

PART 8

Stowage and Restraint

Chapter 8.1 — Stowage and Restraint On or In Transport Units

8.1.1 APPLICATION

8.1.1.1 This chapter applies to the stowage into transport units, and the restraint of packages, overpacks, large packagings, IBCs, cylinders and MEGCs containing dangerous goods and unpackaged dangerous articles that together constitute a placard load.

8.1.1.2 Where requirements are assigned in this chapter to ‘packages’, they apply to packagings containing dangerous goods. They must equally be applied to overpacks, large packagings, segregation devices, IBCs, cylinders and MEGCs containing dangerous goods, and to unpackaged dangerous articles.

NOTE 1: *Special provisions relating to the packing, stowage and restraint of particular dangerous goods may be found in Part 7, or in detailed packing instructions in Chapter 4.1, as referenced in Columns (8) and (9) of the Dangerous Goods List in Chapter 3.2.*

NOTE 2: *Requirements for restraining portable transport units are in Chapter 8.2.*

8.1.2 GENERAL REQUIREMENTS FOR STOWAGE AND RESTRAINT

8.1.2.1 Packages must only be loaded in transport units which 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 transport unit should be constructed in such a way as to prevent the loss of contents. Where appropriate the transport unit should be fitted with devices to facilitate securing and handling of the dangerous goods.
[UN 7.1.1.4]

8.1.2.2 The interior and exterior of a transport unit must 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.
[UN 7.1.1.5]

8.1.2.3 Packages must be stowed and restrained in the transport unit in accordance with the Load Restraint Guide, or in a manner which provides at least the equivalent levels of safety and security.

8.1.2.4 Transport units must be loaded so that incompatible dangerous or other goods are segregated in accordance with Chapter 9.2. Specific loading instructions such as orientation arrows, not to be double stacked, keep dry or temperature control requirements must be met. Liquid dangerous goods should be loaded below dry dangerous goods whenever possible
[UN 7.1.1.6]

8.1.2.5 Packages must be restrained by suitable means (such as fastening straps, sliding slatboards, adjustable brackets) in the 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. 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 must not be over-tightened to cause damage or deformation of the package
[UN 7.1.1.7 part]

8.1.2.6 When dangerous goods are transported with other goods, all goods must be restrained in the transport units so as to prevent the release of dangerous goods. Packages, must be stowed and restrained so as to prevent damage to other goods and equipment. Any other goods and equipment must be stowed and restrained in the transport unit so as to prevent damage to the dangerous goods.
[UN 7.1.1.7 part]

- 8.1.2.7 Packagings and IBCs that are fitted with a vented closure must be stowed and restrained with the closure uppermost.
- 8.1.2.8 If the dangerous goods are of a kind that may lead to the formation of flammable, toxic or other harmful atmospheres, they must be stowed so that no harmful atmosphere will accumulate in the vehicle cabin in event of leakage.

8.1.2.9 During loading and unloading, packages containing dangerous goods must be protected from being damaged. Particular attention must be paid to the handling of packages during their preparation for transport, to the type of 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 of the packages. Packages that appear to be leaking or damaged so that the contents may escape must not be accepted for transport. If a package is found to be damaged so that the contents leak, the damaged package must not be transported but moved to a safe place ...

- 8.1.2.10 If packages containing dangerous goods are stowed on a pallet, the pallet must be of sound construction and free of projections.

8.1.3 OPEN AND NON-RIGID SIDED VEHICLES AND CONTAINERS

8.1.3.1 This Section applies to the transport of dangerous goods on vehicles and freight containers that are not closed transport units (e.g. stowed on an open tray or platform or in a curtain sided transport unit).

NOTE: *Vehicles and freight containers with curtain sides are not closed transport units and are therefore subject to this Section.*

8.1.3.2 Except where 8.1.3.4 or 8.1.3.5 applies, if unpackaged dangerous articles or dangerous goods in packages are transported on a vehicle or container described in 8.1.3.1:

- (a) they must be stowed and restrained within rigid sides or gates; and
- (b) no dangerous article or package containing dangerous goods may protrude above the sides or gates by more than 30% of the height of the article or package; and
- (c) no parts of an article or package may protrude horizontally beyond the sides or gates.

8.1.3.3 Despite 8.1.3.2, gates to the rear of the dangerous goods on a road vehicle may be omitted if:

- (a) the dangerous goods are loaded towards the front of the vehicle; and
- (b) other goods are stowed and restrained at the rear of the dangerous goods in accordance with the Load Restraint Guide in such a manner that the dangerous goods will be prevented from falling from the vehicle during transport; and
- (c) those other goods remain in place throughout the journey.

8.1.3.4 If dangerous goods of Class 2 that are secured in gas industry cylinder pallets (stillages), are transported on a vehicle or container described in 8.1.3.1:

- (a) the cylinders must be secured within the frame of the stillage, by a lashing system to meet the Load Restraint Guide; and
- (b) not more than 45% of the height of the cylinder may protrude above the stillage rail; and
- (c) the stillages must be stowed and restrained on the vehicle or open freight container in accordance with the Load Restraint Guide.

NOTE: *For orientation of cylinders of liquefied gas, see also 7.1.4.3.*

8.1.3.5 Dangerous goods in IBCs, large packagings, segregation devices, pressure drums or MEGCs are not subject to 8.1.3.2 if they are restrained in accordance with the Load Restraint Guide.

Chapter 8.2 — Restraint of Transport Units On Vehicles

8.2.1 RESTRAINING FREIGHT CONTAINERS

A freight container containing dangerous goods which is transported on a vehicle must be restrained on the vehicle:

- (a) for road transport, in accordance with the Load Restraint Guide; and
- (b) for rail transport, as required under the relevant legislation or agreements concerning Rail Safety.

NOTE: *These requirements will normally be met by the use of four engaged twist locks.*

8.2.2 RESTRAINING PORTABLE TANKS

8.2.2.1 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.
[UN 7.2.2]

NOTE: *Usage of portable tanks is subject to Chapter 4.2 of this Code. For liquids, particular attention is drawn to 4.2.1.9.6.*

8.2.2.2 A portable tank which is transported on a vehicle must be securely fastened to the vehicle using either:

- (a) four engaged twist locks; or
- (b) another equally effective method for securing the portable tank, in accordance with the Load Restraint Guide.

8.2.2.3 Except when the tank is nominally empty, dangerous goods in the liquid state must not be transported on a road vehicle in a portable tank having a capacity of more than 7,500 litres, unless:

- (a) the height of the centroid of the tank cross section at tank half length falls within an isosceles triangle having:
 - (i) a base length at ground level equal to the overall width between the outside walls of the outside tyres of the main load bearing axle groups, and
 - (ii) base angles not exceeding 64 degrees; or
- (b) the distance between the ground and the load bearing surface of the bottom corner casting of the loaded tank does not exceed 1100mm.

8.2.2.4 If a portable tank is marked with notations indicating how it should be handled in the transport of dangerous goods, it must be handled in accordance with those notations.

8.2.3 RESTRAINING BULK CONTAINERS

8.2.3.1 A bulk container in the form of a freight container must be restrained on the vehicle in accordance with 8.2.1.

8.2.3.2 A bulk container that is not an integral part of the vehicle and is not in the form of a freight container must be restrained on the vehicle in accordance with the Load Restraint Guide.

8.2.3.3 If a bulk container is marked with notations indicating how it should be handled in the transport of dangerous goods, it must be handled in accordance with the notations.

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