

## Part 7 – Provisions concerning transport operations

### 7.1.13.2 Additional stowage precautions for toxic substances which are also flammable liquids

- .1 On ships carrying passengers, these substances shall be stowed "away from" any deck or spaces provided for the use of passengers. When such substances are transported on board roll-on/roll-off ships, see the relevant provisions of chapter 7.4.
- .2 These substances shall be stowed in a mechanically ventilated space and be kept as cool as reasonably practicable during transit. They shall, in general, be stowed "away from" all sources of heat.

### 7.1.14 Stowage of goods of class 7

7.1.14.1 Radioactive material shall be stowed as indicated in the Dangerous Goods List for class 7 in 3.2, in accordance with the appropriate stowage category specified in 7.1.1.2.

7.1.14.2 The total activity in a single cargo space of an inland water craft, or in another conveyance, for transport of LSA material or SCO in Type IP-1, Type IP-2, Type IP-3 packaging or unpackaged shall not exceed the limits shown in the table hereunder.

**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 cargo space of an inland water craft
LSA-I	No limit	No limit
LSA-II and LSA-III non-combustible solids	No limit	100A <sub>2</sub>
LSA-II and LSA-III combustible solids, and all liquids and gases	100A <sub>2</sub>	10A <sub>2</sub>
SCO	100A <sub>2</sub>	10A <sub>2</sub>

7.1.14.3 Consignments shall be securely stowed.

7.1.14.4 Provided that its average surface heat flux does not exceed 15 W/m<sup>2</sup> and that the immediately surrounding cargo is not in sacks or bags, a package or overpack may be transported 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.

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

- .1 Except under the condition of exclusive use, 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 the table hereunder. For consignments of LSA-I material there shall be no limit on the sum of the transport indexes.

**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 <sup>a</sup>	
1 Hold, compartment or defined 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

<sup>a</sup> Packages or overpacks transported in or on a vehicle which are in accordance with the provisions of 7.1.14.7 may be transported by vessels provided that they are not removed from the vehicle at any time while on board the ship.

- .2 Where a consignment is transported under exclusive use, there shall be no limit on the sum of the transport indexes aboard a single conveyance.
- .3 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.
- .4 The total sum of the criticality safety indexes in a freight container and aboard a conveyance shall not exceed the values shown in the table hereunder.

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 <sup>a</sup>		
1 <i>Cargo space or defined deck area:</i>		
Packages, overpacks, small freight containers	50	100
Large freight containers	50	100
2 <i>Total vessel:</i>		
Packages, overpacks, small freight containers	200 <sup>b</sup>	200 <sup>c</sup>
Large freight containers	No limit <sup>b</sup>	No limit <sup>c</sup>

<sup>a</sup> Packages or overpacks transported in or on a vehicle which are in accordance with the provisions of 7.1.14.7 may be transported by ships provided that they are not removed from the vehicle at any time while on board the ship. In that case, the entries under the heading "under exclusive use" apply.

<sup>b</sup> 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.

<sup>c</sup> 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. The intervening space between groups may be occupied by other cargo.

- 7.1.14.6** 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.
- 7.1.14.7** For consignments under exclusive use, the radiation level shall not exceed:
- .1 10 mSv/h at any point on the external surface of any package or overpack, and may only exceed 2 mSv/h provided that:
- .1 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
  - .2 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
  - .3 there is no loading or unloading during the shipment;
- .2 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
- .3 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.
- 7.1.14.8** 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.
- 7.1.14.9** Packages or overpacks having a surface radiation level greater than 2 mSv/h, unless being transported in or on a vehicle under exclusive use in accordance with the table under 7.1.14.5, footnote (a), shall not be transported by ship except under special arrangement.

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- 7.1.14.10** The transport of consignments by means of a special use ship 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 provisions specified in 7.1.14.5 provided that the following conditions are met:
- .1 a radiation protection programme for the shipment shall be approved by the competent authority of the flag State of the ship and, when requested, by the competent authority at each port of call;
  - .2 stowage arrangements shall be predetermined for the whole voyage, including any consignments to be loaded at ports of call *en route*; and
  - .3 the loading, transport and unloading of the consignments shall be supervised by persons qualified in the transport of radioactive material.
- 7.1.14.11** Any 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.
- 7.1.14.12** Except as provided in 7.1.14.13, 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  $\mu\text{Sv/h}$  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  $\mu\text{Sv/h}$  at the surface.
- 7.1.14.13** An overpack, freight container, tank, intermediate bulk container or conveyance dedicated to the transport of radioactive material under exclusive use shall be excepted from the provisions of 4.1.9.1.4 and 7.1.14.12 solely with regard to its internal surfaces and only for as long as it remains under that specific exclusive use.
- 7.1.14.14** 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.
- 7.1.15 Stowage of goods of class 8**
- 7.1.15.1 General stowage precautions for goods of class 8**
- 7.1.15.1.1** The substances of this class shall be kept as dry as reasonably practicable, since in the presence of moisture they may be corrosive to most metals and some also react violently with water.
- 7.1.15.1.2** All substances of this class for which an unprotected plastics packaging is permitted shall be kept as cool as reasonably practicable as the resistance of most plastics decreases at higher temperatures.
- 7.1.15.2 Additional stowage precautions for corrosive substances which are also flammable liquids**
- 7.1.15.2.1** On ships carrying passengers, these substances shall be stowed well "away from" any deck or spaces provided for the use of passengers. When such substances are transported on board roll-on/roll-off ships, special attention shall be given to the relevant provisions of chapter 7.4.
- 7.1.15.2.2** These substances shall be stowed in a mechanically ventilated space and be kept as cool as reasonably practicable during transit. They shall, in general, be stowed "away from" all sources of heat.
- 7.1.16 Stowage of goods of class 9**
- 7.1.16.1 Stowage precautions for AMMONIUM NITRATE BASED FERTILIZER, UN 2071**
- 7.1.16.1.1** AMMONIUM NITRATE BASED FERTILIZER, UN 2071 shall be stowed in a clean cargo space capable of being opened up in an emergency. In the case of bagged fertilizer or fertilizer in containers, it is sufficient if, in the case of an emergency, the cargo is accessible through free approaches (hatch entries), and mechanical ventilation enables the master to exhaust any gases or fumes resulting from decomposition. The possible need to open hatches in case of fire to provide maximum ventilation and to apply water in an emergency, and the consequent risk to the stability of the ship through flooding of the cargo space, shall be considered before loading.
- 7.1.16.1.2** If suppression of decomposition should prove impracticable (such as in bad weather), there would not necessarily be immediate danger to the structure of the ship. However, the residue left after decomposition may have only half the mass of the original cargo; this loss of mass may also affect the stability of the ship and shall be considered before loading.
- 7.1.16.1.3** AMMONIUM NITRATE BASED FERTILIZER, UN 2071 shall be stowed out of direct contact with a metal engine-room bulkhead. In the case of bagged material, this may be done, for example, by using wooden boards to