids of packing groups I and II in bulk
Class 3 and Division 4.1	desensitized explosives
Division 4.2	goods of packing group I in bulk
Division 4.3	goods of packing group I in bulk
Division 5.1	oxidizing liquids of packing group I in bulk
Division 5.1	perchlorates, ammonium nitrate, ammonium nitrate fertilisers and ammonium nitrate emulsions or suspensions or gels, in bulk
Division 6.1	toxic substances of packing group I
Division 6.2	infectious substances of Category A (UN Nos. 2814 and 2900)
Class 8	corrosive substances of packing group I in bulk

NOTE: *For the purposes of this table, "in bulk" means transported in quantities greater than 3 000 kg or 3 000 l in portable tanks or bulk containers.*

1.4.3.1.3 For dangerous goods of Class 7, high consequence radioactive material is that with an activity equal to or greater than a transport security threshold of 3 000 A_2 per single package (see also 2.7.2.2.1) except for the following radionuclides where the transport security threshold is given in Table 1.4.2 below.

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Table 1.4.2: Transport security thresholds for specific radionuclides

Element	Radionuclide	Transport security threshold (TBq)
Americium	Am-241	0.6
Gold	Au-198	2
Cadmium	Cd-109	200
Californium	Cf-252	0.2
Curium	Cm-244	0.5
Cobalt	Co-57	7
Cobalt	Co-60	0.3
Cesium	Cs-137	1
Iron	Fe-55	8000
Germanium	Ge-68	7
Gadolinium	Gd-153	10
Iridium	Ir-192	0.8
Nickel	Ni-63	600
Paladium	Pd-103	900
Promethium	Pm-147	400
Polonium	Po-210	0.6
Plutonium	Pu-238	0.6
Plutonium	Pu-239	0.6
Radium	Ra-226	0.4
Ruthenium	Ru-106	3
Selenium	Se-75	2
Strontium	Sr-90	10
Thallium	Tl-204	200
Thulium	Tm-170	200
Yterbium	Yb-169	3

1.4.3.1.4 For mixtures of radionuclides, determination of whether or not the transport security threshold has been met or exceeded can be calculated by summing the ratios of activity present for each radionuclide divided by the transport security threshold for that radionuclide. If the sum of the fractions is less than 1, then the radioactivity threshold for the mixture has not been met nor exceeded.

This calculation can be made with the formula:

$$\sum_i \frac{A_i}{T_i} < 1$$

Where:
A_i = activity of radionuclide *i* that is present in a package (TBq)
T_i = transport security threshold for radionuclide *i* (TBq).

1.4.3.1.5 When radioactive material possess subsidiary risks of other classes or divisions, the criteria of table 1.4.1 shall also be taken into account (see also 1.5.5.1).

1.4.3.2 *Specific security provisions for high consequence dangerous goods*

1.4.3.2.1 In implementing national security provisions competent authorities shall consider establishing a programme for identifying consignors or carriers engaged in the transport of high consequence dangerous goods for the purpose of communicating security related information.

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1.4.3.2.2 *Security plans*

1.4.3.2.2.1 Carriers, consignors and others (including infrastructure managers) engaged in the transport of high consequence dangerous goods (see 1.4.3.1) shall adopt, implement and comply with a security plan that addresses at least the elements specified in 1.4.3.2.2.2.

1.4.3.2.2.2 The security plan shall comprise at least the following elements:

(a) Specific allocation of responsibilities for security to competent and qualified persons with appropriate authority to carry out their responsibilities;

(b) Records of dangerous goods or types of dangerous goods transported;

(c) Review of current operations and assessment of vulnerabilities, including inter-modal transfer, temporary transit storage, handling and distribution as appropriate;

(d) Clear statements of measures, including training, policies (including response to higher threat conditions, new employee/employment verification etc.), operating practices (e.g. choice/use of routes where known, access to dangerous goods in temporary storage, proximity to vulnerable infrastructure etc.), equipment and resources that are to be used to reduce security risks;

(e) Effective and up to date procedures for reporting and dealing with security threats, breaches of security or security incidents;

(f) Procedures for the evaluation and testing of security plans and procedures for periodic review and update of the plans;

(g) Measures to ensure the security of transport information contained in the plan; and

(h) Measures to ensure that the distribution of the transport information is limited as far as possible. (Such measures shall not preclude provision of transport documentation required by Chapter 5.4 of these Regulations).

NOTE: *Carriers, consignors and consignees should co-operate with each other and with appropriate authorities to exchange threat information, apply appropriate security measures and respond to security incidents.*

1.4.3.2.3 For radioactive material, the provisions of this Chapter and of section 7.2.4 are deemed to be complied with when the provisions of the Convention on Physical Protection of Nuclear Material[1] and the IAEA circular on "The Physical Protection of Nuclear Material and Nuclear Facilities"[2] are applied.

[1] *INFCIRC/274/Rev.1, IAEA, Vienna (1980).*

[2] *INFCIRC/225/Rev.4 (Corrected), IAEA, Vienna (1999).*

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CHAPTER 1.5

GENERAL PROVISIONS CONCERNING CLASS 7

1.5.1 Scope and application

1.5.1.1 These Regulations establish standards of safety which provide an acceptable level of control of the radiation, criticality and thermal hazards to persons, property and the environment that are associated with the transport of radioactive material. These regulations are based on the IAEA Regulations for the Safe Transport of Radioactive Material (2009 Edition), Safety Standards Series No. TS-R-1, IAEA, Vienna (2009). Explanatory material can be found in "Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (2005 Edition)", Safety Standard Series No. TS-G-1.1 (Rev.1), IAEA, Vienna (2008). The prime responsibility for safety shall rest with the person or organization responsible for facilities and activities that give rise to radiation risk.

1.5.1.2 The objective of these Regulations is to establish requirements that must be satisfied to ensure safety and to protect persons, property and the environment from the effects of radiation in the transport of radioactive material. This protection is achieved by requiring:

(a) Containment of the radioactive contents;

(b) Control of external radiation levels;

(c) Prevention of criticality; and

(d) Prevention of damage caused by heat.

These requirements are satisfied firstly by applying a graded approach to contents limits for packages and conveyances and to performance standards applied to package designs depending upon the hazard of the radioactive contents. Secondly, they are satisfied by imposing requirements on the design and operation of packages and on the maintenance of packagings, including a consideration of the nature of the radioactive contents. Finally, they are satisfied by requiring administrative controls including, where appropriate, approval by competent authorities.

1.5.1.3 These Regulations apply to the transport of radioactive material by all modes on land, water or in the air, including transport which is incidental to the use of the radioactive material. Transport comprises all operations and conditions associated with and involved in the movement of radioactive material; these include the design, manufacture, maintenance and repair of packaging, and the preparation, consigning, loading, transport including in-transit storage, unloading and receipt at the final destination of loads of radioactive material and packages. A graded approach is applied to the performance standards in these Regulations that are characterized by three general severity levels:

(a) Routine conditions of transport (incident free);

(b) Normal conditions of transport (minor mishaps);

(c) Accident conditions of transport.

1.5.1.4 These Regulations do not apply to:

(a) Radioactive material that is an integral part of the means of transport;

(b) Radioactive material moved within an establishment which is subject to appropriate safety regulations in force in the establishment and where the movement does not involve public roads or railways;

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(c) Radioactive material implanted or incorporated into a person or live animal for diagnosis or treatment;

(d) Radioactive material in consumer products which have received regulatory approval, following their sale to the end user;

(e) Natural material and ores containing naturally occurring radionuclides which are either in their natural state, or have only been processed for purposes other than for extraction of the radionuclides, and which are not intended to be processed for use of these radionuclides provided the activity concentration of the material does not exceed 10 times the values specified in 2.7.2.2.1 (b), or calculated in accordance with 2.7.2.2.2 to 2.7.2.2.6;

(f) Non-radioactive solid objects with radioactive substances present on any surfaces in quantities not in excess of the limit set out in the definition for "contamination" in 2.7.1.2.

1.5.1.5 *Specific provisions for the transport of excepted packages*

1.5.1.5.1 Excepted packages which may contain radioactive material in limited quantities, instruments, manufactured articles and empty packagings as specified in 2.7.2.4.1 shall be subject only to the following provisions of Parts 5 to 7:

(a) The applicable provisions specified in 5.1.2, 5.1.3.2, 5.1.4, 5.1.5.4, 5.2.1.7 and 7.1.8.5.2;

(b) The requirements for excepted packages specified in 6.4.4; and

(c) If the excepted package contains fissile material, one of the fissile exceptions provided by 2.7.2.3.5 shall apply and the requirement of 6.4.7.2 shall be met.

1.5.1.5.2 Excepted packages shall be subject to the relevant provisions of all other parts of these Regulations.

1.5.2 Radiation protection programme

1.5.2.1 The transport of radioactive material shall be subject to a radiation protection programme which shall consist of systematic arrangements aimed at providing adequate consideration of radiation protection measures.

1.5.2.2 Doses to persons shall be below the relevant dose limits. Protection and safety shall be optimized in order that the magnitude of individual doses, the number of persons exposed, and the likelihood of incurring exposure shall be kept as low as reasonably achievable, economic and social factors being taken into account, within the restriction that the doses to individuals be subject to dose constraints. A structured and systematic approach shall be adopted and shall include consideration of the interfaces between transport and other activities.

1.5.2.3 The nature and extent of the measures to be employed in the programme shall be related to the magnitude and likelihood of radiation exposures. The programme shall incorporate the requirements in 1.5.2.2, 1.5.2.4 to 1.5.2.7 and 7.1.8.1.1. Programme documents shall be available, on request, for inspection by the relevant competent authority.

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1.5.2.4 For occupational exposures arising from transport activities, where it is assessed that the effective dose:

(a) Is likely to be between 1 and 6 mSv in a year, a dose assessment programme via workplace monitoring or individual monitoring shall be conducted;

(b) Is likely to exceed 6 mSv in a year, individual monitoring shall be conducted.

When individual monitoring or workplace monitoring is conducted, appropriate records shall be kept.

NOTE: *For occupational exposures arising from transport activities, where it is assessed that the effective dose is most unlikely to exceed 1mSv in a year, no special work patterns, detailed monitoring, dose assessment programmes or individual record keeping need be required.*

1.5.2.5 In the event of accidents or incidents during the transport of radioactive material, emergency provisions, as established by relevant national and/or international organizations, shall be observed to protect persons, property and the environment. 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).

1.5.2.6 Emergency procedures shall take into account the formation of other dangerous substances that may result from the reaction between the contents of a consignment and the environment in the event of an accident.

1.5.2.7 Workers shall be appropriately trained in the radiation hazards involved and the precautions to be observed in order to ensure restriction of their exposure and that of other persons who might be affected by their actions.

1.5.3 Quality assurance

1.5.3.1 Quality assurance programmes based on international, national or other standards acceptable to the competent authority shall be established and implemented for the design, manufacture, testing, documentation, use, maintenance and inspection of all special form radioactive material, low dispersible radioactive material and packages and for transport and in-transit storage operations to ensure compliance with the relevant provisions of these Regulations. Certification that the design specification has been fully implemented shall be available to the competent authority. The manufacturer, consignor or user shall be prepared to provide facilities for competent authority inspection during manufacture and use and to demonstrate to any cognizant competent authority that:

(a) The manufacturing methods and materials used are in accordance with the approved design specifications; and

(b) All packagings are periodically inspected and, as necessary, repaired and maintained in good condition so that they continue to comply with all relevant requirements and specifications, even after repeated use.

Where competent authority approval is required, such approval shall take into account and be contingent upon the adequacy of the quality assurance programme.

1.5.4 Special arrangement

1.5.4.1 Special arrangement shall mean those provisions, approved by the competent authority, under which consignments which do not satisfy all the requirements of these Regulations applicable to radioactive material may be transported.

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1.5.4.2 Consignments for which conformity with any provision applicable to Class 7 is impracticable shall not be transported except under special arrangement. Provided the competent authority is satisfied that conformity with the Class 7 provisions of these Regulations is impracticable and that the requisite standards of safety established by these Regulations have been demonstrated through alternative means the competent authority may approve special arrangement transport operations for single or a planned series of multiple consignments. The overall level of safety in transport shall be at least equivalent to that which would be provided if all the applicable requirements had been met. For international consignments of this type, multilateral approval shall be required.

1.5.5 Radioactive material possessing other dangerous properties

1.5.5.1 In addition to the radioactive and fissile properties, any subsidiary risk of the contents of a package, such as explosiveness, flammability, pyrophoricity, chemical toxicity and corrosiveness, shall also be taken into account in the documentation, packing, labelling, marking, placarding, stowage, segregation and transport, in order to be in compliance with all relevant provisions for dangerous goods of these regulations.

1.5.6 Non-compliance

1.5.6.1 In the event of a non-compliance with any limit in these Regulations applicable to radiation level or contamination:

(a) The consignor shall be informed of the non-compliance

(i) by the carrier if the non-compliance is identified during transport; or

(ii) by the consignee if the non-compliance is identified at receipt;

(b) The carrier, consignor or consignee, as appropriate, shall:

(i) take immediate steps to mitigate the consequences of the non-compliance;

(ii) investigate the non-compliance and its causes, circumstances and consequences;

(iii) take appropriate action to remedy the causes and circumstances that led to the non-compliance and to prevent a recurrence of similar circumstances that led to the non-compliance; and

(iv) communicate to the relevant competent authority(ies) on the causes of the non-compliance and on corrective or preventive actions taken or to be taken; and

(c) The communication of the non-compliance to the consignor and relevant competent authority(ies), respectively, shall be made as soon as practicable and it shall be immediate whenever an emergency exposure situation has developed or is developing.