

## Consolidated Changes Agreed for 61st Edition DGR

### SECTION 2—LIMITATIONS

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#### 2.3 Dangerous Goods Carried by Passengers or Crew

##### 2.3.0 General

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2.3.0.2 Notwithstanding any additional restrictions that may be implemented by States in the interests of aviation security, except for the incident reporting requirements of 9.6.1 and 9.6.2, the provisions of these Regulations do not apply to 2.3.2 to 2.3.5 when carried by passengers or crew members for personal use or in baggage which has been separated from its owner during transit (e.g. lost baggage or improperly routed baggage) or in excess baggage carried as cargo as permitted by 1.2.7.1(gh).

##### Notes:

1. See Subsection 2.2 for a listing of Hidden Dangerous Goods which may not be obvious to passengers and crew and which may be inadvertently contained in baggage.
2. The following provisions are tabulated in Table 2.3.A.

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##### 2.3.2.2 Wheelchairs/Mobility Aids with Non-spillable Wet Batteries or with Batteries which Comply with Special Provision A123 or A199

Battery-powered wheelchairs or other similar mobility aids for use by passengers whose mobility is restricted by either a disability, their health or age, or a temporary mobility problem (e.g. broken leg), with non-spillable wet batteries or with batteries which comply with Special Provision A123 or A199. [These batteries must meet the following requirements:](#)

~~(a) non-spillable batteries must comply with Special Provision A67;~~

[2.3.2.2.1 The mobility aid must be prepared for transport to prevent:](#)

[\(a\) unintentional activation; and](#)

[\(b\) non-spillable batteries are not permitted to contain any free or unabsorbed liquid.](#)

~~(b)~~[2.3.2.2.2](#) ~~†~~The operator must secure, by use of straps, tie-downs or other restraint devices, a battery powered mobility aid with installed batteries. The mobility aid, the batteries, electrical cabling and controls must be protected from damage including by the movement of baggage, mail or cargo;

~~(c)~~[2.3.2.2.3](#) ~~†~~The operator must verify that:

~~1.~~[\(a\)](#) the passenger has confirmed that the battery is a non-spillable wet battery that complies with special provision A67, [see 2.3.2.2.1](#), or a nickel-metal hydride battery or dry battery;

~~2.~~[\(b\)](#) the battery terminals are protected from short circuits, e.g. by being enclosed within a battery container;

~~3.~~[\(c\)](#) the battery is either:

~~(i)~~[1.](#) securely attached to the wheelchair or mobility aid and the electrical circuits are isolated following the manufacturer's instructions; or

~~(ii)~~[2.](#) removed by the user, if the mobility aid is specifically designed to allow it to be, following the manufacturer's instructions.

~~(d)~~[2.3.2.2.4](#) ~~A~~a passenger may carry a maximum of one spare battery;

~~(e)~~[2.3.2.2.5](#) ~~†~~The operator must ensure that any battery(ies) removed from the wheelchair/mobility aid or spare batteries are carried in strong, rigid packagings which must be carried in the cargo compartment (see 9.3.14.6 and Figure 9.3.C);

~~(f)~~[2.3.2.2.6](#) the operator must inform the pilot-in-command of the location of mobility aids with installed batteries, removed batteries and spare batteries;

~~(g)~~2.3.2.2.7 it is recommended that passengers make advance arrangements with each operator.

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### 2.3.2.3 Wheelchairs/Mobility Aids with Spillable Batteries

Battery-powered wheelchairs or other similar mobility aids for use by passengers whose mobility is restricted by either a disability, their health or age, or a temporary mobility problem (e.g. broken leg), with spillable batteries. These batteries must meet the following requirements:

~~(a)~~2.3.2.3.1 ~~†~~The operator must secure, by use of straps, tie-downs or other restraint devices, a battery powered mobility aid with installed batteries. The mobility aid, the batteries, electrical cabling and controls must be protected from damage including by the movement of baggage, mail or cargo;

~~(b)~~2.3.2.3.2 ~~the~~The operator must verify that:

- a) ~~1-~~the battery terminals are protected from short circuits, e.g. by being enclosed within a battery container;
- b) ~~2-~~the battery is fitted, where feasible, with spill-resistant vent caps;
- c) ~~3-~~the battery is either:
  1. ~~(i)~~ securely attached to the wheelchair or mobility aid and the electrical circuits are isolated following the manufacturer's instructions; or
  2. ~~(ii)~~ removed from the mobility aid following the manufacturer's instructions when the mobility aid cannot be maintained in an upright position, see 2.3.2.3(c), 9.3.14.6 and Figure 9.3.C.

~~(c)~~2.3.2.3.3 ~~the~~The operator must load, stow, secure and unload a mobility aid with a spillable battery in an upright position. If the wheelchair or mobility aid cannot be loaded, stowed, secured and unloaded always in an upright position or if the mobility aid does not adequately protect the battery, the operator must remove the battery. The removed battery must be carried in strong, rigid packagings as follows:

- a) ~~1-~~packagings must be leak-tight, impervious to battery fluid and be protected against upset by securing to pallets or by securing them in cargo compartments using appropriate means of securement (other than by bracing with freight or baggage) such as by use of restraining straps, brackets or holders;
- b) ~~2-~~batteries must be protected against short circuits, secured upright in these packagings and surrounded by compatible absorbent material sufficient to absorb their total liquid contents; and
- c) ~~3-~~these packagings must be marked "BATTERY, WET, WITH WHEELCHAIR" or "BATTERY, WET, WITH MOBILITY AID" and be labelled with the "Corrosive" label (see Figure 7.3.V) and with the "Package Orientation" label (see Figures 7.4.D and 7.4.E).

~~(d)~~2.3.2.3.4 ~~the~~The operator must inform the pilot-in-command of the location of mobility aids with installed batteries and removed batteries;

~~(e)~~2.3.2.3.5 ~~†~~It is recommended that passengers make advance arrangements with each operator.

### 2.3.2.4 Wheelchairs/Mobility Aids with Lithium Batteries

Lithium ion battery powered wheelchairs or other similar mobility aids for use by passengers whose mobility is restricted by either a disability, their health or age, or a temporary mobility problem (e.g. broken leg), subject to the following conditions:

~~(a)~~2.3.2.4.1 The batteries must be of a type which meets the requirements of each test in the *UN Manual of Tests and Criteria, Part III*, subsection 38.3;

~~(b)~~2.3.2.4.2 ~~the~~The operator must secure, by use of straps, tie-downs or other restraint devices, a battery powered mobility aid with installed batteries. The mobility aid, the batteries, electrical cabling and controls must be protected from damage including by the movement of baggage, mail or cargo;

~~(c)~~2.3.2.4.3 ~~†~~The operator must verify:

- a. ~~1-~~the battery terminals are protected from short circuits, e.g. by being enclosed within a battery container;
- b. ~~2-~~the battery is either
  1. ~~(i)~~ securely attached to the wheelchair or mobility aid and the electrical circuits are isolated following the manufacturer's instructions; or
  2. ~~(ii)~~ removed by the user, if the mobility aid is specifically designed to allow it to be, following the manufacturer's instructions (see 9.3.14.6 and Figure 9.3.C). The battery removed from the mobility aid must not exceed 300 Wh, or for mobility aids fitted with two batteries, each battery must not exceed 160 Wh.

~~(d)~~2.3.2.4.4 ~~a~~A passenger may carry a maximum of one spare lithium ion battery not exceeding 300 Wh or two spare batteries each not exceeding 160 Wh;

~~(e)~~2.3.2.4.5 ~~t~~The operator must ensure that any battery removed from the mobility aid and any spare batteries are carried in the passenger cabin. The removed or spare batteries must be protected from damage (e.g. by placing each battery in a protective pouch);

~~(f)~~2.3.2.4.6 ~~t~~The operator must inform the pilot-in-command of the location of the mobility aid with installed batteries, removed batteries and spare batteries;

~~(g)~~2.3.2.4.7 ~~It~~ is recommended that passengers make advance arrangements with each operator.

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### 2.3.4 Goods Acceptable with Operator Approval as Baggage

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#### 2.3.4.3 Avalanche Rescue Backpack

One avalanche rescue backpack per person containing a-cartridges of compressed gas in Division 2.2 without a subsidiary hazard. The avalanche rescue backpack may also be equipped with a pyrotechnic trigger mechanism containing not more than 200 mg net of explosives in Division 1.4S. The backpack must be packed in such a manner that it cannot be accidentally activated. The air bags within the backpacks must be fitted with pressure relief valves.

...

TABLE 2.3.A

	The pilot-in-command must be informed of the location			
	Permitted as carry-on baggage			
	Permitted in or as checked baggage			
The approval of the operator is required				
...				
<b>Avalanche rescue backpack</b> one (1) per person, containing <u>a-cartridges</u> of compressed gas in Div. 2.2. May also be equipped with a pyrotechnic trigger mechanism containing no more than 200 mg net of Div. 1.4S. The backpack must be packed in such a manner that it cannot be accidentally activated. The airbags within the backpacks must be fitted with pressure relief valves.	YES	YES	YES	NO
...				
<b>Fuel cells</b> containing fuel, powering portable electronic devices (e.g. cameras, cellular phones, laptop computers and camcorders), see <u>2.3.5.409</u> for details.	NO	NO	YES	NO
<b>Fuel cell cartridges, spare</b> for portable electronic devices, see <u>2.3.5.409</u> for details.	NO	YES	YES	NO
...				
<b>Internal combustion or fuel cell engines</b> , must meet A70 (see <u>2.3.5.4513</u> for details).	NO	YES	NO	NO
...				
<b>Lithium Batteries:</b> Portable electronic devices (PED) containing lithium metal or lithium ion cells or batteries, including medical devices such as portable oxygen concentrators (POC) and consumer electronics such as cameras, mobile phones, laptops and tablets, when carried by passengers or crew for personal use (see <u>2.3.5.98</u> ). For lithium metal batteries the lithium metal content must not exceed 2 g and for lithium ion batteries the Watt-hour rating must not exceed 100 Wh. Devices in checked baggage must be completely switched off and must be protected from damage. Each person is limited to a maximum of 15 PED. Baggage equipped with a lithium battery, other than lithium button cells, the battery must be removable. If offered as checked baggage the battery must be removed and carried in the cabin.	NO*	YES	YES	NO
...				
<u>Mobility Aids: Battery-powered wheelchairs or other similar mobility devices with lithium ion batteries where the battery is specifically designed to be removed, the battery must be carried in the cabin (see 2.3.2.4.3 (b)2. for details).</u>	<u>YES</u>	<u>NO</u>	<u>YES</u>	<u>YES</u>
...				
<b>Non-radioactive medicinal or toiletry articles</b> (including aerosols) such as hair sprays, perfumes, colognes and medicines containing alcohol; <u>and non-flammable, non-toxic (Division 2.2) aerosols with no subsidiary hazard, for sporting or home use.</u>	NO	YES	YES	NO
<b>Non-flammable, non-toxic aerosols in Division 2.2, with no subsidiary hazard, for sporting or home use</b>	NO	YES	NO	NO
The <u>total</u> net quantity of non-radioactive medicinal or toiletry articles and non-flammable, non-toxic ( <u>Division 2.2</u> ) aerosols <u>in Division 2.2</u> must not exceed 2 kg or 2 L and the net quantity of each single article must not exceed 0.5 kg or 0.5 L. Release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release of the contents.				
...				
<b>Permeation devices</b> , must meet A41 (see <u>2.3.5.4614</u> for details).	NO	YES	NO	NO
<b>Portable electronic devices containing non-spillable batteries</b> , batteries must meet A67 and must be 12 V or less and 100 Wh or less. A maximum of 2 spare batteries may be carried (see <u>2.3.5.4311</u> for details).	NO	YES	YES	NO
...				
<b>Specimens, non-infectious</b> packed with small quantities of flammable liquid, must meet A180 (see <u>2.3.5.4412</u> for details).	NO	YES	YES	NO

### 2.3.5 Goods Acceptable without the Operator's Approval

Dangerous goods, as listed in 2.3.5.1 through ~~2.3.5.165~~, are permitted on aircraft as baggage without the approval of the operator(s).

#### 2.3.5.1 Medicinal or Toiletry Articles ~~and Aerosols in Divisions 2.2~~

Non-radioactive medicinal or toiletry articles (including aerosols). The term "medicinal or toiletry articles" is intended to include such items as hair sprays, perfumes, colognes and medicines containing alcohols. ~~Aerosols in Division 2.2, with no subsidiary hazard, for sporting or home use, are permitted in checked baggage only.~~

#### ~~2.3.5.2 Aerosols in Division 2.2~~

~~Aerosols in Division 2.2, with no subsidiary hazard, for sporting or home use, are permitted in checked baggage only.~~

#### **Note:**

*The total net quantity of all such articles carried by each passenger or crew member under the provisions of ~~2.3.5.1 and 2.3.5.2~~ must not exceed 2 kg or 2 L and the net quantity of each single article must not exceed 0.5 kg or 0.5 L. Release valves on aerosols must be protected by a cap or other suitable means to prevent inadvertent release of the contents.*

#### ~~2.3.5.32~~ **Cylinders for Mechanical Limbs**

Small cylinders of a gas of Division 2.2 worn for the operation of mechanical limbs. Also, spare cylinders of a similar size if required to ensure an adequate supply for the duration of the journey.

#### **Renumber all subsequent paragraphs**

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#### **2.3.5.8 Portable Electronic Devices (PED) (Including Medical Devices) Containing Batteries**

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**2.3.5.8.3** In addition, lithium batteries are subject to the following conditions:

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e. electronic cigarettes containing lithium batteries are permitted in carry-on baggage only (see ~~2.3.5.4615~~)

...

#### ~~2.3.5.4211~~ **Portable Electronic Devices Containing Non-Spillable Batteries**

In checked or carry-on baggage, portable electronic devices containing a non-spillable battery meeting the requirements of Special Provision A67. A maximum of two spare non-spillable batteries meeting Special Provision A67 may also be carried. The following requirements apply:

(a) the voltage of each battery must not exceed 12 V and the watt-hour rating must not exceed 100 Wh;

(b) the battery must not contain any free or unabsorbed liquid;

~~(bc)~~ the device must either be protected from inadvertent activation, or the battery must be disconnected, and the battery terminals insulated;

~~(ed)~~ each spare battery must be protected from short circuit by insulation of the battery terminals.

#### ~~2.3.5.4312~~ **Non-Infectious Specimens Packed with Small Quantities of Flammable Liquids**

In checked or carry-on baggage non-infectious specimens, such as specimens of mammals, birds, amphibians, reptiles, fish, insects and other invertebrates containing small quantities of flammable liquids provided that the following requirements of Special Provision A180 are complied with-:

(a) the specimens are:

1. wrapped in paper towel and/or cheesecloth moistened with alcohol or an alcohol solution and then placed in a plastic bag that is heat-sealed. Any free liquid in the bag must not exceed 30 mL; or
2. placed in vials or other rigid containers with no more than 30 mL of alcohol or an alcohol solution;

(b) the prepared specimens are then placed in a plastic bag that is then heat-sealed;

- (c) the bagged specimens are then placed inside another plastic bag with absorbent material then heat sealed;
- (d) the finished bag is then placed in a strong outer packaging with suitable cushioning material;
- (e) the total quantity of flammable liquid per outer packaging must not exceed 1 L.
- (f) the completed package is marked "scientific research specimens, not restricted".

### **2.3.5.1413 Internal Combustion or Fuel Cell Engines**

~~In checked baggage only,~~ Flammable liquid powered internal combustion or fuel cell engines being carried separately or incorporated into a machine or other apparatus, without batteries or other dangerous goods may be accepted in checked baggage only provided that the engine must comply with the following requirements of Special Provision A70-:

- (a) the engine is powered by a fuel that does not meet the classification criteria for any class or division; or
- (b) the fuel tank of the machine or other apparatus has never contained any fuel, or the fuel tank has been flushed and purged of vapours and adequate measures taken to nullify the hazard;
- (c) the passenger has provided the operator with written or electronic documentation stating that a flushing and purging procedure has been followed; and
- (d) the entire fuel system of the engine has no free liquid and all fuel lines are sealed or capped or securely connected to the machinery or apparatus.

### **2.3.5.1514 Permeation Devices**

In checked baggage only permeation devices for calibrating air quality monitoring equipment. These devices must comply with the following requirements of Special Provision A41-:

- (a) each device must be constructed of a material compatible with the dangerous goods it contains;
- (b) the total quantity of dangerous goods in each device is limited to 2 mL and the device must not be liquid full at 55°C;
- (c) each permeation device must be placed in a sealed, high impact-resistant, tubular inner packaging of plastic or equivalent material. Sufficient absorbent material must be contained in the inner packaging to completely absorb the contents of the device. The closure of the inner packaging must be securely held in place with wire, tape or other positive means;
- (d) each inner packaging must be contained in a secondary packaging constructed of metal, or plastic having a minimum thickness of 1.5 mm. The secondary packaging must be hermetically sealed;
- (e) the secondary packaging must be securely packed in strong outer packaging. The completed package must be capable of withstanding, without breakage or leakage of any inner packaging and without significant reduction in effectiveness:
  1. the following free drops onto a rigid, non-resilient, flat and horizontal surface from a height of 1.8 m:
    - one drop flat on the bottom;
    - one drop flat on the top;
    - one drop flat on the long side;
    - one drop flat on the short side;
    - one drop on a corner at the junction of three intersecting edges; and
  2. a force applied to the top surface for a duration of 24 hours, equivalent to the total weight of identical packages if stacked to a height of 3 m (including the test sample).

#### **Note:**

Each of the above tests may be performed on different but identical packages.

- (f) the gross weight of the completed package must not exceed 30 kg.

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## 2.4 Transport of Dangerous Goods by Post

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2.4.2 The dangerous goods listed in this subsection may be accepted in mail for air carriage subject to the provisions of the appropriate national authorities concerned and the parts of these [Regulations](#) ~~which relate to such materials~~:

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## 2.6 Dangerous Goods in Excepted Quantities

...[DGB/114, S07-01, Rev 2]

### 2.6.7.1 Marking of Packages

2.6.7.1.1 Packages containing excepted quantities of dangerous goods prepared in accordance with this subsection must be durably and legibly marked with the mark shown in Figure 2.6.B. The primary hazard class or, when assigned, the division of each of the dangerous goods contained in the package must be shown in the mark. Where the name of the shipper or consignee is not shown elsewhere on the package this information must be included within the mark.

2.6.7.1.2 The mark must be in the form of a square. The hatching and symbol must be of the same colour, black or red, on white or suitable contrasting background. The dimensions of the mark must be a minimum of 100 mm × 100 mm. Where dimensions are not specified, all features must be in approximate proportion to those shown.

2.6.7.1.3 The mark must be applied on one face of the package. Where the mark is applied by way of a label, the label must not be folded or affixed in such a manner that parts of the same mark appear on different faces of the package.

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## SECTION 3—CLASSIFICATION

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### 3.8 Class 8—Corrosives

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TABLE 3.8.A

Class 8—Packing Group Assignment based on Corrosivity (3.8.3)

Packing Group	Exposure Time	Observation Period	Effect
I	≤ 3 min	≤ 60 min	<del>Irreversible damage</del> Full thickness destruction of intact skin
II	> 3 min ≤ 1 h	≤ 14 d	<del>Irreversible damage</del> Full thickness destruction of intact skin
III	> 1 h ≤ 4 h	≤ 14 d	<del>Irreversible damage</del> Full thickness destruction of intact skin
III	-	-	Corrosion rate on steel/aluminium surfaces > 6.25 mm a year at a test temperature of 55°C

**Note:**

*h = hours, d = days.*

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### 3.9 Class 9—Miscellaneous Dangerous Substances and Articles, Including Environmentally Hazardous Substances

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### 3.9.2.6 Lithium Batteries

#### 3.9.2.6.0 Assigned entries:

- UN 3090 **Lithium metal batteries**
- UN 3091 **Lithium metal batteries contained in equipment** or **Lithium metal batteries packed with equipment**
- UN 3480 **Lithium ion batteries**
- UN 3481 **Lithium ion batteries contained in equipment** or **Lithium ion batteries packed with equipment**
- UN 3536 **Lithium batteries installed in cargo transport unit**

...

**3.9.2.6.1** Cells and batteries, cells and batteries contained in equipment, or cells and batteries packed with equipment, containing lithium in any form must be assigned to UN 3090, UN 3091, UN 3480 or UN 3481, as appropriate. They may be transported under these entries if they meet the following provisions:

...

(g) manufacturers and subsequent distributors of cells or batteries manufactured after 30 June 2003 must make available the test summary as specified in the *UN Manual of Tests and Criteria, Part III*, sub-section 38.3, paragraph 38.3.5. ~~This test summary must be made available from 1 January 2020.~~

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## SECTION 4—IDENTIFICATION

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### 4.1 Selecting Proper Shipping Name

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#### 4.1.2 Items Not Listed by Name

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TABLE 4.1.A

List of Generic and n.o.s. Proper Shipping Names (4.1.2.2)

Class or Division	Subsidiary Hazard	UN or ID No	Proper Shipping Names (Note: The ★ is not part of the proper shipping name.)
...	...	...	...
<b>Class 4</b>			
...			
Division 4.2			
<i>Specific entries</i>			
...			
4.2		3313	<b>Organic pigments, self-heating, n.o.s. ★</b>
...			
<b>Class 6</b>			
...			
Division 6.2			
...			
<i>Specific entries</i>			
6.2	2900		<b>Infectious substance, affecting animals ★ only</b>
6.2	2814		<b>Infectious substance, affecting humans ★</b>

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#### 4.1.6 Using the List of Dangerous Goods

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##### 4.1.6.4 Column D

Labels—Contains the hazard label(s) to be applied to the outside of each package and overpack for the commodity shown in Column B. The primary hazard label is listed first followed by any subsidiary hazard label(s). For n.o.s. or generic articles and substances with more than one hazard, all applicable subsidiary hazard labels may not be indicated. In these cases, subsidiary hazard labels must be applied in accordance with 7.2.3.5, 7.2.3.6 and 7.2.3.8. In addition, handling labels for “Cryogenic liquid”, “Environmentally hazardous substance”, “Keep away from heat” and “Magnetized Material” are shown in this column against applicable articles and substances. See 7.2.4 for the application of Handling Labels.

... [DGB/114, S04-01]

#### 4.2 List of Dangerous Goods

UN/ID No.	Proper Shipping Name/Description	Class or Div. (Sub Risk)	Hazard Label(s)	PG	EQ	Passenger and Cargo Aircraft				Cargo Aircraft Only		S.P. see 4.4	ERG Code		
						Ltd Qty		Pkg Inst	Max Net Qty/Pkg	Pkg Inst	Max Net Qty/Pkg			Pkg Inst	Max Net Qty/Pkg
						Pkg Inst	Max Net Qty/Pkg								
A	B	C	D	E	F	G	H	I	J	K	L	M	N		
...															
3082	Environmentally hazardous substance, liquid, n.o.s.*	9	Miscellaneous & <u>Environmentally hazardous</u>	III	E1	Y964	30 kg G	964	450 L	964	450 L	A97 A158 A197	9L		
3077	Environmentally hazardous substance, liquid, n.o.s.*	9	Miscellaneous & <u>Environmentally hazardous</u>	III	E1	Y956	30 kg G	956	400 kg	956	400 kg	A97 A158 A179 A197	9L		
...															
3449	Bromobenzyl cyanides, solid	6.1	Toxic	I	<del>E0</del> E5		Forbidden		<del>Forbidden</del> 666 5 kg	673	50 kg	A4 A29	6L		
...															
2389	Furan	3	<u>Flamm. Liquid</u>	I	E3		Forbidden		<del>Forbidden</del> 351 1 L		<del>Forbidden</del> 361 30 L		3H		
3536	Lithium batteries installed in cargo transport unit † lithium ion batteries or lithium metal batteries	9			E0		Forbidden		Forbidden		Forbidden		12FZ		
1700	Tear gas candles	6.1(4.1)	Toxic & Flamm. Solid		E0		Forbidden		Forbidden	679	50 kg	A1 A802	6Fi		

#### 4.4 Special Provisions

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**A70** Internal combustion or fuel cell engines or machinery, being shipped either separately or incorporated into a vehicle, machine or other apparatus, without batteries or other dangerous goods, are not subject to these Regulations when carried as cargo or baggage (see 2.3.5.4513), provided that:

(a) for flammable liquid powered engines:

...

**A197** (375) These substances when transported in single or combination packagings containing a net quantity per single or inner packaging of 5 L or less for liquids or having a net weight per single or inner packaging of 5 kg or less for solids, are not subject to any other provisions of these Regulations provided the packagings meet the general provisions of 5.0.2.4.1, 5.0.2.6.1.1 and 5.0.2.8.

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**A324** For the purpose of transporting a symbolic flame, the appropriate authority of the States of origin and of the operator may approve the carriage of lamps fuelled by UN 1223—Kerosene, or UN 3295—Hydrocarbons, liquid, n.o.s., carried by a passenger as carry-on baggage only.

Lamps must be of a “Davy” type or similar apparatus. In addition, the following conditions apply as a minimum:

- (a) no more than four lamps may be carried on board the aircraft;
- (b) lamps may contain no more fuel than the quantity adequate for the duration of the flight and the fuel must be contained in a leakproof reservoir;
- (c) lamps must be adequately secured;
- (d) whilst on board the aircraft, the lamps must be under the constant supervision of an accompanying person, who must not be a member of the operating crew;
- (e) lamps may be lit by the accompanying person, but must not be refilled on board the aircraft;
- (f) at least one fire extinguisher must always be kept within reach of the accompanying person ~~at all times~~. The accompanying person must be trained in the use of the extinguisher;
- (g) the crew members of the aircraft must be given a verbal briefing about the carriage of the lamps and the pilot-in-command must be provided with a copy of the approval; and
- (h) 9.5.1.1.3 ~~(bc)~~, ~~(ed)~~, ~~(ef)~~, 9.5.1.2, 9.5.1.3 and 9.6.1 of these Regulations must apply.

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**A802** Notwithstanding the absence of a packing group in column E, substances and articles assigned to these entries must be packed in UN Specification packagings that meet packing group II performance standards. This does not apply when aerosols are prepared for transport in accordance with the limited quantity or for lithium batteries prepared in accordance with Section IB of Packing Instructions 965 or 968 provisions.

**Note:** For the purposes of identification and documentation the packing group as shown in Table 4.2 applies and is to be used in the completion of the Shipper's Declaration, regardless of a packaging required to meet a higher packing group performance standard as indicated above.

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## SECTION 5 – PACKING

### 5.0.2.11 Different Dangerous Goods Packed in One Outer Packaging

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- (c) an outer packaging containing Division 6.2 (Infectious Substances) must not contain other dangerous goods except may contain material for refrigeration or freezing or packaging material such as absorbent material as provided in Packing Instruction 620;

...[DGB/113, S05.01]

(h) the following dangerous goods do not need to be taken into account in the calculation of the “Q” value:

- Carbon dioxide, solid (dry ice) UN 1845;
- those where Columns J or L of the List of Dangerous Goods indicate “No limit”;
- those with the same UN number, packing group, ~~and~~ physical state (i.e. solid or liquid) and the same maximum net quantity according to column J or L subsection of Table 4.2 List of Dangerous Goods, provided they are the only dangerous goods in the package and the total net quantity does not exceed the maximum net quantity shown in the List of Dangerous Goods.

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## 5.1 Packing Instructions—Class 1—Explosives

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### PACKING INSTRUCTION 131

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This instruction applies to Div. 1.4B explosives on [Cargo Aircraft OnlyCAO](#) and Div. 1.4S explosives on passenger aircraft and Cargo Aircraft Only.

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**PACKING INSTRUCTION 133**

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This instruction applies to Div. 1.4B and Div. 1.4G explosives on [Cargo Aircraft OnlyCAO](#) and Div. 1.4S explosives on passenger aircraft and Cargo Aircraft Only.

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**PACKING INSTRUCTION 134**

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This instruction applies to Div. 1.3.C and Div. 1.4C explosives on [Cargo Aircraft OnlyCAO](#) and Div. 1.4S explosives on passenger aircraft and Cargo Aircraft Only.

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**PACKING INSTRUCTION 135**

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This instruction applies to Div. 1.3.G and Div. 1.4G explosives on [Cargo Aircraft OnlyCAO](#) and Div. 1.4S explosives on passenger aircraft and Cargo Aircraft Only.

...

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**PACKING INSTRUCTION 136**

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This instruction applies to Div. 1.4C explosives on [Cargo Aircraft OnlyCAO](#) and Div. 1.4S explosives on passenger aircraft and Cargo Aircraft Only.

...

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**PACKING INSTRUCTION 137**

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This instruction applies to Div. 1.4D explosives on [Cargo Aircraft OnlyCAO](#) and Div. 1.4S explosives on passenger aircraft and Cargo Aircraft Only.

...

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**PACKING INSTRUCTION 138**

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This instruction applies to UN 0237 on [Cargo Aircraft OnlyCAO](#).

...

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**PACKING INSTRUCTION 139**

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This instruction applies to explosives in compatibility group D on [Cargo Aircraft OnlyCAO](#).

...

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**PACKING INSTRUCTION 140**

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This instruction applies to Div. 1.4G explosives on [Cargo Aircraft OnlyCAO](#) and Div. 1.4S explosives on passenger aircraft and Cargo Aircraft Only.

...

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**PACKING INSTRUCTION 141**

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This instruction applies to Div. 1.4 compatibility group B, D and G explosives on [Cargo Aircraft OnlyCAO](#) and Div. 1.4S explosives on passenger aircraft and Cargo Aircraft Only.

...

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**PACKING INSTRUCTION 142**

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This instruction applies to Div. 1.4G explosives on [Cargo Aircraft OnlyCAO](#) and Div. 1.4S explosives on passenger aircraft and Cargo Aircraft Only.

...

**PACKING INSTRUCTION 143**

This instruction applies to explosives in compatibility group C on [Cargo Aircraft OnlyCAO](#).

...

**5.2 Packing Instructions—Class 2—Gases**

...

**PACKING INSTRUCTION Y203**

This instruction applies to Limited Quantities of aerosols and UN 2037.

...

UN Number	Total <b>gross-weight</b> per package
UN 1950, Aerosols, flammable	30 kg G
UN 1950, Aerosols, non-flammable	30 kg G
UN 2037, Gas cartridges or Receptacles, small, containing gas	1 kg

...

**PACKING INSTRUCTION 206**

OPERATOR VARIATIONS: Add [FX-02](#)

This instruction applies to Gas samples, non-pressurized in Division 2.3 on [Cargo Aircraft OnlyCAO](#) and in Division 2.1 on passenger aircraft and Cargo Aircraft Only.

...

**5.3 Packing Instructions—Class 3—Flammable Liquids**

...[DGB/114, S05-02]

Packing instructions containing composites will be added a table right below Single Packagings to indicate separately the correct details for composite packagings permitted. The table below is provided as an example but similarly will apply to the PIs listed hereafter as appropriate.

PI 354, 355, 360 – 366, 373

SINGLE PACKAGINGS											
Type	Drums				Jerricans			Cylinders			
Desc.	Steel	Alu-min-ium	Plastic	Other metal	Steel	Alu-min-ium	Plastic				
Spec.	1A1 1A2	1B1 1B2	1H1 1H2	1N1 1N2	3A1 3A2	3B1 3B2	3H1 3H2	As permitted in <a href="#">5.0.6.6</a>			
Com-pos-ites											
Type	Drums					Boxes					
Desc.	Steel	Alu-min-ium	Plywood	Fibre	Plastic	Steel	Alu-min-ium	Wood	Plywood	Fibreboard	Plastic
Spec.	6HA1	6HB1	6HD1	6HG1	6HH1	6HA2	6HB2	6HC	6HD2	6HG2	6HH2

...[DGB/114, S05-02]

PI 377

SINGLE PACKAGINGS			
Type	Drums		Jerricans
Desc.	Steel		Steel
Spec.	1A1		3A1
			Cylinders
			Steel
			As permitted in 5.0.6.6

**Composites**

Type	Drums	
Desc.	Steel	
Spec.	6HA1	

...

### 5.4 Packing Instructions—Class 4—Flammable Solids; Substances Liable to Spontaneous Combustion; Substances which, in Contact with Water, Emit Flammable Gases

...[DGB/114, S05-02]

PI 448, 449, 453

SINGLE PACKAGINGS											
Type	Drums					Jerricans			Cylinders		
Desc.	Steel	Alu-min-ium	Plastic	Other metal		Steel	Alu-min-ium	Plastic			
Spec.	1A1 1A2	1B1 1B2	1H1 1H2	1N1 1N2		3A1 3A2	3B1 3B2	3H1 3H2		As permitted in <a href="#">5.0.6.6</a>	
Com-pos-ites											
Type	Drums					Boxes					
Desc.	Steel	Alu-min-ium	Plywood	Fibre	Plastic	Steel	Alu-min-ium	Wood	Plywood	Fibreboard	Plastic
Spec.	6HA1	6HB1	6HD1	6HG1	6HH1	6HA2	6HB2	6HC	6HD2	6HG2	6HH2

...[DGB/114, S05-02]

PI 457

SINGLE PACKAGINGS						
Type	Drums			Jerricans		
Desc.	Plastic			Plastic		
Spec.	1H1 1H2			3H1 3H2		
Composites						
Type	Drums			Boxes		
Desc.	Plywood	Fibre	Plastic	Wood	Plywood	Fibreboard
Spec.	6HD1	6HG1	6HH1	6HC	6HD2	6HG2

...[DGB/114, S05-02]

PI 463, 465, 470, 471, 479, 482, 487, 488, 489, 490, 491

SINGLE PACKAGINGS											
Type	Drums					Jerricans			Cylinders		
Desc.	Steel	Alu-min-ium	Plastic	Other metal		Steel	Alu-min-ium	Plastic			
Spec.	1A1 1A2	1B1 1B2	1H1 1H2	1N1 1N2		3A1 3A2	3B1 3B2	3H1 3H2	As permitted in <a href="#">5.0.6.6</a>		
Com-pos-ites											
Type	Drums					Boxes					
Desc.	Steel	Alu-min-ium	Plywood	Fibre	Plastic	Steel	Alu-min-ium	Wood	Plywood	Fibreboard	Plastic
Spec.	6HA1	6HB1	6HD1	6HG1	6HH1	6HA2	6HB2	6HC	6HD2	6HG2	6HH2

...

## 5.5 Packing Instructions—Class 5—Oxidizing Substances; Organic Peroxides

...[DGB/114, S05-02]

PI 555, 562, 563

SINGLE PACKAGINGS											
Type	Drums					Jerricans			Cylinders		
Desc.	Steel	Alu-min-ium	Plastic	Other metal		Steel	Alu-min-ium	Plastic			
Spec.	1A1 1A2	1B1 1B2	1H1 1H2	1N1 1N2		3A1 3A2	3B1 3B2	3H1 3H2	As permitted in <a href="#">5.0.6.6</a>		
Com-pos-ites											
Type	Drums					Boxes					
Desc.	Steel	Alu-min-ium	Plywood	Fibre	Plastic	Steel	Alu-min-ium	Wood	Plywood	Fibreboard	Plastic
Spec.	6HA1	6HB1	6HD1	6HG1	6HH1	6HA2	6HB2	6HC	6HD2	6HG2	6HH2

...

## CLASS 6 — TOXIC AND INFECTIOUS SUBSTANCES


...

### PACKING INSTRUCTION 650

This instruction applies to UN 3373 on passenger and cargo aircraft and Cargo Aircraft Only.

...[DGB/113, S05.03]

Passengers and crew members are prohibited from transporting infectious substances as or in carry-on baggage, checked baggage or on their person.

 If an Air Waybill is used, the “Nature and Quantity of Goods” box must show “UN 3373”, the text “BIOLOGICAL SUBSTANCE, CATEGORY B” and the number of packages (unless these are the only packages within the consignment).

Clear instructions on filling and closing such packages must be provided by packaging manufacturers and subsequent distributors to the shipper or to the person who prepares the package (e.g. patient) to enable the package to be correctly prepared for transport.

...

Other dangerous goods must not be packed in the same packaging as Division 6.2 Infectious Substances unless they are necessary for maintaining the viability, stabilizing or preventing degradation or neutralizing the hazards of the infectious substances. A quantity of 30 mL or less of dangerous goods included in Classes 3, 8 or 9 permitted as excepted quantities under 2.6 may be packed in each primary receptacle containing infectious substances provided these substances meet the requirements of 2.6. When these small quantities of dangerous goods are packed with infectious substances in accordance with this packing instruction, no other requirements in these Regulations need be met.

...

...[DGB/114, S05-02]

Packing instructions containing composites will be added a table right below Single Packagings to indicate separately the correct details for composite packagings permitted. The table below is provided as an example but similarly will apply to the PIs listed hereafter as appropriate.

PI 655, 657 - 663, 670, 672-677, 680

SINGLE PACKAGINGS											
Type	Drums				Jerricans			Cylinders			
Desc.	Steel	Alu-min-ium	Plastic	Other metal	Steel	Alu-min-ium	Plastic	As permitted in <a href="#">5.0.6.6</a>			
Spec.	1A1 1A2	1B1 1B2	1H1 1H2	1N1 1N2	3A1 3A2	3B1 3B2	3H1 3H2				
Com-pos-ites											
Type	Drums					Boxes					
Desc.	Steel	Alu-min-ium	Plywood	Fibre	Plastic	Steel	Alu-min-ium	Wood	Plywood	Fibreboard	Plastic
Spec.	6HA1	6HB1	6HD1	6HG1	6HH1	6HA2	6HB2	6HC	6HD2	6HG2	6HH2

...[DGB/114, S05-02]

PI 681

SINGLE PACKAGINGS											
Type	Drums				Jerricans			Cylinders			
Desc.	Steel				Steel			Steel			
Spec.	1A1				3A1			As permitted in 5.0.6.6			
Composites											
Type	Drums										
Desc.	Steel										
Spec.	6HA1										

...

### 5.8 Packing Instructions—Class 8—Corrosives

...[DGB/114, S05-02]

Packing instructions containing composites will be added a table right below Single Packagings to indicate separately the correct details for composite packagings permitted. The table below is provided as an example but similarly will apply to the PIs listed hereafter as appropriate.

PI 855, 856, 862, 863, 864

SINGLE PACKAGINGS											
Type	Drums				Jerricans			Cylinders			
Desc.	Steel	Alu-min-ium	Plastic	Other metal	Steel	Alu-min-ium	Plastic	As permitted in <a href="#">5.0.6.6</a>			
Spec.	1A1 1A2	1B1 1B2	1H1 1H2	1N1 1N2	3A1 3A2	3B1 3B2	3H1 3H2				
Com-pos-ites											
Type	Drums					Boxes					
Desc.	Steel	Alu-min-ium	Plywood	Fibre	Plastic	Steel	Alu-min-ium	Wood	Plywood	Fibreboard	Plastic
Spec.	6HA1	6HB1	6HD1	6HG1	6HH1	6HA2	6HB2	6HC	6HD2	6HG2	6HH2

... DGB/114, S05-02]

PI 876

SINGLE PACKAGINGS			
Type	Drums	Jerricans	Cylinders
Desc.	Steel	Steel	Steel
Spec.	1A1	3A1	As permitted in 5.0.6.6
Composites			
Type	Drums		
Desc.	Steel		
Spec.	6HA1		

...

## CLASS 9 — MISCELLANEOUS DANGEROUS GOODS

...

...[DGB/114, S05-02]

Packing instructions containing composites will be added a table right below Single Packagings to indicate separately the correct details for composite packagings permitted. The table below is provided as an example but similarly will apply to the PIs listed hereafter as appropriate.

PI 956, 964

SINGLE PACKAGINGS											
Type	Drums				Jerricans			Cylinders			
Desc.	Steel	Alu-min-ium	Plastic	Other metal	Steel	Alu-min-ium	Plastic				
Spec.	1A1 1A2	1B1 1B2	1H1 1H2	1N1 1N2	3A1 3A2	3B1 3B2	3H1 3H2	As permitted in <a href="#">5.0.6.6</a>			
Com-pos-ites											
Type	Drums					Boxes					
Desc.	Steel	Alu-min-ium	Plywood	Fibre	Plastic	Steel	Alu-min-ium	Wood	Plywood	Fibreboard	Plastic
Spec.	6HA1	6HB1	6HD1	6HG1	6HH1	6HA2	6HB2	6HC	6HD2	6HG2	6HH2

... DGB/114, S05-02]

### PACKING INSTRUCTION 960

This instruction applies to UN 3316 on passenger aircraft and Cargo Aircraft Only.

...

Combination Packagings			
UN Number	Inner Packaging* (see 6.1)	Maximum net quantity of dangerous goods per kit**	Net Quantity per package
UN 3316, <b>Chemical kit or First aid kit</b>	Liquids: 250 mL	Liquids: 1.0 L	10.0 kg
	Solids: 250 g	Solids: 1.0 kg	
* containing dangerous goods			
** the total quantity of dangerous goods in any one kit must not exceed 1.0 L or 1.0 kg.			

...

### PACKING INSTRUCTION Y960

This instruction applies to Limited Quantities of dangerous goods in chemical kits or First aid kits.

...

Combination Packagings			
UN Number	Inner Packaging* (see 6.1)	Maximum net quantity of dangerous goods per kit**	Net Quantity per package
UN 3316, <b>Chemical kit or First aid kit</b>	Liquids: 30 mL	1.0 kg	1.0 kg
	Solids: 100 g		
* containing dangerous goods			
** the total quantity of dangerous goods in any one kit must not exceed 1.0 L or 1.0 kg.			

...



## PACKING INSTRUCTION 962

---

This instruction applies to UN 3363 on passenger aircraft and Cargo Aircraft Only.

This entry only applies to machinery or apparatus containing dangerous goods as a residue or as an integral element of the machinery or apparatus. It must not be used for machinery or apparatus for which a proper shipping name exists in Table 4.2. For other than fuel system components, machinery or apparatus may only contain one or more of the following: dangerous goods permitted under 2.7.2 or magnetized material meeting the requirements of Packing Instruction 953 or gases of Division 2.2 without subsidiary hazard, but excluding refrigerated liquefied gases.

**Note:** *If machinery or apparatus contains only magnetised material meeting the requirements of Packing Instruction 953, it must be consigned as UN 2807.*

~~If the machinery or apparatus contains more than one item of dangerous goods, the individual substances must not be capable of reacting dangerously together.~~

The General Packing Requirements of 5.0.2 must be met except that 5.0.2.5, 5.0.2.11, 5.0.2.13.3 and 5.0.2.14 do not apply.

...

## PACKING INSTRUCTION Y963

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...

(l) ~~inner packagings containing liquid dangerous goods must be packed with their closures upward and the upright position of the package must be indicated by~~ either the "Package Orientation" (This Way Up) labels (see Figure 7.4.D and Figure 7.4.E) or pre-printed package orientation labels meeting the same specifications as Figure 7.4.D or Figure 7.4.E (ISO Standard 780:1997) ~~must be used on combination packagings and overpacks containing liquid dangerous goods~~. Orientation arrows are not required on outer packagings of combination packagings containing:

...

## PACKING INSTRUCTION Y964

---

This instruction applies to Limited Quantities of UN 1941, UN 1990, UN 3082 and UN 3334.

~~Except for UN 3082, when the requirements of 5.0.2.9 do not apply;~~ The General Packing Requirements of Subsections 2.7.5, 5.0.2 to 5.0.4 (with the exception of 5.0.2.3, 5.0.2.5, 5.0.2.11 and 5.0.2.14.2) must be met except that the packagings do not have to meet the marking and testing requirements of 6.0.4 and Subsection 6.3. Packagings must meet the construction criteria specified in Subsections 6.1 and 6.2 and the test criteria specified in Subsection 6.6. In addition, for UN 3082 the requirements of 5.0.2.9 do not apply.

...

## PACKING INSTRUCTION 965

---

### Introduction

This instruction applies to lithium ion or lithium polymer cells and batteries (UN 3480) on Cargo Aircraft Only.

...

### Section II

...

### Additional Requirements—Section II

...

A Shipper's Declaration for Dangerous Goods is not required.

The text below is duplicated

~~Any person preparing or offering cells or batteries for transport must receive adequate instruction on these requirements commensurate with their responsibilities. Information on adequate instruction can be found in subsection 1.6.~~

A shipper is not permitted to offer for transport more than one (1) package prepared according to this section in any single consignment.

...

...[DGB/113, S05-04]

### PACKING INSTRUCTION 966

---

#### Introduction

This instruction applies to lithium ion or lithium polymer cells and batteries packed with equipment (UN 3481) on passenger and Cargo Aircraft Only.

...

#### Section II

...

**Table 966-II**

	Passenger aircraft	Cargo <del>A</del> ircraft <del>Only</del>
Net quantity of lithium ion cells or batteries per package	5 kg	5 kg

...

### PACKING INSTRUCTION 967

---

#### Introduction

This instruction applies to lithium ion or lithium polymer cells and batteries contained in equipment (UN 3481) on passenger and Cargo Aircraft Only.

...

#### Section II

...

**Table 967-II**

	Passenger aircraft	Cargo <del>A</del> ircraft <del>Only</del>
Net quantity of lithium ion cells or batteries per package	5 kg	5 kg

...

### PACKING INSTRUCTION 968

---

#### Introduction

This instruction applies to lithium metal or lithium alloy cells and batteries (UN 3090) on Cargo Aircraft Only.

The general requirements apply to all lithium metal batteries prepared for transport according to this packing instruction:

- Section IA applies to lithium metal cells with a lithium metal content in excess of 1 g and lithium metal batteries with an aggregate lithium ~~metal~~ content in excess of 2 g, or to quantities of lithium metal cells or batteries in excess of those permitted in Section IB of this packing instruction which must be assigned to Class 9 and are subject to all of the applicable requirements of these Regulations;
- Section IB applies to lithium metal cells with a lithium metal content not exceeding 1 g and lithium metal batteries with an aggregate lithium ~~metal~~ content not exceeding 2 g packed in quantities that exceed the allowance permitted in Section II, Table 968-II; and
- Section II applies to lithium metal cells with a lithium metal content not exceeding 1 g and lithium metal batteries with an aggregate lithium ~~metal~~ content not exceeding 2 g packed in quantities not exceeding the allowance permitted in Section II, Table 968-II.

...

## Section IA

These requirements apply to lithium metal cells with a lithium metal content in excess of 1 g and lithium metal batteries with an aggregate lithium ~~metal~~ content in excess of 2 g that have been determined to meet the criteria for assignment to Class 9.

...

## PACKING INSTRUCTION 969

---

### Introduction

This instruction applies to lithium metal or lithium alloy cells and batteries packed with equipment (UN 3091) on passenger and Cargo Aircraft Only.

For the purposes of this packing instruction “equipment” means the device or apparatus for which the lithium cells or batteries will provide electrical power for its operation.

The general requirements apply to all lithium metal batteries packed with equipment prepared for transport according to this packing instruction:

- Section I applies where equipment is packed with lithium metal cells with a lithium metal content in excess of 1 g or lithium metal batteries with an aggregate lithium ~~metal~~ content in excess of 2 g which must be assigned to Class 9 and are subject to all of the applicable requirements of these Regulations; and
- Section II applies where equipment is packed with lithium metal cells with an aggregate lithium ~~metal~~ content not exceeding 1 g or lithium metal batteries with a lithium metal content not exceeding 2 g.

...

### Section I

These requirements apply to lithium metal cells with a lithium metal content in excess of 1 g and lithium metal batteries with an aggregate lithium ~~metal~~ content in excess of 2 g that have been determined to meet the criteria for assignment to Class 9.

...

### Section II

...

**Table 969-II**

	Passenger aircraft	Cargo <del>Aircraft-Only</del>
Net quantity of lithium ion cells or batteries per package	5 kg	5 kg

...

## PACKING INSTRUCTION 970

---

### Introduction

This instruction applies to lithium metal or lithium alloy cells and batteries contained in equipment (UN 3091) on passenger and Cargo Aircraft Only.

For the purposes of this packing instruction “equipment” means the device or apparatus for which the lithium cells or batteries will provide electrical power for its operation.

The general requirements apply to all lithium metal batteries contained in equipment prepared for transport according to this packing instruction:

- Section I applies where equipment contains lithium metal cells with a lithium metal content in excess of 1 g or lithium metal batteries with an aggregate lithium ~~metal~~ content in excess of 2 g which must be assigned to Class 9 and are subject to all of the applicable requirements of these Regulations; and
- Section II applies where equipment contains lithium metal cells with a lithium metal content not exceeding 1 g or lithium metal batteries with an aggregate lithium ~~metal~~ content not exceeding 2 g.

...

## Section II

...

Table 970-II

	Passenger aircraft	Cargo Aircraft Only
Net quantity of lithium ion cells or batteries per package	5 kg	5 kg

...

## SECTION 6—PACKAGING SPECIFICATIONS AND PERFORMANCE TESTS

...

### 6.0.4.1 Applicability

Except for some packagings intended for gases of Class 2, radioactive materials of Class 7 and some packagings used for Class 9 items, all single packagings and all outer packagings of combination ~~packages-packagings~~ and of composite ~~packages-packagings~~ which have been manufactured and tested in accordance with the UN specifications and tests must bear marks which are durable, legible and placed in a location and of such size relative to the ~~package-packaging~~ as to be readily visible. For packages with a gross weight exceeding 30 kg the marks, or a duplicate thereof, must appear on the top or on the side of the package. Letters, numbers and symbols must be at least 12 mm high, except for ~~packages-packagings~~ of 30 L or 30 kg capacity or less, when they must be at least 6 mm in height. For ~~packages-packagings~~ of 5 L or 5 kg or less the letters, numbers and symbols must be of an appropriate size.

#### Note:

*Handwritten specification marks are not acceptable. Marks which are not printed or embossed directly on to packaging may be open to additional airline scrutiny so as to ensure the validity of the marks. In such cases and to prevent shipment delays, shippers are encouraged to provide contact details with the shipment so that the validity of the mark can be confirmed.*

...

### 6.5.4.3 Tests and Number of Samples Required

Table 6.5.B Test Required for Packaging Types (6.5.4.3)

...

#### Notes:

~~1. In the above table, “fibreboard” refers to fibreboard or similar materials whose performance may be rapidly affected by moisture; “plastic” refers to plastic, which may embrittle at low temperature; and “other” refers to other materials such as metal whose performance is not significantly affected by moisture or temperature.~~

~~21.~~ Where a primary receptacle is made of two or more different materials, the material most liable to damage determines the appropriate test.

~~32.~~ The material of the secondary packagings is not taken into consideration when selecting the test or conditioning for the test.

~~6.5.4.3.1~~ If the packaging to be tested consists of a fibreboard outer box with a plastic primary receptacle, five samples must undergo the water spray test (see 6.5.4.4.6) prior to dropping and another five must be conditioned to -18°C (see 6.5.4.4.7) prior to dropping. If the packaging is to contain dry ice then one further single sample shall be dropped five times after conditioning in accordance with 6.5.4.4.8.

~~6.5.4.3.2 Packagings prepared as for transport must be subjected to the tests in 6.5.4.4 and 6.5.4.5. In Table 6.5.B, “fibreboard” refers to fibreboard or similar materials whose performance may be rapidly affected by moisture; “plastic” refers to plastic, which may embrittle at low temperature; and “other” refers to other materials such as metal whose performance is not significantly affected by moisture or temperature.~~

## SECTION 7 – MARKING AND LABELLING

...

## 7.1 Marking

...[DGB/113, S07-01, Rev 2]

### 7.1.3.1 General

All marks must be so placed on the packages or overpacks that they are not covered or obscured by any part of or attachment to the packaging or any other label or mark. Marks required by 7.1.4.2 (Figure 7.1.A), 7.1.5.3 (Figure 7.1.B) and 7.1.5.5 (Figure 7.1.C) must be applied on one face of the package. Where marks are applied by means of a label, the label must not be folded or affixed in such a manner that parts of the same mark appear on different faces of the package. The required marks must not be located with other package marks that could substantially reduce their effectiveness.

...

### 7.1.5.5 Lithium Batteries

<Index><PrimaryKey>Lithium Batteries</PrimaryKey>

<SecondaryKey>Mark</SecondaryKey></Index>

<Index><PrimaryKey>Marking of Packages</PrimaryKey>

<SecondaryKey>Lithium Batteries</SecondaryKey></Index>

**7.1.5.5.1** Packages containing lithium cells or batteries prepared in accordance with Section II of Packing Instructions 965 to 970 and Section IB of Packing Instructions 965 and 968 must be marked as shown in Figure 7.1.C.

...

## 7.2 LABELLING

...

### 7.2.4 Handling Labels

...

#### 7.2.2.3 Label Specifications

**7.2.2.3.1** All labels (hazard labels and handling labels) used on packages of dangerous goods and overpacks containing dangerous goods, must conform, in shape, colour, format, symbol and text, to the specimen designs reproduced in Subsection 7.3 and Subsection 7.4. Except as indicated, no variation in specification is permitted. The dimensions for handling labels shown in Figure 7.4.A through Figure 7.4.G are minimum dimensions, except as otherwise provided for. Hazard and handling labels having dimensions not smaller than half of those shown in Figure 7.3.G, Figure 7.3.P, Figure 7.3.W and Figure 7.4.B to Figure 7.4.E may be used on packages containing infectious substances when the packages are of such dimensions that they can only bear smaller labels. Where the label is reduced in size the dimensions may be reduced proportionally provided the symbols and other elements ~~of the elements~~ of the label remain clearly visible.

...

...[DGB/113, S07-04]

#### 7.2.4.5 Keep Away From Heat

The “Keep Away From Heat” handling label (see Figure 7.4.F) must be used in addition to the applicable hazard label on packages and overpacks containing self-reactive substances in Division 4.1 and Division 5.2, Organic Peroxides (see Special Provision A20). This label should be affixed on the same surface of the package near the hazard label(s).

...

## SECTION 8—DOCUMENTATION

...

### 8.1 Shipper's Declaration for Dangerous Goods

...

## 8.1.2 General Principles for Completion of Declaration Form

...

### 8.1.2.4 Consolidations

...[DGB/114, S08-01]

**8.1.2.4.3** The declaration forms for these component consignments must accompany the consolidated shipment. At the airport of destination of the consolidated shipment, the delivering operator will hand a copy of each declaration form to the de-consolidator (break-bulk agent).

#### **Note:**

~~When offering a deconsolidated shipment for further air transportation, at least two copies of the Shipper's Declaration for Dangerous Goods must be presented to the next accepting operator.~~

8.1.2.4.4 When offering a deconsolidated shipment for further air transportation, at least two copies of the Shipper's Declaration for Dangerous Goods must be presented to the next accepting operator.

...

### 8.1.4.1 Signature

...

8.1.4.1.2 If the Shipper's Declaration information is presented to the operator by means of EDP or EDI transmission techniques, the signature(s) may be electronic signature(s) or may be replaced by the name(s) (in capitals) of the person authorized to sign. Where the original consignment is transhipped to an operator that requires a paper document, the operator must ensure that document produced is the "Shipper's Declaration for Dangerous Goods" in the format and design shown in Figure 8.1.A or Figure 8.1.B. The Shipper's Declaration must indicate "Original Received Electronically" ~~in association with the signature~~ and the name of the signatory must be shown in capital letters.

...

### 8.1.6.5 Aircraft Limitations

...[DGB/114, S10-01, Rev.1]

8.1.6.5.3 When a shipment is required to be transported on a cargo aircraft solely because of a State ~~V~~variation (2.8.2), that shipment may be carried on a passenger aircraft outside that State's jurisdiction. ~~In this case the "Cargo Aircraft Only" label must be removed before the shipment is loaded onto a passenger aircraft outside that State's jurisdiction. The following note should~~statement: be added in the "Additional Handling Information" box of the Shipper's Declaration: "This shipment may be carried on passenger aircraft outside the jurisdiction of XXXX" (where XXXX is the name of the State) must be shown in the "Additional Handling Information" box of the Shipper's Declaration.

In this case the "Cargo Aircraft Only" label must be removed before the shipment is loaded onto a passenger aircraft outside State XXXX jurisdiction. When the shipment is subsequently carried inside State XXXX jurisdiction, the CAO label must be re-affixed.

When this statement is used, no other "Cargo Aircraft Only" articles may appear on the declaration.

...

### 8.1.6.9 Nature and Quantity of Dangerous Goods

#### 8.1.6.9.1 First Sequence—Identification

The Shipper's Declaration must contain the following information for each substance or article described. The information must be in the order shown with no information interspersed except as provided by these Regulations:

Step 1. UN number or ID number (from Column A) preceded by the prefix "UN" or "ID" as appropriate.

Step 2. Proper shipping name (from Column B) as determined by 4.1.2 and 8.1.3.

Step 3. The Class or, when assigned the Division of the goods, including for Class 1, the Compatibility Group letter (all from Column C).

Step 4. Any assigned subsidiary hazard class or division number(s) (from Column C) corresponding to the subsidiary hazard label (s) to be applied must be entered following the numerical hazard class or division and must be enclosed in brackets.

...

#### 8.1.6.9.2 Second Sequence—Number and Type of Packagings, Quantity of Dangerous Goods

Alternative spelling, reflecting common usage around the world, is acceptable for words such as “Fiberboard” for “Fibreboard” etc. However, the spelling appearing in Table 5.0.C is preferred.

The number of packages can be entered in numerical characters e.g. 1, 2, 3 or in alpha characters e.g. one, two, three. The type of package may be shown in singular or plural regardless of the actual number of packages, e.g. 4 steel drum, 1 plastic boxes.

Step 6. Number of packages (of same type and content), their type of packaging e.g. “1 Composite fibre drum”, “1 Fibreboard box”, “3 steel drums”, “four Composite IBCs”, etc. and:

...

#### FIGURE 8.1.P

##### Shipper's Declaration Completion—Example 12

The appropriate method of describing a lithium ion battery in compliance with Section IB. "IB" may also appear immediately after the packing instruction number in the packing instruction column.

...

## SECTION 9—HANDLING

### 9.6. Reporting

...

#### 9.6.1 Dangerous Goods Accidents and Incidents

An operator must report dangerous goods accidents or incidents to the appropriate authorities of the State of the operator and the State in which the accident or incident occurred, in accordance with the reporting requirements of those appropriate authorities.

##### **Notes:**

1. *This includes incidents involving dangerous goods that are not subject to all or part of these Regulations through the application of an exception or of a special provision (for example, an incident involving the short circuiting of a dry cell battery that is required to meet short circuit prevention conditions in a special provision of 4.4).*

2. *For an example of an accident and incident reporting form see Figure 9.6.A—Dangerous Goods Occurrence Report.*

3. Entities other than operators who are in possession of dangerous goods at the time a dangerous goods accident or incident occurs or at the time a dangerous goods incident is discovered to have occurred should follow the reporting requirements of 9.6.1. Entities other than operators who discover undeclared or misdeclared dangerous goods should follow the reporting requirements of 9.6.2. These entities may include, but are not limited to, freight forwarders, customs authorities and security screening providers.

#### 9.6.4 Reporting of Dangerous Goods Occurrences

An operator must report to the appropriate authorities of the State of the operator and the State of origin any occasion when:

(a) dangerous goods are discovered to have been carried when not loaded, segregated, separated and secured in accordance with 9.2 or 9.3; or

(b) dangerous goods are discovered to have been carried without information having been provided to the Pilot-in-Command in accordance with 9.5.1.1.

##### **Note:**

*Entities other than operators who are in possession of dangerous goods at the time a dangerous goods accident or incident occurs or at the time a dangerous goods incident is discovered to have occurred should follow the reporting requirements of 9.6.1. Entities other than operators who discover undeclared or misdeclared dangerous goods should follow the reporting requirements of 9.6.2. These entities may include, but are not limited to, freight forwarders, customs authorities and security screening providers.*

...

## SECTION 10—RADIOACTIVE MATERIAL

...

### 10.3 Classification

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#### 10.3.4 Special Form

...

##### 10.3.4.3.5 Alternative Tests

Specimens that comprise or simulate radioactive material enclosed in a sealed capsule may be excepted from:

- (a) the tests prescribed in 10.3.4.3.1 and 10.3.4.3.2, provided that the specimens are alternatively subjected to the impact test prescribed in ISO 2919:2012: "Radiation Protection—Sealed Radioactive Sources—General requirements and classification":
  1. the Class 4 impact test if the mass of the special form radioactive material is less than 200 g; or
  2. the Class 5 impact test if the mass of the special form radioactive material is 200 g or more than but less than 500 g; and
- (b) the test prescribed in 10.3.4.3.4, provided they are alternatively subjected to the Class 6 temperature test prescribed in ISO 2919:2012 "Radiation Protection—Sealed Radioactive Sources—General requirements and classification".

...

#### 10.3.6 Surface Contaminated Object (SCO)

##### 10.3.6.1 Definition

...

###### 10.3.6.1.1 SCO-I

A solid object on which:

- (a) the non-fixed contamination on the accessible surface averaged over 300 cm<sup>2</sup> (or the surface area if less than 300 cm<sup>2</sup>) does not exceed 4 Bq/cm<sup>2</sup> (~~0.1 µCi/cm<sup>2</sup>~~) for beta and gamma emitters and low toxicity alpha emitters, or 0.4 Bq/cm<sup>2</sup> (~~0.01 µCi/cm<sup>2</sup>~~) for all other alpha emitters;
- (b) the fixed contamination on the accessible surface averaged over 300 cm<sup>2</sup> (or the surface area if less than 300 cm<sup>2</sup>) does not exceed 40 kBq/cm<sup>2</sup> (~~1 µCi/cm<sup>2</sup>~~) for beta and gamma emitters and low toxicity alpha emitters, or 4 kBq/cm<sup>2</sup> (~~0.1 µCi/cm<sup>2</sup>~~) for all other alpha emitters; and
- (c) the non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm<sup>2</sup> (or the surface area if less than 300 cm<sup>2</sup>) does not exceed 40 kBq/cm<sup>2</sup> (~~1 µCi/cm<sup>2</sup>~~) for beta and gamma emitters and low toxicity alpha emitters, or 4 kBq/cm<sup>2</sup> (~~0.1 µCi/cm<sup>2</sup>~~) for all other alpha emitters.

###### 10.3.6.1.2 SCO-II

A solid object on which either the fixed or non-fixed contamination on the surface exceeds the applicable limits specified for SCO-I in 10.3.6.1.1 and on which:

- (a) the non-fixed contamination on the accessible surface averaged over 300 cm<sup>2</sup> (or the surface area if less than 300 cm<sup>2</sup>) does not exceed 400 Bq/cm<sup>2</sup> (~~10 µCi/cm<sup>2</sup>~~) for beta and gamma emitters and low toxicity alpha emitters, or 40 Bq/cm<sup>2</sup> (~~1 µCi/cm<sup>2</sup>~~) for all other alpha emitters;



- (b) the fixed contamination on the accessible surface averaged over 300 cm<sup>2</sup> (or the surface area if less than 300 cm<sup>2</sup>) does not exceed 80 kBq/cm<sup>2</sup> (~~20 µCi/cm<sup>2</sup>~~) for beta and gamma emitters and low toxicity alpha emitters, or 80 kBq/cm<sup>2</sup> (~~2 µCi/cm<sup>2</sup>~~) for all other alpha emitters; and
- (c) the non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm<sup>2</sup> (or the surface area if less than 300 cm<sup>2</sup>) does not exceed 80 kBq/cm<sup>2</sup> (~~20 µCi/cm<sup>2</sup>~~) for beta and gamma emitters and low toxicity alpha emitters, or 80 kBq/cm<sup>2</sup> (~~2 µCi/cm<sup>2</sup>~~) for all other alpha emitters.

...

## 10.7 Marking and Labelling

...

### 10.7.3 Applicability of Hazard Labels

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#### 10.7.3.3.3 Transport Index (TI)

For Category II and Category III Yellow labels only, the Transport Index must be inscribed in the box provided. It must be rounded up to one decimal place, e.g. 1.04 becomes 1.1.

...

## 10.8 Documentation

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### 10.8.1 Shipper's Declaration for Dangerous Goods

...

#### 10.8.3 Detailed Instructions for Completing the Declaration Form

...

##### 10.8.3.5 Aircraft Limitations

...

**10.8.3.5.2** When a radioactive material shipment is required to be transported on a cargo aircraft solely because of USG-10a State variation, that shipment may be carried on a passenger aircraft outside US that State's jurisdiction. ~~In this case, the "Cargo Aircraft Only" label must be removed before the shipment is loaded onto a passenger aircraft outside US jurisdiction.~~ The following note should be added in the "Additional Handling Information" box of the Shipper's Declaration:The statement:

- "This shipment may be carried on passenger aircraft outside US of XXXX jurisdiction" (where XXXX is the name of the State) must be shown in the "Additional Handling Information" box of the Shipper's Declaration.

In this case, the "Cargo Aircraft Only" label must be removed before the shipment is loaded onto a passenger aircraft outside State US XXXX jurisdiction. When the shipment is subsequently carried inside XXXX jurisdiction, the CAO label must be re-affixed.

When this statement is used, no other "Cargo Aircraft Only" articles may appear on the declaration.

...

#### 10.8.3.9 Nature and Quantity of Dangerous Goods

...

##### 10.8.3.9.3 Third Sequence—Packing Instructions

Step 9. Category of the package(s) and overpack or freight container (see 10.5.15.1 (a)):

- (a) the category of the package(s), i.e. "I-White" or "II-Yellow" or "III-Yellow". Where packages are placed in an overpack, the category of the overpack must also be provided;

(b) for Category “II-Yellow” and “III-Yellow” only—Transport Index of the package(s). Where packages are placed in an overpack, the Transport Index of the overpack must also be provided. The Transport Index must be rounded up to ~~the first one~~ decimal place, e.g. 1.04 becomes 1.1;

...

### 10.8.3.10 Completion of “Nature and Quantity of Dangerous Goods” Box

When completing the “Nature and Quantity of Dangerous Goods” box, each sequence of information must be clearly separated or identified.

...

(b) for the manually completed form, the information must be entered in sequence and should be within the columns provided;

(c) information within a sequence must be separated by commas.

### 10.8.3.11 Additional Handling Information

OPERATOR VARIATIONS: Change MP-04 to be MP-05

...

### 10.8.7 Competent Authority Certificates

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#### 10.8.7.2 Type B Package Documentation

Documentation requirements may be summarized as follows:

- Type B package design approval certificate required in all cases;
- Type B(M) package shipment approval certificate required for each Type B(M) package containing radioactive material with an activity greater than 3,000 A<sub>1</sub> or 3,000 A<sub>2</sub>, as appropriate, or 1,000 TBq ~~(20,000 Ci)~~, whichever is least;
- Fissile material package design/shipment approval certificate (see 10.8.7.4);
- Shipper's Declaration—required in all cases.

**Note:**

*Type B(M) package design approval and package shipment approval may be combined on a single certificate.*

...

#### 10.8.7.5 Special Form Design Approval

10.8.7.5.1 The design for Special Form radioactive material must meet the definition of Special Form radioactive material given in Appendix A and requires unilateral approval, i.e. approval by the competent authority of the ~~State of origin~~ State approving the design only.

10.8.7.5.2 The competent authority must establish a “Special Form Approval Certificate” stating that the approved design meets the definition of Special Form radioactive material given in Appendix A and must attribute to that design an identification mark.

...

## APPENDIX A—GLOSSARY

### A

...

AGENT, BLASTING, TYPE B see EXPLOSIVE, BLASTING TYPE B

AGENT, BLASTING, TYPE E see EXPLOSIVE, BLASTING TYPE E

...

**AGGREGATE LITHIUM CONTENT.** The sum of the grams of lithium content contained by the cells comprising a battery.

Reference this new entry in: 2.3.2.6(c)2., SP A178(c)2., PI 968, Introduction (three times), Section IB and Section II, PI 969, Introduction (twice) and Section II and PI 970, Introduction (twice) and Section II.

...

**FISSILE MATERIAL NUCLIDES** Uranium-233, uranium-235, plutonium-239, and plutonium-241. Fissile material is a material containing any of the fissile nuclides or any combination of these. Excepted from the definition of fissile material are the following:

- (a) natural uranium or depleted uranium which is unirradiated;
- (b) natural uranium or depleted uranium, which has been irradiated in thermal reactors only;
- (c) material with fissile nuclides less than a total of 0.25 g;
- (d) any combination of (a), (b) and/or (c).

These exclusions are only valid if there is no other material with fissile nuclides in the package.

...

**LITHIUM BATTERIES INSTALLED IN CARGO TRANSPORT UNIT.** Typically, this applies to lithium ion batteries installed into multi-modal shipping containers (cargo transport unit) where the completed unit acts as a large storage battery. The completed unit will contain lithium ion batteries plus battery management systems and may include air conditioning and a fire suppression system.

...

## **APPENDIX D.1— Competent Authorities for Dangerous Goods**

### **Estonia (EST)**

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## **APPENDIX I—IMPENDING CHANGES**

### **Introduction**

The 20th–21st revised edition of the UN Recommendations on the Transport of Dangerous Goods “Model Regulations” contains amendments to the provisions applicable to the transport of dangerous goods for all modes

of transport. The members of the ICAO Dangerous Goods Panel also initiate amendments to the provisions of the Technical Instructions for the Safe Transport of Dangerous Goods by Air “Technical Instructions” particularly where those provisions only apply to air transport. These amendments will be reviewed by the ICAO Dangerous Goods Panel (DGP) as part of the development of the ~~2019–2020~~2021–2022 edition of the ICAO Technical Instructions, which will come into force 1 January ~~2019~~2021.

Since these changes are significant and given the need for shippers and others in the transport chain to be aware of and comply with, the detailed requirements of the Regulations, this Appendix provides advance notice of the impending changes.

As the content of the ~~2019–2020~~2021–2022 edition of the ICAO Technical Instructions has yet to be finalised, the exact wording and detail of the requirements applicable to air transport will only be finalised in the ~~60th–62nd~~ edition of the IATA DGR, which will be published in the 3rd quarter of ~~2018–2020~~ and become effective 1 January ~~2019~~2021.

**Notes:**

1. *Editorial notes have been added where appropriate to assist users to understand the implications of the changes. Provisions that are still subject to ongoing discussion by the ICAO DGP are enclosed in square brackets [ ] to identify that they may not appear as shown in this appendix or may be modified in the final Regulations.*
2. *To assist readers of this appendix, the section references in the appendix reflect those within the DGR, for example I.4.4 identifies the changes that will appear in 4.4—Special Provisions. The likely impact on the various DGR sections are identified by way of the standard reference marks used throughout the DGR (see Appendix B.2.1).*

## SECTION I.1—APPLICABILITY

...

### I.1.1 Basis of these Regulations

I.1.1.1 The UN Subcommittee of Experts on the Transport of Dangerous Goods (SCoETDG) develops recommended procedures for the transport of all types of dangerous goods except radioactive materials. These procedures, applicable to all modes of transport, are published in the Recommendations on the Transport of Dangerous Goods—Model Regulations (~~20th–21st~~ revised edition).

**Note:**

*Recommendations on Tests and Criteria, which are incorporated 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.~~6~~and Amend. 17) available from the United Nations. This Manual includes:*

- *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 and polymerizing substances of Division 4.1 and organic peroxides of Division 5.2.*
- *Part III: Classification procedures, test methods and criteria relating to articles or substances of Class 2, Class 3, Class 4, Division 5.1, Class 8 and Class 9.*
- *Part IV: Test methods concerning transport equipment.*
- *Part V: Classification procedures, test methods and criteria relating to sectors other than transport.*
- *Appendices: Information common to a number of different types of tests and national contacts for test details.*

...

### I.1.2 Application of these Regulations

...

#### 1.2.7 Exceptions

1.2.7.1 Except for information provided to operator employees, as shown in 1.4.2, the provisions of these Regulations do not apply to dangerous goods carried by an aircraft where the dangerous goods are:

- (a) to provide medical aid to a patient during flight when those dangerous goods:

1. have been placed on board with the approval of the operator; or
2. form part of the permanent equipment of the aircraft when it has been adapted for specialized use; providing that:
  - (i) gas cylinders have been manufactured specifically for the purpose of containing and transporting that particular gas;
  - (ii) equipment containing wet cell batteries is kept and when necessary secured, in an upright position to prevent spillage of the electrolyte.

**Note:**

*For the dangerous goods passengers are permitted to carry as medical aid see 2.3.2 to 2.3.5.*

- (b) to provide veterinary aid or a humane killer for an animal during flight;
- (c) for dropping during flight in connection with agricultural, horticultural, forestry, ice jam control and landslide clearance or pollution control activities;
- (d) for dropping or triggering in connection with avalanche control activities;
- (e) to provide aid in connection with search and rescue operations during flight, or related to the flight;
- (f) vehicles carried in aircraft designed or modified for vehicle ferry operations if all of the following requirements are met:
  1. authorization has been given by the appropriate authorities of the States concerned and such authorities have prescribed specific terms and conditions for the particular operator's operation;
  2. vehicles are secured in an upright position;
  3. fuel tanks are so filled as to prevent spillage of fuel during loading, unloading and transit; and
  4. adequate ventilation rates are maintained in the aircraft compartment in which the vehicles are carried.
- (g) dangerous goods that are required for the propulsion of the means of transport or the operation of its specialized equipment during transport (e.g. refrigeration units) or that are required in accordance with the operating regulations (e.g. fire extinguishers) (see Subsection 2.5).

**Note:**

*This exception is only applicable to the means of transport performing the transport operation.*

- (h) contained within items of excess baggage (see definition of "excess baggage" in Appendix A—Glossary) being sent as cargo provided that:
  1. the excess baggage has been consigned as cargo by or on behalf of a passenger;
  2. the dangerous goods may only be those that are permitted by and in accordance with 2.3 to be carried in checked baggage;
  3. the excess baggage is marked with the words "Excess baggage consigned as cargo".

(i) equipment such as data loggers and cargo tracking devices with installed lithium batteries, attached to or placed in packages, overpacks or unit load devices are not subject to any provisions of these Regulations provided the following conditions are met:

1. the equipment must be in use or intended for use during transport;
2. each cell or battery must meet the provisions of 3.9.2.6.1(a), (e), (f) if applicable and (g);
3. for a lithium ion cell, the Watt-hour rating must not exceed 20 Wh;
4. for a lithium ion battery, the Watt-hour rating must not exceed 100 Wh;
5. for a lithium metal cell, the lithium metal content must not exceed 1 g;
6. for a lithium metal battery, the aggregate lithium content must not exceed 2 g;
7. the equipment must be capable of withstanding the shocks and loadings normally encountered during transport.

**Note:**

This exception does not apply where the data loggers or cargo tracking devices are offered for transport as a consignment in accordance with Packing Instruction 967 or 970.

...

## I.1.5 Training Requirements

### Editorial Note:

The text shown below is taken from Appendix H in the 60<sup>th</sup> edition of the DGR. The changes indicated are made to the provisions shown in Appendix H. This replaces all of what is currently shown in 1.5 in this edition.

### I.1.5.1 Dangerous Goods Training Programmes

#### I.1.5.1.1 Establishment and Maintenance

##### **Note:**

*A training programme includes elements such as design methodology, assessment, initial and recurrent training, instructor qualifications and competencies, training records and evaluation of the effectiveness of training.*

I.1.5.1.1.1 The employer of personnel that perform functions aimed at ensuring that dangerous goods are transported in accordance with these Regulations must establish and maintain a dangerous goods training programme ~~for personnel performing any function described in these Regulations.~~

~~I.1.5.1.1.2 The employer [must/should] establish and maintain a dangerous goods training program for personnel who may not perform any function described in these Regulations but do perform functions related to the movement of cargo, baggage, passengers, or mail. The aim of the program is to ensure personnel are competent to perform functions aimed at preventing undeclared dangerous goods or dangerous goods not permitted from being carried on an aircraft.~~

##### **Notes:**

1. An approach to ensuring personnel are competent to perform any function for which they are responsible is provided in achieving this objective is provided in Appendix H.2: "Dangerous good training programs guidelines - Competency-based training and assessment (CBTA) approach."

2. Security personnel who are involved with the screening of passengers and crew and their baggage and cargo or mail are required to be trained irrespective of whether the operator on which passenger or cargo is to be transported carries dangerous goods as cargo.

I.1.5.1.1.3 All operators must establish a dangerous goods training programme regardless of whether or not they are approved to transport dangerous goods as cargo.

I.1.5.1.1.4 Training courses may be developed and delivered by or for the employer.

##### **Note:**

~~The objective of a dangerous goods training programme is to ensure that persons are competent to perform their assigned functions. An approach to achieving this objective is provided in Appendix H.2: "Dangerous good training programs guidelines - Competency based training and assessment (CBTA) approach."~~

#### I.1.5.1.2 Objective of Dangerous Goods Training

I.1.5.1.2.1 The employer must ensure that personnel are competent to perform any function for which they are responsible prior to performing any of these functions. This must be achieved through training and assessment commensurate with the functions for which they are responsible. Such training must include:

- (a) general familiarization training—which must be aimed at providing familiarity with the general provisions;
- (b) function specific training—which must provide detailed training in the requirements applicable to the function for which that person is responsible; and
- (c) safety training—which must cover the hazards presented by dangerous goods, safe handling and emergency response procedures.

##### **Note:**

*General information on the provisions for dangerous goods carried by passengers and crew (see 2.3) should be included in training courses, as appropriate.*

I.1.5.1.2.2 Personnel who have received training but who are assigned to new functions must be assessed to determine their competence in respect of their new function. If competency is not demonstrated, appropriate additional training must be provided.

I.1.5.1.2.3 Personnel must be trained to recognize the hazards presented by dangerous goods, to safely handle them and to apply appropriate emergency response procedures.

#### **I.1.5.1.3 Recurrent Training and Assessment**

Personnel must receive recurrent training and assessment within 24 months of previous training and assessment to ensure that competency has been maintained. However, if recurrent training and assessment is completed within the final three months of validity of the previous training and assessment, the period of validity extends from the month on which the recurrent training and assessment was completed until 24 months from the expiry month of that previous training and assessment. For example, a person attends an initial course finishing on 14 April 2019; their training validity therefore expires 30 April 2021. They may attend recurrent training any time between 1 February and 30 April 2021 and their next recurrent training date will remain 30 April 2023. If, however they complete recurrent training in January 2021, then as this is more than 3 months prior to the end of April then their training expiry date becomes 31 January 2023.

#### **I.1.5.1.4 Training and Assessment Records**

I.1.5.1.4.1 The employer must maintain a record of training and assessment for personnel.

I.1.5.1.4.2 The record of training and assessment must be maintained, which must include:

- the individual's name;
- the most recent training and assessment completion month;
- a description, copy or reference to training and assessment materials used to meet the training and assessment requirements;
- the name and address of the organization providing the training and assessment; and
- evidence which shows that personnel have been assessed as competent to perform their responsibilities.

I.1.5.1.4.3 Training and assessment records must be retained by the employer for a minimum period of thirty-six months from the most recent training and assessment completion month and must be made available upon request to the employee or appropriate national authority.

#### **I.1.5.2 Review and Approval of Training Programs**

I.1.5.2.1 Dangerous goods training programmes for operators' must be approved by the appropriate authority of the State of the Operator in accordance with the provisions of Annex 6—Operation of Aircraft.

I.1.5.2.2 Dangerous goods training programmes required for entities other than operators and designated postal operators should be approved as determined by the appropriate national authority.

#### **Note:**

*See I.1.5.4.2 for approval of training programmes for designated postal operators.*

#### **I.1.5.3 Instructor Qualifications and Competencies**

I.1.5.3.1 Unless otherwise provided for by the appropriate national authority, instructors of initial and recurrent dangerous goods training programmes must demonstrate or be assessed as competent in instruction and the function(s) that they will instruct prior to delivering such a dangerous goods training programme.

I.1.5.3.2 Instructors delivering initial and recurrent dangerous goods training programmes must deliver such a course at least every 24 months, or in the absence of this attend recurrent training.

I.1.5.3.3 Instructors must receive and understand updates to dangerous goods information and be made familiar with those changes by training or other means on an annual basis or as the Regulations are modified. Organisations must ensure that the instructor receives updates to the Regulations and training material on an annual basis with the issuance of each edition of the DGR.

#### **I.1.5.4 Designated Postal Operators Training Programs**

I.1.5.4.1 Staff of designated postal operators must be trained commensurate with their responsibilities. The subject matter to which their various categories of staff should be familiar with is indicated in Table H.1.5.A.

I.1.5.4.2 Dangerous goods training programmes of designated postal operators must be subjected to review and approval by the civil aviation authority of the State where the mail was accepted by the designated postal operator.

#### **TABLE I.1.5.A**

#### **Minimum Requirements for Training Curricula for Designated Postal Operators (I.1.5.1.2)**

...

## I.1.7 Dangerous Goods Security

...

### I.1.7.3 Provisions for High Consequence Dangerous Goods

...

**TABLE 1.7.A**  
**Indicative List of High Consequence Dangerous Goods (1.7.3.1.2)**

...	...
Class 1	Division 1.4, UN 0104, UN 0237, UN 0255, UN 0267, UN 0289, UN 0361, UN 0365, UN 0366, UN 0440, UN 0441, UN 0455, UN 0456, UN 0500, <a href="#">UN 0512</a> , <a href="#">UN 0513</a>
...	...
<a href="#">Class 1</a>	<a href="#">Division 1.6</a>
...	...
Class 6	Division 6.2 infectious substances of Category A (UN 2814 and UN 2900) <a href="#">and medical waste of category A (UN 3549)</a>

...

### I.1.7.5 Radioactive Material

For radioactive material, the provisions of this Subsection are deemed to be complied with when the provisions of the Convention on Physical Protection of Nuclear Material((1)) and of IAEA circular on "[Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities](#)~~The Physical Protection of Nuclear Material and Nuclear Facilities~~"((2)) are applied.((1)) ((2))

(2): ~~INFCIRC/225/Rev.4 (Corrected), IAEA, Vienna (1999)~~[INFCIRC/225/Rev.5. IAEA Vienna \(2011\)](#).

...

## SECTION I.3—CLASSIFICATION

...

### I.3.1 Class 1—Explosives

...

#### I.3.1.7 Exclusion from Class 1

...

I.3.1.7.4 An article may be excluded from Class 1 when three unpackaged articles, each individually activated by its own means of initiation or ignition or external means to function in the designed mode, meet the following test criteria:

- no external surface has a temperature of more than 65°C. A momentary spike in temperature up to 200°C is acceptable;
- no rupture or fragmentation of the external casing or movement of the article or detached parts thereof of more than 1 m in any direction;

**Note:**

*Where the integrity of the article may be affected in the event of an external fire these criteria must be examined by a fire test, ~~such as described in ISO 12097-3~~. [One such method is described in ISO 14451-2 using a heating rate of 80 K/min.](#)*

- no audible report exceeding 135 dB(C) peak at a distance of 1 m;
- no flash or flame capable of igniting a material such as a sheet of 80 ±10 g/m<sup>2</sup> paper in contact with the article; and



(e) no production of smoke, fumes or dust in such quantities that the visibility in a 1 m<sup>3</sup> chamber equipped with appropriately sized blow out panels is reduced more than 50% as measured by a calibrated light (lux) meter or radiometer located 1 m from a constant light source located at the midpoint on opposite walls. The general guidance on Optical Density Testing in ISO 5659-1 and the general guidance on the Photometric System described in Section 7.5 in ISO 5659-2 may be used or similar optical density measurement methods designed to accomplish the same purpose may also be employed. A suitable hood cover surrounding the back and sides of the light meter must be used to minimize effects of scattered or leaking light not emitted directly from the source.

**Notes:**

1. If during the tests addressing criteria (a), (b), (c) and (d) no or very little smoke is observed the test described in (e) may be waived.
2. The appropriate national authority may require testing in packaged form if it is determined that, as packaged for transport, the article may pose a greater hazard.

...

### **I.3.2 Class 2—Gases**

...

#### **I.3.2.1 Definition**

...

**I.3.2.1.3** This class comprises compressed gases; liquefied gases; dissolved gases; refrigerated liquefied gases; mixtures of one or more gases with one or more vapours of substances of other classes; articles charged with a gas, ~~and~~ aerosols and chemicals under pressure. (~~F~~For aerosols see 3.2.5).

**Note:**

“Cryogenic liquid” means the same as “refrigerated liquefied gas”.

...

#### **I.3.2.2 Divisions**

##### **I.3.2.2.0 Classification**

Substances of Class 2 are assigned to one of three divisions based on the primary hazard of the gas during transport.

**Note:**

*Aerosols (UN 1950), Receptacles, small, containing gas (UN 2037) and Gas cartridges (UN 2037) must be regarded as being in Division 2.1 when the criteria in 3.2.5.2.1 are met. [For chemicals under pressure, UN 3500 to UN 3505, see Special Provision A187.](#)*

##### **I.3.2.2.1 Division 2.1 Flammable Gas**

Gases which at 20°C and a standard pressure of 101.3 kPa (1.01 bar):

- (a) are ignitable when in a mixture of 13% or less by volume with air; or
- (b) have a flammable range with air of at least 12 percentage points regardless of the lower flammable limit. Flammability must be determined by tests or by calculation in accordance with methods adopted by ISO (see ISO Standard 10156:~~2010~~[2017](#)). Where insufficient data are available to use these methods, tests by a comparable method recognized by the appropriate national authority must be used.

##### **I.3.2.2.2 Division 2.2 Non-flammable, Non-toxic Gas**

Gases which:

- (a) are asphyxiant—gases which dilute or replace the oxygen normally in the atmosphere; or
- (b) are oxidizing—gases which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does; or
- (c) do not come under the other divisions.

**Note:**

In I.3.2.2.2(b) “gases which cause or contribute to the combustion of other material more than air does” means pure gases or gas mixtures with an oxidizing power greater than 23.5% ~~per cent~~ as determined by a method specified in ISO 10156:~~2010~~[2017](#).

...

### **I.3.2.3 Mixtures of Gases**

I.3.2.3.1 For the classification of gas mixtures into one of the three divisions (including vapours of substance from other classes) the following principles must be used:

I.3.2.3.1.1 Flammability must be determined by tests or by calculation in accordance with methods adopted by ISO (see ISO Standard 10156:~~2010~~[2017](#)). Where insufficient data are available to use these methods, tests by a comparable method recognized by the appropriate national authority must be used.

...

I.3.2.3.1.4 Oxidizing ability is determined either by tests or by calculation methods adopted by the International Standards Organization (ISO) (see the Note under I.3.2.2.2, ISO 10156:~~2010~~[2017](#)).

...

### **I.3.4 Class 4—Flammable Solids; Substances Liable to Spontaneous Combustion; Substances which, in Contact with Water, Emit Flammable Gases**

...

#### **I.3.4.2 Division 4.2—Substances Liable to Spontaneous Combustion**

...

##### **I.3.4.2.3.3 Self-Heating Substances**

...

I.3.4.2.3.3.2 Self-reactive substances, ~~except for Type G~~, which also give a positive result according to this test method must not be classified in Division 4.2 but in Division 4.1 (see 3.4.1.2.1).

...

### **I.3.6 Class 6—Toxic and Infectious Substances**

...

#### **I.3.6.2 Division 6.2—Infectious Substances**

##### **I.3.6.2.1 Definitions**

For the purposes of these Regulations:

**I.3.6.2.1.1** Infectious substances are substances which are known or are reasonably expected to contain pathogens. Pathogens are defined as micro-organisms (including bacteria, viruses, ~~rickettsiae~~, parasites, fungi) and other agents such as prions, which can cause disease in humans or animals.

**Note:**

*Toxins from plant, animal or bacterial sources which do not contain any infectious substances or toxins that are not contained in substances which are infectious substances should be considered for classification in Division 6.1 and assigned to UN 3172.*

...

**I.3.6.2.1.5** Medical or clinical wastes are wastes derived from the [veterinary treatment of animals](#), the medical treatment of ~~animals or~~ humans or from bio-research.

##### **I.3.6.2.2 Classification of Infectious Substances**

**I.3.6.2.2.1** Infectious substances must be classified in Division 6.2 and assigned to UN 2814, UN 2900, UN 3291, ~~or UN 3373 or UN 3549~~, as appropriate.

**I.3.6.2.2.2** Infectious substances are divided into the following categories:

I.3.6.2.2.2.1 Category A: An infectious substance which is transported in a form that, when exposure to it occurs, is capable of causing permanent disability, life-threatening or fatal disease in otherwise healthy humans or animals. Indicative examples of substances that meet these criteria are given in Table 3.6.D.

**Note:**

*An exposure occurs when an infectious substance is released outside of the protective packaging, resulting in physical contact with humans or animals.*

- (a) Infectious substances meeting these criteria which cause disease in humans or both in humans and animals must be assigned to UN 2814. Infectious substances which cause disease only in animals must be assigned to UN 2900.
- (b) Assignment to UN 2814 or UN 2900 must be based on the known medical history and symptoms of the source human or animal, endemic local conditions, or professional judgement concerning individual circumstances of the source human or animal.

**Notes:**

1. *The proper shipping name for UN 2814 is Infectious substance, affecting humans. The proper shipping name for UN 2900 is Infectious substance, affecting animals only.*
2. *The following table is not exhaustive. Infectious substances, including new or emerging pathogens, which do not appear in the table but which meet the same criteria must be assigned to Category A. In addition, if there is doubt as to whether or not a substance meets the criteria it must be included in Category A.*
3. *In the following table, the micro-organisms written in italics are bacteria, ~~mycoplasma, rickettsia~~ or fungi.*

...

### I.3.6.2.2.3 Exceptions

...

**I.3.6.2.2.3.9** Medical devices or equipment potentially contaminated with or containing infectious substances which are being transported for disinfection, cleaning, sterilization, repair, or equipment evaluation are not subject to the provisions of these Regulations when carried as cargo if packed in packagings designed and constructed in such a way that, under normal conditions of transport, they cannot break, be punctured or leak their contents. Packagings must be designed to meet the construction requirements listed in 6.2.

...

**I.3.6.2.2.3.9.3** This exception does not apply to:

- (a) medical waste (UN 3291 [and UN 3549](#));
- (b) medical devices or equipment contaminated with or containing infectious substances in Category A (UN 2814 or UN 2900); and
- (c) medical devices or equipment contaminated with or containing other dangerous goods that meet the definition of another hazard class.

...

### I.3.6.2.5 Medical or Clinical Wastes

**I.3.6.2.5.1** Medical or clinical wastes containing:

[\(a\) Category A infectious substances must be assigned to UN 2814, ~~or~~ UN 2900 or UN 3549, as appropriate. Solid medical waste containing Category A infectious substances generated from the medical treatment of humans or veterinary treatment of animals may be assigned to UN 3549. The UN 3549 entry must not be used for waste from bio-research or liquid waste;](#)

[\(b\) ~~Medical or clinical wastes containing infectious substances in~~ Category B ~~infectious substances;~~ must be assigned to UN 3291. ~~For the assignment, international, regional or national waste catalogues may be taken into account.~~](#)

**I.3.6.2.5.2** Medical or clinical wastes which are reasonably believed to have a low probability of containing infectious substances must be assigned to UN 3291. [For the assignment, international, regional or national waste catalogues may be taken into account.](#)

**Note:**

The proper shipping name for UN 3291 is *Biomedical waste, n.o.s., Clinical waste, unspecified, n.o.s. or Medical waste, n.o.s. or Regulated medical waste, n.o.s.*

**I.3.6.2.5.3** Decontaminated medical or clinical wastes which previously contained infectious substances are not subject to these Regulations unless they meet the criteria for inclusion in another class.

...

### **I.3.8 Class 8—Corrosives**

...

#### **I.3.8.3 Packing Group Assignment for Substances and Mixtures**

**I.3.8.3.1** Existing human and animal data including information from single or repeated exposure must be the first line of evaluation, as they give information directly relevant to effects on the skin.

**I.3.8.3.2** In assigning the packing group in accordance with 3.8.2.2:

**I.3.8.3.2.1,** ~~a~~Account must be taken of human experience in instances of accidental exposure. In the absence of human experience, the ~~packing group classification~~ must be based on the data obtained from experiments in accordance with Organization for Economic Co-operation and Development (OECD) Guidelines for Testing of Chemicals No. 404, “Acute Dermal Irritation/Corrosion”, 2015, ~~or~~ No. 435, In Vitro Membrane Barrier Test Method for Skin Corrosion, 2015, No. 431, In Vitro Skin Corrosion: Reconstructed Human Epidermis (RHE) Test Method, 2016 or No. 430, In Vitro Skin Corrosion: Transcutaneous Electrical Resistance Test (TER) Test Method, 2015.

**I.3.8.3.2.2** A substance or mixture which is determined not to be corrosive in accordance with OECD Guideline for the Testing of Chemicals No. 404, No. 435, No. 431, or No. 430, In Vitro Skin Corrosion: Transcutaneous Electrical Resistance Test (TER), 2015 or No. 431, In Vitro Skin Corrosion: Human Skin Model Test, 2015 may be considered not to be corrosive to skin for the purposes of these Regulations without further testing.

**I.3.8.3.2.3** If the *in vitro* test results indicate that the substance or mixture is corrosive and not assigned to Packing Group I, but the test method does not allow discrimination between Packing Groups II and III, it must be considered to be Packing Group II.

...

### **3.9 Class 9—Miscellaneous Dangerous Substances and Articles, Including Environmentally Hazardous Substances**

...

**3.9.2.12 Other Substances or Articles Presenting a Danger During Transport, but not Meeting the Definitions of Another Class**

**3.9.2.12.0 Assigned entries:**

...

- UN 3363 Dangerous goods in articles or **Dangerous goods in apparatus or Dangerous goods in machinery**

...

#### **I.3.12 Classification of Articles Containing Dangerous Goods, n.o.s.**

...

**I.3.12.4** This section does not apply to dangerous goods of Class 1, Division 6.2, Class 7 or radioactive material contained in articles. However, this section applies to articles containing explosives which are excluded from Class 1 in accordance with 3.1.7.4.

...

## **Section 4 —Identification**

...

## 4.1 Selecting Proper Shipping Name

...

**TABLE 4.1.A**  
List of Generic and n.o.s. Proper Shipping Names (4.1.2.2)

Class or Division	Subsidiary Hazard	UN or ID No	Proper Shipping Names (Note: The ★ is not part of the proper shipping name.)
...	...	...	...
<b>Class 6</b>			
Division 6.2			
<i>Specific entries</i>			
...			
6.2		3291	<b>Medical waste, n.o.s.</b>
<a href="#">6.2</a>		<a href="#">3549</a>	<a href="#">Medical waste, Category A, affecting animals only</a>
<a href="#">6.2</a>		<a href="#">3549</a>	<a href="#">Medical waste, Category A, affecting humans</a>
...			

## 4.2 List of Dangerous Goods

UN/ID No.	Proper Shipping Name/Description	Class or Div. (Sub Hazard)	Hazard Label(s)	PG	EQ	Passenger and Cargo Aircraft				Cargo Aircraft Only		S.P. see 4.4	ERG Code		
						Ltd Qty		Pkg Inst	Max Net Qty/Pkg	Pkg Inst	Max Net Qty/Pkg			Pkg Inst	Max Net Qty/Pkg
						Pkg Inst	Max Net Qty/Pkg								
A	B	C	D	E	F	G	H	I	J	K	L	M	N		
3291	Biomedical waste, n.o.s.	6.2	Infectious	II	E0	Forbidden		<del>622621</del>	No limit	<del>622621</del>	No limit	A117	11L		
3291	Clinical waste, unspecified, n.o.s.	6.2	Infectious	II	E0	Forbidden		<del>622621</del>	No limit	<del>622621</del>	No limit	A117	11L		
<a href="#">3363</a>	<a href="#">Dangerous goods in articles</a>	<a href="#">9</a>	<a href="#">Miscellaneous</a>		<a href="#">E0</a>	<a href="#">Forbidden</a>		<a href="#">See 962</a>		<a href="#">See 962</a>		<a href="#">A48</a> <a href="#">A107</a>	<a href="#">9L</a>		
3380	Desensitized explosive, solid, n.o.s. ★	4.1				Forbidden		Forbidden		Forbidden		A133 <a href="#">A217</a>	3E		
<a href="#">0511</a>	<a href="#">Detonators, electronic † programmable for blasting</a>	<a href="#">1.1.B</a>				<a href="#">Forbidden</a>		<a href="#">Forbidden</a>		<a href="#">Forbidden</a>			<a href="#">1L</a>		
<a href="#">0512</a>	<a href="#">Detonators, electronic † programmable for blasting</a>	<a href="#">1.4.B</a>	<a href="#">Explosive 1.4</a>		<a href="#">E0</a>	<a href="#">Forbidden</a>		<a href="#">Forbidden</a>		<a href="#">131</a>	<a href="#">75 kg</a>		<a href="#">1L</a>		
<a href="#">0513</a>	<a href="#">Detonators, electronic † programmable for blasting</a>	<a href="#">1.4.S</a>	<a href="#">Explosive 1.4</a>		<a href="#">E0</a>	<a href="#">Forbidden</a>		<a href="#">131</a>	<a href="#">25 kg</a>	<a href="#">131</a>	<a href="#">100 kg</a>		<a href="#">1L</a>		
2522	2-Dimethylaminoethyl methacrylate, stabilized	6.1	Toxic	II	E4	Y641	1 L	654	5 L	662	60 L	<a href="#">A209</a>	6L		
2383	Dipropylamine	3 (8)	Flamm. liquid & Corrosive	II	E2	Y340	0.5 L	352	1 L	363	5 L	<del>A209</del>	3C		
3082	Environmentally hazardous substance, liquid, n.o.s. ★	9	Miscellaneous	III	E1	Y964	30 kg G	964	450 L	964	450 L	A97 A158 A197 <a href="#">A215</a>	9L		
3077	Environmentally hazardous substance, solid, n.o.s. ★	9	Miscellaneous	III	E1	Y956	30 kg G	956	400 kg	956	400 kg	A97 A158 A197 <a href="#">A215</a>	9L		
2216	Fish meal, stabilized	9	<a href="#">Miscellaneous</a>	<a href="#">III</a>	<a href="#">E1</a>	Forbidden		<del>Forbidden</del> <a href="#">956</a>	<a href="#">100 kg</a>	<del>Forbidden</del> <a href="#">956</a>	<a href="#">200 kg</a>	<a href="#">A2</a> <a href="#">A219</a>	9L		

UN/ID No.	Proper Shipping Name/Description	Class or Div. (Sub Hazard)	Hazard Label(s)	PG	EQ	Passenger and Cargo Aircraft				Cargo Aircraft Only		S.P. see 4.4	ERG Code
						Ltd Qty		Pkg Inst	Max Net Qty/Pkg	Pkg Inst	Max Net Qty/Pkg		
						Pkg Inst	Max Net Qty/Pkg						
A	B	C	D	E	F	G	H	I	J	K	L	M	N
2037	<b>Gas cartridges</b> (flammable) without a release device, non-refillable	2.1	Flamm. gas		E0	Y203	1 kg	203	1 kg	203	15 kg	A145 A167 A802	10L
2037	<b>Gas cartridges</b> (non-flammable) without a release device, non-refillable	2.2	Non-flamm. gas		E0	Y203	1 kg	203	1 kg	203	15 kg	A98 A145 A167 A802	2L
2037	<b>Gas cartridges</b> (oxidizing) without a release device, non-refillable	2.2 (5.1)	Non-flamm. gas & Oxidizer		E0	Y203	1 kg	203	1 kg	203	15 kg	A145 A167 A802	2X
3549	<b>Medical waste, Category A, affecting animals only, solid</b>	6.2				Forbidden		Forbidden		Forbidden		A2 A218	11L
3549	<b>Medical waste, Category A, affecting humans solid</b>	6.2				Forbidden		Forbidden		Forbidden		A2 A218	11L
3291	<b>Medical waste, n.o.s.</b>	6.2	Infectious	#	E0	Forbidden		622621   No limit		622621   No limit		A117	11L
0340	<b>Nitrocellulose</b> dry or wetted with less than 25% water (or alcohol) by weight	1.1D				Forbidden		Forbidden		Forbidden		A216	1L
0341	<b>Nitrocellulose</b> unmodified or plasticized with less than 18% plasticizing substance by weight	1.1D				Forbidden		Forbidden		Forbidden		A216	1L
2557	<b>Nitrocellulose mixture without plasticizer, without pigment</b> with 12.6% or less nitrogen by dry weight	4.1	Flamm. solid	II	E0	Forbidden		452   1 kg		453   15 kg		A57 A86 A217	3L
2557	<b>Nitrocellulose mixture without plasticizer, with pigment</b> with 12.6% or less nitrogen by dry weight	4.1	Flamm. solid	II	E0	Forbidden		452   1 kg		453   15 kg		A57 A86 A217	3L
2557	<b>Nitrocellulose mixture with plasticizer, without pigment</b> with 12.6% or less nitrogen by dry weight	4.1	Flamm. solid	II	E0	Forbidden		452   1 kg		453   15 kg		A57 A86 A217	3L
2557	<b>Nitrocellulose mixture with plasticizer, with pigment</b> with 12.6% or less nitrogen by dry weight	4.1	Flamm. solid	II	E0	Forbidden		452   1 kg		453   15 kg		A57 A86 A217	3L
0343	<b>Nitrocellulose, plasticized</b> with 18% or more plasticizing substance by weight	1.3C				Forbidden		Forbidden		Forbidden		A216	1L
0342	<b>Nitrocellulose, wetted</b> with 25% or more alcohol by weight	1.3C				Forbidden		Forbidden		Forbidden		A216	1L
2556	<b>Nitrocellulose with alcohol</b> 25% or more alcohol by dry weight and 12.6% nitrogen or less by dry weight	4.1	Flamm. solid	II	E0	Forbidden		452   1 kg		453   15 kg		A57 A86 A217	3L
2555	<b>Nitrocellulose with water</b> 25% or more water, by weight	4.1	Flamm. solid	II	E0	Forbidden		452   1 kg		453   15 kg		A57 A86 A217	3L
2037	<b>Receptacles, small, containing gas</b> (flammable) without a release device, non-refillable	2.1	Flamm. gas		E0	Y203	1 kg	203	1 kg	203	15 kg	A145 A167 A802	10L
2037	<b>Receptacles, small, containing gas</b> (non-flammable) without a release device, non-refillable	2.2	Non-flamm. gas		E0	Y203	1 kg	203	1 kg	203	15 kg	A98 A145 A167 A802	2L

UN/ID No. A	Proper Shipping Name/Description B	Class or Div. (Sub Hazard) C	Hazard Label(s) D	PG E	EQ F	Passenger and Cargo Aircraft				Cargo Aircraft Only		S.P. see 4.4 M	ERG Code N
						Ltd Qty		Pkg Inst I	Max Net Qty/Pkg J	Pkg Inst K	Max Net Qty/Pkg L		
						Pkg Inst G	Max Net Qty/Pkg H						
2037	Receptacles, small, containing gas (oxidizing) without a release device, non-refillable	2.2 (5.1)	Non-flamm. gas & Oxidizer		E0	Y203	1 kg	203	1 kg	203	15 kg	A145 A167 A802	2X
3291	Regulated medical waste, n.o.s.	6.2	Infectious	#	E0	Forbidden		<del>622621</del>	No limit	<del>622621</del>	No limit	A117	11L

...

#### I.4.4 Special Provisions

...

**I.A78** (172) Where a radioactive material has (a) subsidiary hazard(s):

- (a) the substance must be allocated to Packing Groups I, II or III, if appropriate, by application of the packing group criteria in Section 3 corresponding to the nature of the predominant subsidiary hazard;
- (b) packages must be labelled with subsidiary hazard labels corresponding to each subsidiary hazard exhibited by the material in accordance with the relevant provisions of 10.7.2. Corresponding placards must be affixed to cargo transport units in accordance with the relevant provisions of 10.7.5;
- (c) for the purposes of documentation and package marking, the proper shipping name must be supplemented with the name of the constituents which most predominantly contribute to this (these) subsidiary hazard(s) and which must be enclosed in parenthesis. However, where the constituent is listed by name in Table 4.2 and:
  1. “forbidden” is shown in columns I/J, the Shipper’s Declaration must indicate Cargo Aircraft Only and the package must bear CAO labels, except that the substance may be shipped with the prior approval of the appropriate authority of the State of origin and the State of the operator under the conditions established by those authorities. A copy of the document of approval, showing the quantity limitations and the packaging requirements, must accompany the consignment;
  2. “forbidden” is shown in columns K/L, the substance is forbidden for transport by air except that the substance may be shipped with the prior approval of the appropriate authority of the State of origin and the State of the operator under the conditions established by those authorities. A copy of the document of approval, showing the quantity limitations and the packaging requirements, must accompany the consignment.

Radioactive material with a subsidiary hazard of Division 4.2 in Packing Group I must be transported in Type B packages. These may be transported on passenger or cargo aircraft.

- (d) the Shipper’s Declaration must indicate the ~~subsidiary~~ class or division of the subsidiary hazard and where assigned, the packing group as required by 10.8.3.9.1, Step 4 and Step 5.
  - (e) the packaging must also be capable of meeting the appropriate performance criteria for the subsidiary hazard.
- For packing, see also 10.3.10.1(c).

...

**I.A107** This entry only applies to articles such as machinery, or apparatus or devices containing dangerous goods as a residue or as an integral element of the machinery or apparatus article. It must not be used for machinery or apparatus articles for which a proper shipping name already exists in Subsection 4.2–List of Dangerous Goods.

Where the quantity of dangerous goods contained as an integral element in machinery or apparatus articles exceeds the limits permitted by Packing Instruction 962, and the dangerous goods meet the provisions of Special Provision 301 of the UN Model Regulations, the machinery or apparatus article may be transported only with the prior approval of the appropriate authority of the State of Origin and the State of the Operator under the written conditions established by those authorities.

...

**I.A145** Waste aerosols, waste gas cartridges and waste receptacles, small, containing gas are forbidden from air transport. Waste gas cartridges that were filled with gases of Division 2.2 and have been pierced are not subject to these Regulations.

...

**I.A154** (376) Lithium batteries identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons or cells or batteries that cannot be diagnosed as damaged or defective prior to transport). [Lithium ion cells or batteries and lithium metal cells or batteries identified as being damaged or defective such that they do not conform to the type tested according to the applicable provisions of the *Manual of Tests and Criteria* are forbidden for transport. For the purposes of this special provision, these may include, but are not limited to:

a) cells or batteries identified as being defective for safety reasons;

b) cells or batteries that have leaked or vented;

c) cells or batteries that cannot be diagnosed prior to transport; or

d) cells or batteries that have sustained physical or mechanical damage.

In assessing a cell or battery as damaged or defective, an assessment or evaluation must be performed based on safety criteria from the cell, battery or product manufacturer or by a technical expert with knowledge of the cell's or battery's safety features. An assessment or evaluation may include, but is not limited to, the following criteria:

a) acute hazard, such as gas, fire, or electrolyte leaking;

b) the use or misuse of the cell or battery;

c) signs of physical damage, such as deformation to cell or battery casing, or colours on the casing;

d) external and internal short circuit protection, such as voltage or isolation measures;

e) the condition of the cell or battery safety features; or

f) damage to any internal safety components, such as the battery management system.]

...

**I.A176** (356) Metal hydride storage system(s) installed in vehicles, vessels, machinery, engines or aircraft or in completed components or intended to be installed in vehicles, vessels, machinery, engines or aircraft must be approved by the appropriate national authority before acceptance for transport. The Shipper's Declaration must include an indication that the package was approved by the appropriate national authority or a copy of the approval must accompany each consignment.

...

**I.A185** (360) Vehicles only powered by lithium metal batteries or lithium ion batteries must be ~~consigned~~ underassigned to the entry UN 3171, Battery-powered vehicle.

Lithium batteries installed in cargo transport units, designed only to provide power external to the transport unit must be assigned to entry UN 3536 **Lithium batteries installed in cargo transport unit.**

...

**I.A213** (387) Lithium batteries in conformity with 3.9.2.6.1(f) containing both primary lithium metal cells and rechargeable lithium ion cells must be assigned to UN 3090 or UN 3091, as appropriate. When such batteries are transported in accordance with Section IB or II of Packing Instruction 968, or in accordance with Section II of 969 or 970, the total lithium content of all lithium metal cells contained in the battery must not exceed 1.5 g and the total capacity of all lithium ion cells contained in the battery must not exceed 10 Wh.

**I.A214** (388) UN 3166 entries apply to vehicles powered by flammable liquid or flammable gas internal combustion engines or fuel cells.

Vehicles powered by a fuel cell engine must be assigned to the entries UN 3166, Vehicle, fuel cell, flammable gas powered or UN 3166, Vehicle, fuel cell, flammable liquid powered, as appropriate. These entries include hybrid electric vehicles powered by both a fuel cell and an internal combustion engine with wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, transported with the battery(ies) installed.



Other vehicles which contain an internal combustion engine must be assigned to the entries UN 3166, Vehicle, flammable gas powered or UN 3166, Vehicle, flammable liquid powered, as appropriate. These entries include hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, transported with the battery(ies) installed.

If a vehicle is powered by a flammable liquid and a flammable gas internal combustion engine, it must be assigned to UN 3166, Vehicle, flammable gas powered.

UN 3171 only applies to vehicles powered by wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries and equipment powered by wet batteries or sodium batteries transported with these batteries installed.

For the purpose of this special provision, vehicles are self-propelled apparatus designed to carry one or more persons or goods. Examples of such vehicles are cars, motorcycles, scooters, three- and four-wheeled vehicles or motorcycles, trucks, locomotives, bicycles (pedal cycles with a motor) and other vehicles of this type (e.g. self-balancing vehicles or vehicles not equipped with at least one seating position), wheelchairs, lawn tractors, self-propelled farming and construction equipment, boats and aircraft. This includes vehicles transported in a packaging. In this case some parts of the vehicle may be detached from its frame to fit into the packaging.

Examples of equipment are lawnmowers, cleaning machines or model boats and model aircraft. Equipment powered by lithium metal batteries or lithium ion batteries must be assigned to the entries UN 3091, Lithium metal batteries contained in equipment or UN 3091, Lithium metal batteries packed with equipment or UN 3481, Lithium ion batteries contained in equipment or UN 3481, Lithium ion batteries packed with equipment, as appropriate. [Lithium ion batteries or lithium metal batteries installed in a cargo transport unit designed only to provide power external to the cargo transport unit must be assigned to UN 3536 \*\*Lithium batteries installed in cargo transport unit.\*\*](#)

[I.A215](#) For UN 3077 and UN 3082, the technical name may be a name shown in bold characters in Column B of Table 4.2, provided that this name does not include "n.o.s." or an "\*". The name which most appropriately describes the substance or mixture must be used, e.g.:

[UN 3082, \*\*Environmentally hazardous substance, liquid, n.o.s.\*\* \(Paint\)](#)

[UN 3082, \*\*Environmentally hazardous substance, liquid, n.o.s.\*\* \(Perfumery products\)](#)

[I.A216](#) (393) The nitrocellulose must meet the criteria of the Bergmann-Junk test or methyl violet paper test in the UN *Manual of Tests and Criteria* Appendix 10. Tests of type 3 (c) need not be applied.

[I.A217](#) (394) The nitrocellulose must meet the criteria of the Bergmann-Junk test or methyl violet paper test in the UN *Manual of Tests and Criteria* Appendix 10.

[I.A218](#) (395) This entry must only be used for solid medical waste of Category A transported for disposal.

[I.A219](#) (308) Stabilization of fish meal must be achieved to prevent spontaneous combustion by effective application of ethoxyquin, BHT (butylated hydroxytoluene) or tocopherols (also used in a blend with rosemary extract) at the time of production. The said application must occur within twelve months prior to shipment. Fish meal must contain at least 50 ppm (mg/kg) of ethoxyquin, 100 ppm (mg/kg) of BHT or 250 ppm (mg/kg) of tocopherol-based antioxidant at the time of consignment.

...

## SECTION I.5—PACKING

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### I.5.0.2 General Packing Requirements

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#### I.5.0.2.5 Packaging Test Requirements

New, remanufactured, reused or reconditioned packagings, which are listed in Table 5.0.C, must meet the applicable requirements of Section 6 of these Regulations. Such packagings must be manufactured and tested under a quality assurance programme, which satisfies the appropriate national authority, in order to ensure that such packagings meet those applicable requirements. [Packagings may conform to one or more than one successfully tested design type and may bear more than one mark required by 6.2.](#) Where packagings are required to be tested in accordance with Subsection 6.3, their subsequent use must be as specified in the applicable test report and conform in all respects with the design type which was tested, including the method of packing and size and type of any inner packagings, except as provided for in 5.0.2.12.2 or 6.3.1.2. Before being filled and handed over for transport, every packaging must be inspected to ensure that it is free from corrosion, contamination or other damage. Any packaging which shows signs of reduced strength as compared with the approved design type must no longer be used or must be so reconditioned that it is able to withstand the design type tests. For definitions of remanufactured packages and re-conditioned packages as used in these Regulations, see Appendix A.

**Note:**

*ISO 16106:2006 Packaging—Transport packages for dangerous goods—Dangerous goods packagings, intermediate bulk containers (IBCs) and large packagings—Guidelines for the application of ISO 9001 provides acceptable guidance on procedures which may be followed.*

...

### I.5.2 Packing Instructions—Class 2—Gases

#### I.5.2.0 General Requirements

...

**I.5.2.0.2** Parts of cylinders and closed cryogenic receptacles which are in direct contact with dangerous goods must not be affected or weakened by those dangerous goods and must not cause a dangerous effect (e.g. catalysing a reaction or reacting with the dangerous goods). In addition to the requirements specified in the relevant packing instruction, which take precedence, the applicable provisions of ISO 11114-1:2012 + [A1:2017](#) and ISO 11114-2:2013 must be met.

...

**I.5.2.0.8** Valves must be designed and constructed in such a way that they are inherently able to withstand damage without release of the contents or must be protected from damage which could cause inadvertent release of the contents of the cylinder and closed cryogenic receptacle, by one of the following methods:

- (a) valves are placed inside the neck of the cylinder and closed cryogenic receptacle and protected by a threaded plug or cap;
- (b) valves are protected by caps. Caps must possess vent-holes of sufficient cross-sectional area to evacuate the gas if leakage occurs at the valves;
- (c) valves are protected by shrouds or guards;
- (d) not used; or
- (e) cylinders and closed cryogenic receptacles are transported in an outer packaging. The packaging as prepared for transport must be capable of meeting the drop test specified in 6.3.3 at the Packing Group I performance standards.

**I.5.2.0.8.1** For cylinders and closed cryogenic receptacles with valves as described in (b) and (c), the requirements of ISO 11117:1998 must be met. For valves with inherent protection, the requirements of ~~annex A of ISO 10297:2006 or Annex A of ISO 12097:2014 must be met~~ [Annex A of ISO 10297:2006, Annex A of ISO 10297:2014 or Annex A of ISO 10297 + A1:2017 must be met.](#) [For cylinders and closed cryogenic receptacles with self-closing valves with inherent protection, the requirements of Annex A of ISO 17879:2017 must be met.](#) For metal hydride storage systems, the valve protection requirements specified in ISO 16111:2008 must be met.

...

## **PACKING INSTRUCTION 200**

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This instruction applies to gases in Divisions 2.1, 2.2 and 2.3 on passenger aircraft and Cargo Aircraft Only.

...

For some substances the Particular Packing Provisions of Tables 200.A and 200.B may prohibit a particular type of cylinder.

The following requirements must be met:

...

(c) In no case must cylinders be filled in excess of the limit permitted in the following requirements:

1. for compressed gases, the working pressure must be not more than two-thirds of the test pressure of the cylinders. Restrictions to this upper limit on working pressure may be imposed by particular provisions contained in Tables 200.A and 200.B. In no case must the internal pressure at 65°C exceed the test pressure;
2. for high pressure liquefied gases, the filling ratio must be such that the settled pressure at 65°C does not exceed the test pressure of the cylinders.

The use of test pressures and filling ratios other than those in the Tables 200.A and 200.B is permitted provided that the above criterion is met, except where Particular Packing Provision “h” applies.

For high pressure liquefied gases and gas mixtures for which relevant data are not available, the maximum filling ratio (FR) must be determined as follows:

$$FR = 8.5 \times 10^{-4} \times d_g \times P_h$$

where:

FR = maximum filling ratio

$d_g$  = gas density (at 15°C, 1 bar) (in g/L)

$P_h$  = minimum test pressure (in bar)

If the density of the gas is unknown, the maximum filling ratio must be determined as follows:

where:

FR = maximum filling ratio

$P_h$  = minimum test pressure (in bar)

MM = molecular mass (in g/mol)

$R = 8.31451 \times 10^{-2}$  bar L/mol K (gas constant)

For gas mixtures, the average molecular mass is to be taken, taking into account the volumetric concentrations of the various components;

3. for low pressure liquefied gases, the maximum mass of contents per litre of water capacity (~~filling factor~~) must equal 0.95 times the density of the liquid phase at 50°C; in addition, the liquid phase must not fill the cylinder at any temperature up to 60°C. The test pressure of the cylinder must be at least equal to the vapour pressure (absolute) of the liquid at 65°C, minus 100 kPa (1 bar). For low pressure liquefied gases for which filling data is not provided in the table, the maximum filling ratio must be determined as follows:

...

(e) The filling of cylinders must be carried out by qualified staff using appropriate equipment and procedures. The procedures should include checks of:

- the conformity of cylinders and accessories with these Regulations;
- their compatibility with the product to be transported;
- the absence of damage which might affect safety;
- compliance with the degree or pressure of filling, as appropriate;

— marks and identification.

These requirements are deemed to be met if the following standards are applied:

ISO 10691: 2004	Gas cylinders—Refillable welded steel cylinders for liquefied petroleum gas (LPG)—Procedures for checking before, during and after filling
ISO 11372: 2011	Gas cylinders—Acetylene cylinders—Filling conditions and filling inspection
ISO 11755: 2005	Gas cylinders—Cylinder bundles for compressed and liquefied gases (excluding acetylene)—Inspection at time of filling
ISO 13088: 2011	Gas cylinders—Acetylene cylinder bundles—Filling conditions and filling inspection
ISO 24431: 2016	Gas cylinders— <a href="#">Seamless welded and composite</a> Cylinders for compressed and liquefied gases (excluding acetylene)—Inspection at time of filling

**Note:**

*The carriage of oxygen compressed, and air compressed to provide life support to aquatic animals must comply with 5.0.1.8 of these Regulations.*

...

### PACKING INSTRUCTION 218

This instruction applies to UN 3500, UN 3501, UN 3502, UN 3503, UN 3504 and UN 3505 on passenger aircraft and Cargo Aircraft Only.

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#### Additional Packing Requirements

- (a) cylinders must be so filled that at 50°C the non-gaseous phase does not exceed 95% of their water capacity and they are not completely filled at 60°C. When filled, the internal pressure at 65°C must not exceed the test pressure of the cylinders. The vapour pressures and volumetric expansion of all substances in the cylinders must be taken into account;
- (b) the minimum test pressure must be in accordance with Packing Instruction 200 for the propellant but must not be less than 20 bar;
- (c) non-refillable cylinders used may have a water capacity in litres not exceeding 1,000 L divided by the test pressure expressed in bars provided capacity and pressure restrictions of the construction standard comply with ISO 11118:1999, which limits the maximum capacity to 50 L;
- (d) for liquids charged with a compressed gas both components—the liquid and the compressed gas—have to be taken into consideration in the calculation of the internal pressure in the cylinder. When experimental data is not available, the following steps must be carried out:
  1. calculation of the vapour pressure of the liquid and of the partial pressure of the compressed gas at 15°C (filling temperature);
  2. calculation of the volumetric expansion of the liquid phase resulting from the heating from 15°C to 65°C and calculation of the remaining volume for the gaseous phase;
  3. calculation of the partial pressure of the compressed gas at 65°C considering the volumetric expansion of the liquid phase;

**Note:**

*The compressibility factor of the compressed gas at 15°C and 65°C must be considered.*

4. calculation of the vapour pressure of the liquid at 65°C;
5. the total pressure is the sum of the vapour pressure of the liquid and the partial pressure of the compressed gas at 65°C;
6. consideration of the solubility of the compressed gas at 65°C in the liquid phase.

The test pressure of the cylinders must not be less than the calculated total pressure minus 100 kPa (1 bar).

If the solubility of the compressed gas in the liquid phase is not known for the calculation, the test pressure can be calculated without taking the gas solubility (subparagraph 6) into account.

[\(e\) for fire extinguishing agents assigned to UN 3500, the minimum test period for periodic inspection is 10 years;](#)

(ef) cylinders must not be offered for transport when connected with spray application equipment such as a hose and wand assembly;

(fg) cylinders must be packed in strong outer packagings.

...

### I.5.3 Packing Instructions—Class 3—Flammable Liquids

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#### PACKING INSTRUCTION 372

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This instruction applies to UN 3165, Aircraft hydraulic power unit fuel tank, on Cargo Aircraft Only.

...

Aircraft hydraulic power unit fuel tanks containing a mixture of anhydrous hydrazine and methyl hydrazine (M86 fuel) and designed for installation as complete units in aircraft are acceptable subject to either of the following conditions:

- (a) the unit must consist of an aluminium pressure receptacle made from tubing and having welded heads. Primary containment of the fuel within this receptacle must consist of a welded aluminium bladder having a maximum internal volume of 46 L. The outer receptacle must have a minimum design gauge pressure of 1,275 kPa (12.75 bar) and a minimum burst gauge pressure of 2,755 kPa (27.55 bar). Each receptacle must be leak-checked during manufacture and before shipment and must be found leak-proof. The complete inner unit must be securely packed in non-combustible cushioning material, such as vermiculite, in a strong outer tightly closed metal packaging which will adequately protect all fittings. Maximum quantity of fuel per ~~unit~~ [primary containment](#) and package is 42 L; or
- (b) the unit must consist of an aluminium pressure receptacle. Primary containment of the fuel within this receptacle must consist of a welded hermetically sealed fuel compartment with an elastomeric bladder having a maximum internal volume of 46 L. The pressure receptacle must have a minimum design gauge pressure of 2,860 kPa (28.6 bar) and a minimum burst gauge pressure of 5,170 kPa (51.7 bar). Each receptacle must be leak-checked during manufacture and before shipment and must be found leak-proof. The complete inner unit must be securely packed in non-combustible cushioning material, such as vermiculite, in a strong outer tightly closed metal packaging which will adequately protect all fittings. Maximum quantity of fuel per ~~unit~~ [primary containment](#) and package is 42 L.

...

#### PACKING INSTRUCTION 378

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This instruction applies to UN 3528 Engine, internal combustion, flammable liquid powered, Engine, fuel cell, flammable liquid powered, Machinery, internal combustion, flammable liquid powered and Machinery, fuel cell, flammable liquid powered on passenger aircraft and Cargo Aircraft Only (see PI 220 for flammable gas powered engines and machinery, PI 950 for flammable liquid powered vehicles, PI 951 for flammable gas powered vehicles, PI 952 for battery-powered equipment and vehicles and PI 972 for engines and machinery powered by fuels that are classified as environmentally hazardous substances).

...

- (b) Flammable liquid fuel tanks. Except as otherwise provided for in this packing instruction, fuel tanks must be drained of fuel and tank caps fitted securely. Special precautions are necessary to ensure complete drainage of the fuel system of machines or equipment incorporating internal combustion engines, such as lawn mowers, outboard motors, etc., where such machines or equipment could possibly be handled in other than an upright position. [When it is not possible to handle in other than an upright position, machinery must be drained of fuel as far as practicable, and if any fuel remains it must not exceed one-quarter of the tank capacity;](#)

**I.5.4 Packing Instructions—Class 4—Flammable Solids; Substances Liable to Spontaneous Combustion; Substances which, in Contact with Water, Emit Flammable Gases**

...

**PACKING INSTRUCTION 457**

This instruction applies to 2-Bromo-2-nitropropane-1,3-diol (UN 3241) on passenger aircraft and Cargo Aircraft Only.

...

**SINGLE PACKAGINGS**

Type	Drums		Jerricans		Composites			
Desc	Plastic		Plastic		Plastic			
Spec	1H1 1H2		3H1 3H2		6HC 6HD1 6HD2 6HG1 6HG2 6HH1 <a href="#">6HH2</a>			

...

**PACKING INSTRUCTION 463**

This instruction applies to Division 4.2 liquids in Packing Group III on passenger aircraft.

...

**SINGLE PACKAGINGS**

Type	Drums				Jerricans			Composites	Cylinders
Desc	Steel	Aluminium	Plastic	Other metal	Steel	Aluminium	Plastic	Plastic	
Spec	1A1 <a href="#">1A2</a>	1B1 <a href="#">1B2</a>	1H1 <a href="#">1H2</a>	1N1 <a href="#">1N2</a>	3A1 <a href="#">3A2</a>	3B1 <a href="#">3B2</a>	3H1 <a href="#">3H2</a>	All	As permitted by 5.0.6.6

...

**PACKING INSTRUCTION 465**

This instruction applies to Division 4.2 liquids in Packing Group III on Cargo Aircraft Only.

...

**SINGLE PACKAGINGS**

Type	Drums				Jerricans			Composites	Cylinders
Desc	Steel	Aluminium	Plastic	Other metal	Steel	Aluminium	Plastic	Plastic	
Spec	1A1 <a href="#">1A2</a>	1B1 <a href="#">1B2</a>	1H1 <a href="#">1H2</a>	1N1 <a href="#">1N2</a>	3A1 <a href="#">3A2</a>	3B1 <a href="#">3B2</a>	3H1 <a href="#">3H2</a>	All	As permitted by 5.0.6.6

...

**PACKING INSTRUCTION 470**

This instruction applies to Division 4.2 solids in Packing Group II on Cargo Aircraft Only.

...

**SINGLE PACKAGINGS**

Type	Drums						Jerricans			Boxes								Composites	Cylinders
Desc	Steel	Aluminium	<a href="#">Ply-wood</a>	<a href="#">Fibre</a>	Plastic	Other metal	Steel	Aluminium	Plastic	Steel	Aluminium	Wood	Ply-wood	Reconstituted wood	Fibre-board	Plastic	Other metal	Plastic	
Spec	1A1 1A2	1B1 1B2	<a href="#">1D</a>	<a href="#">1G</a>	1H1 1H2	1N1 1N2	3A1 3A2	3B1 3B2	3H1 3H2	4A	4B	4C2	4D	4F	4G	4H2	4N	All	As permitted in 5.0.6.6

**PACKING INSTRUCTION 471**

This instruction applies to Division 4.2 solids in Packing Group III on Cargo Aircraft Only.

...

**SINGLE PACKAGINGS**

Type	Drums						Jerricans			Boxes								Composites	Cylinders
Desc	Steel	Aluminium	<a href="#">Ply-wood</a>	<a href="#">Fibre</a>	Plastic	Other metal	Steel	Aluminium	Plastic	Steel	Aluminium	Wood	Ply-wood	Reconstituted wood	Fibre-board	Plastic	Other metal	Plastic	
Spec	1A1 1A2	1B1 1B2	<a href="#">1D</a>	<a href="#">1G</a>	1H1 1H2	1N1 1N2	3A1 3A2	3B1 3B2	3H1 3H2	4A	4B	4C2	4D	4F	4G	4H2	4N	All	As permitted in 5.0.6.6

...

**PACKING INSTRUCTION 479**

This instruction applies to Division 4.3 liquids in Packing Group III on passenger aircraft.

...

**SINGLE PACKAGINGS**

Type	Drums				Jerricans			Composites	Cylinders
Desc	Steel	Aluminium	Plastic	Other metal	Steel	Aluminium	Plastic	Plastic	
Spec	1A1 <a href="#">1A2</a>	1B1 <a href="#">1B2</a>	1H1 <a href="#">1H2</a>	1N1 <a href="#">1N2</a>	3A1 <a href="#">3A2</a>	3B1 <a href="#">3B2</a>	3H1 <a href="#">3H2</a>	All	As permitted by 5.0.6.6

...

**PACKING INSTRUCTION 482**

This instruction applies to Division 4.3 liquids in Packing Group III on Cargo Aircraft Only.

...

**SINGLE PACKAGINGS**

Type	Drums				Jerricans			Composites	Cylinders
Desc	Steel	Aluminium	Plastic	Other metal	Steel	Aluminium	Plastic	Plastic	
Spec	1A1 <a href="#">1A2</a>	1B1 <a href="#">1B2</a>	1H1 <a href="#">1H2</a>	1N1 <a href="#">1N2</a>	3A1 <a href="#">3A2</a>	3B1 <a href="#">3B2</a>	3H1 <a href="#">3H2</a>	All	As permitted by 5.0.6.6

...

**PACKING INSTRUCTION 491**

This instruction applies to Division 4.3 solids in Packing Group III on Cargo Aircraft Only.

...

**SINGLE PACKAGINGS**

Type	Drums						Jerricans			Boxes								Composites	Cylinders
Desc	Steel	Aluminium	<a href="#">Ply-wood</a>	<a href="#">Fibre</a>	Plastic	Other metal	Steel	Aluminium	Plastic	Steel	Aluminium	Wood	Ply-wood	Reconstituted wood	Fibre-board	Plastic	Other metal	Plastic	
Spec	1A1	1B1	<a href="#">1D</a>	<a href="#">1G</a>	1H1	1N1	3A1	3B1	3H1	4A	4B	4C2	4D	4F	4G	4H2	4N	All	As permitted in 5.0.6.6

...

## 1.5.5 Packing Instructions—Class 5—Oxidizing Substances; Organic Peroxides

...

### PACKING INSTRUCTION 555

This instruction applies to Division 5.1 liquids in Packing Group III on Cargo Aircraft Only.

...

#### SINGLE PACKAGINGS

Type	Drums				Jerricans			Composites	Cylinders
	Steel	Aluminium	Plastic	Other metal	Steel	Aluminium	Plastic		
Spec	1A1 <a href="#">1A2</a>	1B1 <a href="#">1B2</a>	1H1 <a href="#">1H2</a>	1N1 <a href="#">1N2</a>	3A1 <a href="#">3A2</a>	3B1 <a href="#">3B2</a>	3H1 <a href="#">3H2</a>	All	As permitted by 5.0.6.6

...

## 5.6 Packing Instructions—Class 6—Toxic and Infectious Substances

...

### PACKING INSTRUCTION ~~622~~621

This instruction applies to UN 3291 on passenger and cargo aircraft and Cargo Aircraft Only.

...

### PACKING INSTRUCTION 650

This instruction applies to UN 3373 on passenger and cargo aircraft and Cargo Aircraft Only.

...

For transport, the mark illustrated below must be displayed on the external surface of the outer packaging on a background of a contrasting colour and must be clearly visible and legible. The mark must be in the form of a square set at an angle of 45° (diamond-shaped) with each side having a length of at least 50 mm, the width of the line must be at least 2 mm and the letters and numbers must be at least 6 mm high. [The entire mark must appear on one side of the package.](#) The proper shipping name “Biological Substance, Category B” in letters at least 6 mm high must be marked on the outer packaging adjacent to the diamond-shaped mark.

...

## 1.5.9 Packing Instructions—Class 9—Miscellaneous Dangerous Goods

...

### PACKING INSTRUCTION 956

This instruction applies to UN 1841, UN 1931, [UN 2216](#), UN 2969, UN 3077, UN 3152, UN 3335 and UN 3432 on passenger aircraft and Cargo Aircraft Only.

...

COMBINATION PACKAGINGS		
UN number	Quantity per package Passenger aircraft	Quantity per package Cargo Aircraft Only
UN 1931, <b>Zinc dithionite, or Zinc hydrosulphite</b> <a href="#">UN 2216. Fish meal, stabilized</a> UN 3152, <b>Polyhalogenated biphenyls, solid,</b> <b>Polyhalogenated terphenyls, solid</b> or <b>Halogenated monomethyldiphenylmethanes,</b> <b>solid</b> UN 3432, <b>Polychlorinated biphenyls, solid</b>	100 kg	200 kg
...		

...

### PACKING INSTRUCTION 957

This instruction applies to UN 2211 and UN 3314 on passenger aircraft and Cargo Aircraft Only.



...

Combination and single packagings are permitted.

<b>COMBINATION PACKAGINGS</b>	
<u>Inner Packaging (see 6.1)</u>	<u>Net quantity per inner packaging</u>
<u>Fibre</u>	<u>50 kg</u>
<u>Glass</u>	<u>10 kg</u>
<u>Metal</u>	<u>50 kg</u>
<u>Paper bag</u>	<u>50 kg</u>
<u>Plastic</u>	<u>50 kg</u>
<u>Plastic bag</u>	<u>50 kg</u>

UN number	Quantity per package Passenger aircraft	Quantity per package Cargo Aircraft Only
UN 2211, <b>Polymeric beads, expandable</b>	100.0 kg	200.0 kg
UN 3314, <b>Plastics moulding compound</b>		

**OUTER PACKAGINGS**

Type	<u>Drums</u>						<u>Jerricans</u>			<u>Boxes</u>							
Desc	<u>Steel</u>	<u>Alum- inium</u>	<u>Ply- wood</u>	<u>Fibre</u>	<u>Plastic</u>	<u>Other metal</u>	<u>Steel</u>	<u>Alum- inium</u>	<u>Plastic</u>	<u>Steel</u>	<u>Alum- inium</u>	<u>Wood</u>	<u>Ply- wood</u>	<u>Recon- stituted wood</u>	<u>Fibre- board</u>	<u>Plastic</u>	<u>Other metal</u>
Spec	<u>1A1</u> <u>1A2</u>	<u>1B1</u> <u>1B2</u>	<u>1D</u>	<u>1G</u>	<u>1H1</u> <u>1H2</u>	<u>1N1</u> <u>1N2</u>	<u>3A1</u> <u>3A2</u>	<u>3B1</u> <u>3B2</u>	<u>3H1</u> <u>3H2</u>	<u>4A</u>	<u>4B</u>	<u>4C1</u> <u>4C2</u>	<u>4D</u>	<u>4F</u>	<u>4G</u>	<u>4H1</u> <u>4H2</u>	<u>4N</u>

**SINGLE PACKAGINGS**

Type	<u>Drums</u>						<u>Jerricans</u>			<u>Boxes</u>						
Desc	<u>Steel</u>	<u>Alu- minium</u>	<u>Plywood</u>	<u>Fibre</u>	<u>Plastic</u>	<u>Other metal</u>	<u>Steel</u>	<u>Alu- minium</u>	<u>Plastic</u>	<u>Steel</u>	<u>Alu- minium</u>	<u>Wood</u>	<u>Ply- wood</u>	<u>Recon- stituted wood</u>	<u>Fibre- board</u>	<u>Other metal</u>
Spec	<u>1A1</u> <u>1A2</u>	<u>1B1</u> <u>1B2</u>	<u>1D</u>	<u>1G</u>	<u>1H1</u> <u>1H2</u>	<u>1N1</u> <u>1N2</u>	<u>3A1</u> <u>3A2</u>	<u>3B1</u> <u>3B2</u>	<u>3H1</u> <u>3H2</u>	<u>4A</u>	<u>4B</u>	<u>4C1</u> <u>4C2</u>	<u>4D</u>	<u>4F</u>	<u>4G</u>	<u>4N</u>

...

**PACKING INSTRUCTION 959**

This instruction applies to UN 3245 on passenger aircraft and Cargo Aircraft Only.

...

For transport, the mark illustrated below must be displayed on the external surface of the outer packaging on a background of a contrasting colour and must be clearly visible and legible. The mark must be in the form of a square set at an angle of 45° (diamond-shaped) with each side having a length of at least 50 mm, the width of the line must be at least 2 mm and the letters and numbers must be at least 6 mm high. The entire mark must appear on one side of the package.

...

**PACKING INSTRUCTION 962**

This instruction applies to UN 3363 on passenger aircraft and Cargo Aircraft Only.

This entry only applies to articles such as machinery, ~~or~~ apparatus or devices containing dangerous goods as a residue or as an integral element of the ~~machinery or apparatus~~ article. It must not be used for ~~machinery or apparatus~~ articles for which a proper shipping name exists in Table 4.2. For other than fuel system components, ~~machinery or apparatus~~ articles may only contain one or more of the following: dangerous goods permitted under 2.7.2 or magnetized material meeting the requirements of Packing Instruction 953 or gases of Division 2.2 without subsidiary hazard, but excluding refrigerated liquefied gases.

...

**Additional Packing Requirements**

- if the ~~machinery or apparatus article~~ contains more than one item of dangerous goods, the individual dangerous goods must be enclosed to prevent them reacting dangerously with one another during transport (see 5.0.2.6);
- receptacles containing dangerous goods must be so secured or cushioned as to prevent their breakage or leakage and so as to control their movement within the ~~machinery or apparatus article~~ during normal conditions of transport. Cushioning material must not react dangerously with the contents of the receptacles. Any leakage of the contents must not substantially impair the protective properties of the cushioning material;
- package orientation (“This Way Up”) labels (see 7.4.4 and 7.4.5) or pre-printed orientation labels meeting the same specifications must be affixed on at least two vertical sides with the arrows pointing in the correct direction only when required to ensure liquid dangerous goods remain in their intended orientation. Irrespective of 7.2.3.9.1, ~~machinery or apparatus articles~~ containing magnetized material meeting the requirements of Packing Instruction 953 must have both a “Miscellaneous” and a “Magnetized Material” label (see figure 7.4.A);
- for Division 2.2 gases, cylinders for gases, their contents and filling ratios, must conform to the requirements of Packing Instruction 200;
- dangerous goods in ~~articles machinery or apparatus~~ must be packed in strong outer packagings unless the receptacles containing the dangerous goods are afforded adequate protection by the construction of the ~~machinery or apparatus article~~.

...

COMBINATION PACKAGINGS	
UN number	Maximum net quantity of dangerous goods per package (excluding magnetized material)
UN 3363, <del>Dangerous goods in articles or Dangerous goods in apparatus or Dangerous goods in machinery</del>	Liquids: 0.5 L
	Solids: 1.0 kg
	Gases (Div. 2.2 only): 0.5 kg

...

## PACKING INSTRUCTION 965

### Introduction

This instruction applies to lithium ion or lithium polymer cells and batteries (UN 3480) on Cargo Aircraft Only.

...

### General Requirements

The following requirements apply to all lithium ion or lithium polymer cells and batteries:

- ~~cells and batteries identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons) cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport;~~
- waste batteries and batteries being shipped for recycling or disposal are forbidden from air transport unless approved by the appropriate national authority of the State of origin and the State of the operator;
- cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with electrically conductive materials within the same packaging that could lead to a short circuit.

...

## PACKING INSTRUCTION 966

### Introduction

This instruction applies to lithium ion or lithium polymer cells and batteries packed with equipment (UN 3481) on passenger and Cargo Aircraft Only.

...

### General Requirements

The following requirements apply to all lithium ion or lithium polymer cells and batteries:

- (a) ~~cells and batteries identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons)~~ cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport;
- (b) cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with electrically conductive materials within the same packaging that could lead to a short circuit.

...

---

## **PACKING INSTRUCTION 967**

### **Introduction**

This instruction applies to lithium ion or lithium polymer cells and batteries contained in equipment (UN 3481) on passenger and Cargo Aircraft Only.

...

### **General Requirements**

The following requirements apply to all lithium ion or lithium polymer cells and batteries:

- (a) ~~cells and batteries identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons)~~ Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport;
- (b) cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with electrically conductive materials within the same packaging that could lead to a short circuit.

...

---

## **PACKING INSTRUCTION 968**

### **Introduction**

This instruction applies to lithium metal or lithium alloy cells and batteries (UN 3090) on Cargo Aircraft Only.

...

### **General Requirements**

The following requirements apply to all lithium metal or lithium alloy cells and batteries:

- (a) ~~cells and batteries identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons)~~ Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport;
- (b) waste batteries and batteries being shipped for recycling or disposal are forbidden from air transport unless approved by the appropriate national authority of the State of origin and the State of the operator;
- (c) cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with electrically conductive materials within the same packaging that could lead to a short circuit.

...

---

## **PACKING INSTRUCTION 969**

### **Introduction**

This instruction applies to lithium metal or lithium alloy cells and batteries packed with equipment (UN 3091) on passenger and Cargo Aircraft Only.

...

### **General Requirements**

The following requirements apply to all lithium metal or lithium alloy cells and batteries:

- (a) ~~cells and batteries identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons). Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport;~~
- (b) cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with electrically conductive materials within the same packaging that could lead to a short circuit.

...

## **PACKING INSTRUCTION 970**

---

### **Introduction**

This instruction applies to lithium metal or lithium alloy cells and batteries packed contained in equipment (UN 3091) on passenger and Cargo Aircraft Only.

...

### **General Requirements**

The following requirements apply to all lithium metal or lithium alloy cells and batteries:

- (a) ~~cells and batteries identified by the manufacturer as being defective for safety reasons, or that have been damaged, that have the potential of producing a dangerous evolution of heat, fire or short circuit are forbidden for transport (e.g. those being returned to the manufacturer for safety reasons). Cells or batteries identified as being damaged or defective in accordance with Special Provision A154 are forbidden for transport;~~
- (b) cells and batteries must be protected so as to prevent short circuits. This includes protection against contact with electrically conductive materials within the same packaging that could lead to a short circuit.

...

## **PACKING INSTRUCTION 972**

---

This instruction applies to UN 3530 Engine, internal combustion and Machinery, internal combustion on passenger aircraft and Cargo Aircraft Only (see PI 220 for flammable gas powered engines and machinery, PI 378 for flammable liquid powered engines and machinery, PI 950 for flammable liquid powered vehicles, PI 951 for flammable gas powered vehicles and PI 952 for battery-powered equipment and vehicles).

...

- (b) fuel tanks. Except as otherwise provided for in this packing instruction, fuel tanks must be drained of fuel and tank caps fitted securely. Special precautions are necessary to ensure complete drainage of the fuel system of machines or equipment incorporating internal combustion engines, such as lawn mowers, outboard motors, etc., where such machines or equipment could possibly be handled in other than an upright position. When it is not possible to handle in other than an upright position, machinery must be drained of fuel as far as practicable, and if any fuel remains it must not exceed one-quarter of the tank capacity;

...

## **SECTION I.6—PACKAGING SPECIFICATIONS AND PERFORMANCE TESTS**

...

### **I.6.0 General Provisions**

...

#### **I.6.0.4 Marking of UN Specification Packagings**

...

##### **I.6.0.4.1 Applicability**

Except for some packagings intended for gases of Class 2, radioactive materials of Class 7 and some packagings used for Class 9 items, all single packagings and all outer packagings of combination packages and of composite packages which have been manufactured and tested in accordance with the UN specifications and tests must bear marks which are durable, legible and placed in a location and of such size relative to the package as to be readily visible. For packages with a gross weight exceeding 30 kg the marks, or a duplicate thereof, must appear on the top or on the side of the package. Letters, numbers and symbols must be at least 12 mm high, except for packages of 30 L capacity or less or of 30 kg ~~capacity or less~~ maximum net weight, when they must be at least 6 mm in height. For packages of 5 L capacity or less or of 5 kg ~~maximum net weight~~ less the letters, numbers and symbols must be of an appropriate size.

**Note:**

*Handwritten specification marks are not acceptable. Marks which are not printed or embossed directly on to packaging may be open to additional airline scrutiny so as to ensure the validity of the marks. In such cases and to prevent shipment delays, shippers are encouraged to provide contact details with the shipment so that the validity of the mark can be confirmed.*

#### **I.6.0.4.2 Format of Marks**

**I.6.0.4.2.1** The marks must consist of:

(a) the United Nations packaging symbol as shown in Figure 6.0.A:

**FIGURE 6.0.A**  
**UN Packaging Symbol**

This symbol must not be used for any purpose other than certifying that a packaging complies with the relevant requirements in Section 6. For embossed metal packagings the capital letters “UN” may be applied as the symbol;

(b) the code number designating the type of packagings according to 6.0.3;

(c) the letter X, Y, or Z, designating the packing group(s) for which the design type has been successfully tested:

- X for Packing Group I (these packagings may be used for Packing Group I, II and III articles and substances); or
- Y for Packing Group II (these packagings may be used for Packing Group II and III articles and substances); or
- Z for Packing Group III (these packagings may be used for Packing Group III articles and substances only);

(d) followed by:

- for single packagings intended to contain liquids, a number indicating the relative density, rounded off to the first decimal, for which the design type has been tested; this may be omitted when the relative density does not exceed 1.2; or
- for packagings intended to contain solids or inner packagings, a number corresponding to the maximum gross weight, in kilograms, at which the design type has been tested;

(e) followed by:

- for single packagings intended to contain liquids, the hydraulic test pressure which the packaging was shown to withstand, in kPa rounded down to the nearest 10 kPa; or
- for packagings intended to contain solids or inner packagings, the letter “S”;

(f) followed by the last two digits of the year during which the packaging was manufactured. Packagings of types 1H1, 1H2, 3H1 and 3H2 must also be appropriately marked with the month of manufacture; this may be marked on the packaging in a different place from the remainder of the mark. An appropriate method is shown in Figure 6.0.B:

**FIGURE 6.0.B**  
**Example of Indicating the Month of Manufacture**

\* the last two digits of the year of manufacture may be displayed at that place. In such case and when the clock is placed adjacent to the UN design type mark, the two-digits indication of the year in the type approval mark and in the inner circle of mark may be waived. However, when the clock is not placed adjacent to the UN design type mark, the two digits of the year in the mark and in the clock must be identical.

**Note:**

*Other methods that provide the minimum required information in a durable, visible and legible form are also acceptable.*

- (g) followed by the State authorizing the allocation of the mark, indicated by the international Vehicle Registration Code (VRI Code) as indicated in Appendix D.1 and D.2;
- (h) followed by the name of the manufacturer or other identification of the packaging specified by the appropriate national authority.

...

### **I.6.0.7 Marks on Packagings Tested to More than One Design Type**

Where a packaging conforms to one or more than one tested packaging design type, the packaging may bear more than one mark to indicate the relevant performance test requirements that have been met. Where more than one mark appears on a packaging, the marks must appear in close proximity to one another and each mark must appear in its entirety.

...

## **I.6.1 Requirements for Inner Packaging**

...

### **6.1.7 IP7 and IP7A—Receptacles (Aerosols)**

...

#### **6.1.7.2 Construction**

The receptacles may be seamless or with seams welded, soldered, brazed, double-seamed or swaged. The ends must be of pressure design. Maximum capacity must not exceed ~~820 mL~~ 1 L and the maximum inner diameter must not exceed 76 mm.

...

## **I.6.2 Specifications for UN Outer, Single and Composite Packagings**

...

### **I.6.2.2 Aluminium Drums**

...

**I.6.2.2.6** Closure devices for removable head drums must be so designed and applied that they will remain secure and drums will remain leak-proof under normal conditions of transport. Gaskets or other sealing elements must be used with all removable heads.

**I.6.2.2.7** If materials used for body, heads, closures and fittings are not in themselves compatible with the contents to be transported, suitable internal protective coatings or treatments must be applied. These coatings or treatments must retain their protective properties under normal conditions of transport.

**I.6.2.2.76.2.2.8** Maximum capacity of drum: 450 L.

**I.6.2.2.86.2.2.9** Maximum net weight: 400 kg.

...

### **6.2.7 Metal Drums (Other than Aluminium or Steel)**

...

**I.6.2.7.6** Closure devices for removable head drums must be so designed and applied that they will remain secure and drums will remain leakproof under normal conditions of transport. Gaskets or other sealing elements must be used with all removable heads.

[I.6.2.7.7](#) If materials used for body, heads, closures and fittings are not in themselves compatible with the contents to be transported, suitable internal protective coatings or treatments must be applied. These coatings or treatments must retain their protective properties under normal conditions of transport.

[6.2.7.76.2.7.8](#) Maximum capacity of drum: 450 L.

[6.2.7.86.2.7.9](#) Maximum net weight: 400 kg.

...

#### I.6.4.2 Requirements for UN Cylinders and Closed Cryogenic Receptacles

...

##### I.6.4.2.1 Design, Construction and Initial Inspection and Test

I.6.4.2.1.1 The following standards apply for the design, construction, and initial inspection and test of UN cylinders, except that inspection requirements related to the conformity assessment system and approval must be in accordance with 6.4.2.5:

Reference	Title	Applicable for manufacture
...	...	...
ISO 11119-3:2002	Gas cylinders of composite construction—Specification and test methods—Part 3: Fully wrapped fibre reinforced composite gas cylinders with non-load-sharing metallic or non-metallic liners. <b>Note:</b> <a href="#">This standard must not be used for the linerless cylinders manufactured from two parts joined together.</a>	Until 31 December 2020
ISO 11119-3:2013	Gas cylinders—Refillable composite gas cylinders and tubes—Design, construction and testing—Part 3: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 L with non-load-sharing metallic or non-metallic liners <b>Note:</b> <a href="#">This standard must not be used for the linerless cylinders manufactured from two parts joined together.</a>	Until further notice
<a href="#">ISO 11119-4:2016</a>	<a href="#">Gas cylinders – Refillable composite gas cylinders – Design, construction and testing – Part 4: Fully wrapped fibre reinforced composite gas cylinders up to 150 L with load-sharing welded metallic liners</a>	<a href="#">Until further notice</a>

...

6.4.2.1.2 The following standards apply for the design, construction and initial inspection and test of UN acetylene cylinders, except that inspection requirements related to the conformity assessment system and approval must be in accordance with 6.4.2.5.

**Note:**

*The maximum of 1,000 L volume as mentioned in the ISO standard ISO 21029-1:2004 Cryogenic vessels, does not apply for refrigerated liquefied gases in closed cryogenic receptacles installed in apparatus (e.g. MRI or cooling machines).*

For the cylinder shell:

Reference	Title	Applicable for manufacture
...	...	...
ISO 9809-3:2010	Gas cylinders—Refillable seamless steel gas cylinders—Design, construction and testing—Part 3: Normalized steel cylinders	Until further notice

<a href="#">ISO 4706:2008</a>	<a href="#">Gas cylinders – Refillable welded steel cylinders – Test pressure 60 bar and below</a>	<a href="#">Until further notice</a>
<a href="#">ISO 7866:2012 + Cor 1:2014</a>	<a href="#">Gas cylinders – Refillable seamless aluminium alloy gas cylinders – Design, construction and testing</a> <b>Note:</b> <a href="#">Aluminum alloy 6351A or equivalent must not be used</a>	<a href="#">Until further notice</a>

For [the acetylene cylinder, including](#) the porous mass in the cylinder:

Reference	Title	Applicable for manufacture
ISO 3807-1:2000	Cylinders for acetylene—Basic requirements—Part 1: Cylinders without fusible plugs.	Until 31 December 2020
ISO 3807-2:2000	Cylinders for acetylene—Basic requirements—Part 2: Cylinders with fusible plugs.	Until 31 December 2020
ISO 3807:2013	Gas cylinders—Acetylene cylinders—Basic requirements and type testing	Until further notice

...

#### I.6.4.2.2 Materials

In addition to the material requirements specified in the cylinder and closed cryogenic receptacle design and construction standards and any restrictions specified in the applicable Packing Instruction for the gas(es) to be transported (e.g. Packing Instruction 200 Packing Instruction 202 or Packing Instruction 214), the following standards apply to material compatibility:

Reference	Title	Applicable for manufacture
ISO 11114-1:2012 <a href="#">± A1:2017</a>	Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 1: Metallic materials.	Until further notice
ISO 11114-2:2013	Gas cylinders—Compatibility of cylinder and valve materials with gas contents—Part 2: Non-metallic materials.	Until further notice

#### I.6.4.2.3 Service Equipment

I.6.4.2.3.1 The following standards apply to closures and their protection:

Reference	Title	Applicable for manufacture
...		
ISO 10297:2014	Gas cylinders—Cylinder valves—Specification and type testing	<del>Until further notice</del> <a href="#">Until 31 December 2022</a>
<a href="#">ISO 10297:2014 + A1:2017</a>	<a href="#">Gas cylinders – Cylinder valves – Specification and type testing;</a>	<a href="#">Until further notice</a>
ISO 13340:2001	Transportable gas cylinders—Cylinder valves for non-refillable cylinders—Specification and prototype testing.	Until 31 December 2020
ISO 14246:2014	Gas cylinders—Cylinder valves—Manufacturing tests and examination	<a href="#">Until further notice</a> <a href="#">Until 31 December 2024</a>
<a href="#">ISO 14246:2014 +</a>	<a href="#">Gas cylinders – Cylinder valves – Manufacturing tests and examinations</a>	<a href="#">Until further notice</a>



<a href="#">A1:2017</a>		
ISO 17871:2015	Gas cylinders—Quick release cylinder valves—Specification and type testing	Until further notice
<a href="#">ISO 17879:2017</a>	<a href="#">Gas cylinders – Self-closing cylinder valves – Specification and type testing</a> <b>Note:</b> <i><a href="#">This standard must not be applied to self-closing valves in acetylene cylinders.</a></i>	<a href="#">Until further notice</a>

...

#### I.6.4.2.4 Periodic Inspection and Test

I.6.4.2.4.1 The following standards apply to the periodic inspection and testing of UN cylinders and their closures:

Reference	Title	Applicable for manufacture
...		
ISO 10462:2005	<del>Transportable cylinders for dissolved acetylene—Periodic inspection and maintenance</del>	<del>Until 31 December 2018</del>
...		
ISO 22434:2006	Transportable gas cylinders—Inspection and maintenance of cylinder valves. <b>Note:</b> <i>These requirements may be met at times other than at the periodic inspection and test of UN cylinders</i>	Until further notice
<a href="#">ISO 20475:2018</a>	<a href="#">Gas cylinders – Cylinder bundles – Periodic inspection and testing</a>	<a href="#">Until further notice</a>

...

#### I.6.4.2.7 Marking of Refillable UN Cylinders and Closed Cryogenic Receptacles

...

##### I.6.4.2.7.2 Format of Marks

Certification Marks, the following certification marks must be applied:

- the United Nations packaging symbol as shown in Figure 6.0.A. This symbol must not be used for any purpose other than certifying that a packaging complies with the relevant requirements in Section 6;
- the technical standard (e.g. ISO 9809-1) used for design, construction and testing;
- the character(s) identifying the country of approval as indicated by the international Vehicle Registration Code (VRI Code) as indicated in Appendix D.1 and D.2;

**Note:**

*[For the purpose of this mark the country of approval means the country of the competent authority that authorised the initial inspection and test of the individual receptacle at the time of manufacture.](#)*

- the identity mark or stamp of the inspection body that is registered with the appropriate national authority of the country authorizing the marking;
- the date of the initial inspection, the year (four digits) followed by the month (two digits) separated by a slash (i.e. “/”).

...

#### 6.4.2.9 Marking of UN Metal Hydride Storage Systems

...

##### 6.4.2.9.2 Format of Marking

6.4.2.9.2.1 The following marks must be applied:

Certification Marks, the following certification marks must be applied:

- (a) the United Nations packaging symbol as shown in Figure 6.0.A. This symbol must not be used for any purpose other than certifying that a packaging complies with the relevant requirements in Section 6;
- (b) "ISO 16111"; (the technical standard used for design, manufacture and testing);
- (c) the character(s) identifying the country of approval as indicated by the international Vehicle Registration Code (VRI Code) as indicated in Appendix D.1 and D.2;

**Note:**

For the purpose of this mark the country of approval means the country of the competent authority that authorised the initial inspection and test of the individual receptacle at the time of manufacture.

- (d) the identity mark or stamp of the inspection body that is registered with the appropriate national authority of the country authorizing the marking;
- (e) the date of the initial inspection, the year (four digits) followed by the month (two digits) separated by a slash (i.e. "7").

...

## 6.5 Packagings for Infectious Substances of Category A [\(UN 2814 and UN 2900\)](#)

### 6.5.0 General

The requirements of this subsection apply to packagings intended for the transport of infectious substances of Category A, [UN 2814 and UN 2900](#).

...

### 6.5.3.1 Marking on Packagings for Infectious Substances

6.5.3.1.1 Each packaging intended for use according to these Regulations must bear marks which are durable, legible and placed in a location and of such size relative to the package as to be readily visible. For packages with a gross weight exceeding 30 kg the marks, or a duplicate thereof, must appear on the top or on the side of the package. Letters, numbers and symbols must be at least 12 mm high, except for packages of 30 L [capacity or less](#) or 30 kg ~~capacity or less~~ [maximum net weight](#), when they must be at least 6 mm in height. For packages of 5 L [capacity or less](#) or 5 kg ~~maximum net weight or less~~ the letters, numbers and symbols must be of an appropriate size.

...

### 6.5.4.3 Tests and Number of Samples Required

TABLE 6.5.B

#### Tests Required for Packaging Types (6.5.4.3)

...

**Notes:**

~~1. In the above table, "fibreboard" refers to fibreboard or similar materials whose performance may be rapidly affected by moisture; "plastic" refers to plastic, which may embrittle at low temperature; and "other" refers to other materials such as metal whose performance is not significantly affected by moisture or temperature.~~

~~21. Where a primary receptacle is made of two or more different materials, the material most liable to damage determines the appropriate test.~~

~~32. The material of the secondary packagings is not taken into consideration when selecting the test or conditioning for the test.~~

[6.5.4.3.1](#) If the packaging to be tested consists of a fibreboard outer box with a plastic primary receptacle, five samples must undergo the water spray test (see 6.5.4.4.6) prior to dropping and another five must be conditioned to -18°C (see 6.5.4.4.7) prior to dropping. If the packaging is to contain dry ice then one further single sample ~~shall~~ [must](#) be dropped ~~five times after conditioning~~ in accordance with 6.5.4.4.8.

[6.5.4.3.2](#) Packagings prepared as for transport must be subjected to the tests in 6.5.4.4 and 6.5.5.5. In Table [6.5.B](#), In Table 6.5.B ~~"fibreboard" refers to fibreboard or similar materials whose performance may be rapidly affected by moisture; "plastic" refers to plastic, which may embrittle at low temperature; and "other" refers to other materials such as metal whose performance is not significantly affected by moisture or temperature.~~

...

#### 6.5.4.4 Drop Test

...

**6.5.4.4.8 Packagings intended to contain dry ice—additional drop test.** Where the packaging is intended to contain Carbon dioxide, solid (dry ice), a test additional to those required by 6.5.4.4.1 and when appropriate, in 6.5.4.4.6 or 6.5.4.4.7 must be carried out. One sample must be stored so that all the Carbon dioxide, solid (dry ice) dissipates and then that sample must be dropped in one of the orientations described in 6.5.4.4.2 [or 6.5.4.4.3, as appropriate](#), which must be that most likely to result in failure of the packaging.

...

### SECTION I.7—MARKING AND LABELLING

...

#### I.7.1 Marking

...

##### I.7.1.4 Packaging Use Marks (Packages and Salvage Packagings)

...

##### 7.1.4.2 Limited Quantities

...

7.1.4.2.2 The mark must be in the form of a square set at an angle of 45° (diamond shaped). The top and bottom portions and the surrounding line must be black. The centre area must be white or a suitable contrasting background. The minimum dimension must be 100 mm × 100 mm and the minimum width of line forming the diamond must be 2 mm. The symbol “Y” must be placed in the centre of the mark and must be clearly visible. Where dimensions are not specified, all features must be in approximate proportion to those shown.

7.1.4.2.3 If the size of the package so requires, the minimum outer dimensions shown in Figure 7.1.A may be reduced to be not less than 50 mm × 50 mm provided the mark remains clearly visible. The minimum width of the line forming the diamond may be reduced to a minimum of 1 mm. The symbol “Y” must remain in approximate proportion to that shown in Figure 7.1.A.

[7.1.4.2.4 The entire mark must appear on one side of the package.](#)

...

##### I.7.1.4.4 Size

**I.7.1.4.4.1** The UN/ID number mark and the letters “UN” or “ID” as specified in 7.1.4.1(a) must be at least 12 mm high, except for packagings of 30 L capacity or less or of 30 kg maximum net weight ~~or less~~ and for cylinders of 60 L water capacity [or less](#), when they must be at least 6 mm in height and for packagings of 5 L [capacity or less](#) or [of 5 kg maximum net weight](#) or less when they must be of an appropriate size.

**I.7.1.4.4.2** Except as otherwise specified, package and overpack use marks should be at least 12 mm high, except for packages of 30 L or 30 kg capacity or less when they should have a minimum height of 6 mm.

...

##### I.7.1.5 Additional Marks

...

##### I.7.1.5.5 Lithium Batteries

...

**I.7.1.5.5.3** The mark must be in the form of a rectangle [or square](#) with hatched edging. The symbol (group of batteries, one damaged and emitting flame, above the UN number for lithium ion or lithium metal batteries or cells) must be black on white or suitable contrasting background. The hatching must be red. The mark must be a minimum dimension of ~~420~~[100](#) mm wide × ~~110~~[100](#) mm high and the minimum width of the hatching must be 5 mm. If the size of the package so requires, the dimensions/[line thickness](#) may be reduced to not less than ~~405~~[100](#) mm wide × ~~74~~[70](#) mm high. Where dimensions are not specified, all features must be in approximate proportion to those shown on the full-size mark (Figure 7.1.C).

...

**FIGURE 7.1.C**  
**Lithium Battery Mark (7.1.5.5)**

...

**SECTION I.9—HANDLING**

...

**I.9.6 Reporting**

...

**I.9.6.4 Reporting of Dangerous Goods Occurrences**

An operator must report to the appropriate ~~authorities~~ authority of the State of the operator ~~and the State of origin~~ any occasion when:

- (a) dangerous goods are discovered to have been carried when not loaded, segregated, separated and secured in accordance with 9.2 or 9.3; or
  - (b) dangerous goods are discovered to have been carried without information having been provided to the Pilot-in-Command in accordance with 9.5.1.1.
- ...

**SECTION I.10—RADIOACTIVE MATERIAL**

**I.10.0 Transport of Radioactive Material**

**I.10.0.1 Scope and Application**

**I.10.0.1.1 Scope**

These Regulations establish standards of safety which provide an acceptable level of control of the radiation, criticality and thermal hazards to ~~persons~~ people, 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, (~~2012–2018~~ Edition), IAEA Safety Standards Series No. SSR-6 (Rev. 1), IAEA, Vienna (~~2012~~2018). Explanatory material can be found in Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (~~2012–2018~~ Edition), IAEA Safety Standard Series No. SSG-26 (Rev. 1), IAEA, Vienna (~~2014~~2019). The prime responsibility for safety must rest with the person or organization responsible for facilities and activities that give rise to radiation risk.

**I.10.0.1.2 Objective**

**I.10.0.1.2.1** The objective of these Regulations is to establish requirements that must be satisfied to ensure safety and to protect ~~persons~~ people, property and the environment from ~~the harmful~~ effects of ionizing radiation ~~in~~ during the transport of radioactive material by air. This protection is achieved by requiring:

- containment of the radioactive contents;
- control of external ~~radiation levels~~ dose rate [**Ed Note:** Add GlossRef to new entry];
- prevention of criticality; and
- prevention of damage by heat.

**I.10.0.1.2.2** These requirements are satisfied by:

- (a) applying a graded approach to the limits of the contents for packages and aircraft and to the performance standards, which are applied to package designs depending upon the hazard of the radioactive contents;
- (b) imposing conditions on the design and operation of packages and on the maintenance of the packagings, including consideration of the nature of the radioactive contents; ~~and~~
- (c) requiring administrative controls including, where appropriate, approval by competent authorities; ~~and~~
- (d) making arrangements for planning and preparing emergency response to protect people, property and the environment.

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#### **I.10.0.1.5 Specific Provisions for Excepted Packages**

**I.10.0.1.5.1** Except when the radioactive material possesses other hazardous properties and ~~has to~~must be classified in a class other than Class 7 in accordance with Special Provision A130 or A194, where the provisions of (a) and (b) apply only as relevant, excepted packages which contain radioactive material as specified in 10.3.11.1 are subject to:

- (a) the applicable provisions specified in 10.5.8;
- (b) the requirements for excepted packages specified in 10.6.2.1.

**I.10.0.1.5.2** When the radioactive material possesses other hazardous properties and ~~has to~~must be classified in a class other than Class 7 in accordance with Special Provision A130 or A194:

- (a) the provisions of 10.0.1.5.1 (a) and (b) apply only as relevant; and
- (b) the provisions of these Regulations relating to the main class or division must also be applied.

**I.10.0.1.5.3** Excepted packages are subject to the relevant provisions of all other parts of these Regulations. ~~If the excepted package contains fissile material, one of the fissile exceptions provided by 10.3.7.2 must be applicable and the requirements of 10.9.3.5.3 must be met.~~

#### **I.10.0.2 Radiation Protection Programme**

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**I.10.0.2.4** For occupational exposures arising from transport activities:

- (a) where it is assessed that the effective dose is either:
  - 1. likely to be between 1 and 6 mSv in a year, a dose assessment programme via work place monitoring or individual monitoring must be conducted; or
  - 2. likely to exceed 6 mSv in a year, individual monitoring must be conducted.
- (b) appropriate records must be kept when ~~individual or~~ work place or individual monitoring is conducted.

#### **Note:**

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

**I.10.0.2.5** In the event of ~~accidents or incidents~~ a nuclear or radiological emergency during the transport of radioactive material, emergency provisions, as established by relevant national and/or international organizations, must 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). This includes arrangements for preparedness and response established in accordance with the national and/or international requirements and in a consistent and coordinated manner with the national and/or international emergency arrangements.~~

**I.10.0.2.6** ~~Emergency procedures must take into account.~~ The arrangements for preparedness and response must be based on the graded approach and take into consideration the identified hazards and their potential consequences, including 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 a nuclear or radiological emergency. Guidance for the establishment of such arrangements is contained in "Preparedness and Response for a Nuclear or Radiological Emergency", IAEA Safety Standards Series No. GSR Part 7, IAEA, Vienna (2015); "Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency", IAEA Safety Standards Series No. GSG-2, IAEA, Vienna (2011); "Arrangements for Preparedness for a Nuclear or Radiological Emergency", IAEA Safety Standards Series No. GS-G-2.1, IAEA, Vienna (2007), and "Arrangements for the Termination of a Nuclear or Radiological Emergency", IAEA Safety Standards Series No. GSG-11, IAEA, Vienna (2018).

**I.10.0.2.7** Personnel must be appropriately trained in the radiation hazards involved including the precautions to be observed in order to restrict their occupational exposure and the exposure of other persons who might be affected by their actions.

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#### **I.10.0.4 Shipment Approval By Special Arrangement**

**I.10.0.4.1** Special arrangements means those provisions, approved by the competent authority, under which consignments of radioactive material, which do not satisfy all the applicable requirements of these Regulations may be transported.

**I.10.0.4.2** Consignments for which conformity with any provision applicable to radioactive material is impracticable must not be transported except under special arrangement. Provided the competent authority is satisfied that conformity with the radioactive material provisions of these Regulations is impractical and that the requisite standards of safety established by these Regulations have been demonstrated through ~~alternative means means alternative to the other provisions of these Regulations~~ the competent authority may approve special arrangement transport operations for a single or planned series of multiple consignments. The overall level of safety in transport must be at least equivalent to that which would be provided if all the applicable requirements in these Regulations had been met. Each consignment shipped under special arrangement requires multi-lateral approval.

...

### **I.10.0.6 Non-compliance**

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

- (a) the shipper, consignee, operator and any organization involved during transport, who may be affected, as appropriate, must be informed of the non-compliance:
1. by the operator if the non-compliance is identified during transport;
  2. by the consignee if the non-compliance is identified at receipt;
- (b) the ~~operator~~, shipper, operator or consignee, as appropriate must:
1. take immediate steps to mitigate the consequence of the non-compliance;
  2. investigate the non-compliance and its causes, circumstances and consequences;
  3. take appropriate action to remedy the causes and circumstances that led to the non-compliance and to prevent a recurrence of the causes and similar circumstances similar to those that led to the non-compliance;
  4. communicate to the relevant competent authority(ies) the causes of the non-compliance and on the corrective or preventative actions taken or to be taken; and
- (c) the communication of the non-compliance to the shipper and relevant competent authority(ies), respectively, must be made as soon as possible and it must be immediate whenever an emergency exposure situation has developed or is developing.

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### **I.10.3 Classification**

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#### **I.10.3.2 Determining Activity**

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##### **I.10.3.2.2 Unlisted Single Radionuclides**

For individual radionuclides:

- (a) whose identities are known, but which are not listed in Table 10.3.A, the determination of the basic radionuclide values referred to in 10.3.2.1 must have multilateral approval. For these radionuclides, activity concentration limits for exempt material and activity limits for exempt consignments must be calculated in accordance with the principles established in the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, Safety Series No.115, IAEA, Vienna (1996) "Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards", IAEA Safety Standards Series No. GSR Part 3, IAEA, Vienna (2014). Where the chemical form of each radionuclide is known, it is permissible to use the  $A_2$  value calculated using a dose coefficient for the appropriate lung absorption type, as recommended by the International Commission on Radiological Protection, if the chemical forms of each radionuclide under both normal and accident conditions of transport are taken into consideration. Alternatively, the values of  $A_1$  and  $A_2$  in Table 10.3.B may be used without obtaining such approval;

(b) in instruments or articles in which the radioactive material is enclosed or is included as a component part of the instrument or other manufactured article and which meet 10.3.11.1.3(c), alternative basic radionuclide values to those in Table 10.3.A for the activity limit for an exempt consignment are permitted and require multilateral approval. Such alternative activity limits for an exempt consignment must be calculated in accordance with the principles set out in [the International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, Safety Series No.115, IAEA, Vienna \(1996\) GSR Part 3](#).

### I.10.3.2.3 Determining A<sub>1</sub> and A<sub>2</sub>

In the calculations of A<sub>1</sub> and A<sub>2</sub> for a radionuclide not in Table 10.3.A, a single radioactive decay chain, in which the radionuclides are present in their naturally occurring proportions and in which no [daughter-progeny](#) nuclide has a half-life either longer than 10 days or longer than that of the parent nuclide, must be considered as a single radionuclide and the activity to be taken into account and the A<sub>1</sub> or A<sub>2</sub> value to be applied, must be that corresponding to the parent nuclide of that chain. In the case of radioactive decay chains in which any [daughter-progeny](#) nuclide has a half-life either longer than 10 days or greater than that of the parent nuclide, the parent and such [daughter-progeny](#) nuclides must be considered as mixtures of different nuclides.

**TABLE I.10.3.A**  
**A<sub>1</sub> and A<sub>2</sub> Values for Common Radionuclides (10.3.2.1)**

Radionuclide	Element (Atomic No.)	A <sub>1</sub> (Special Form) (TBq)	A <sub>2</sub> (Other Form) (TBq)	Activity concentration limit for exempt material (Bq/g)	Activity limit for and exempt consignment (Bq)
...					
Ba-131 <sup>a</sup>	Barium (56)	2	2	1 x 10 <sup>2</sup>	1 x 10 <sup>6</sup>
Ba-133		2	3	1 x 10 <sup>2</sup>	1 x 10 <sup>6</sup>
Ba-133m		20	0.6	1 x 10 <sup>2</sup>	1 x 10 <sup>6</sup>
<a href="#">Ba-135m</a>		<a href="#">20</a>	<a href="#">0.6</a>	<a href="#">1 x 10<sup>2</sup></a>	<a href="#">1 x 10<sup>6</sup></a>
Ba-140 <sup>a</sup>		0.5	0.3	1 x 10 <sup>1b</sup>	1 x 10 <sup>5b</sup>
...					
Ge-68 <sup>a</sup>	Germanium (32)	0.5	0.5	1 x 10 <sup>1</sup>	1 x 10 <sup>5</sup>
<a href="#">Ge-69</a>		<a href="#">1</a>	<a href="#">1</a>	<a href="#">1 x 10<sup>1</sup></a>	<a href="#">1 x 10<sup>6</sup></a>
Ge-71		40	40	1 x 10 <sup>4</sup>	1 x 10 <sup>8</sup>
Ge-77		0.3	0.3	1 x 10 <sup>1</sup>	1 x 10 <sup>5</sup>
...					
Ir-189 <sup>a</sup>	Iridium (77)	10	10	1 x 10 <sup>2</sup>	1 x 10 <sup>7</sup>
Ir-190		0.7	0.7	1 x 10 <sup>1</sup>	1 x 10 <sup>6</sup>
Ir-192		1 <sup>c</sup>	0.6	1 x 10 <sup>1</sup>	1 x 10 <sup>4</sup>
<a href="#">Ir-193m</a>		<a href="#">40</a>	<a href="#">4</a>	<a href="#">1 x 10<sup>4</sup></a>	<a href="#">1 x 10<sup>7</sup></a>
Ir-194		0.3	0.3	1 x 10 <sup>2</sup>	1 x 10 <sup>5</sup>
...					
<a href="#">Ni-57</a>	<a href="#">Nickel (28)</a>	<a href="#">0.6</a>	<a href="#">0.6</a>	<a href="#">1 x 10<sup>1</sup></a>	<a href="#">1 x 10<sup>6</sup></a>
Ni-59	<a href="#">Nickel (28)</a>	unlimited	unlimited	1 x 10 <sup>4</sup>	1 x 10 <sup>9</sup>
Ni-63		40	30	1 x 10 <sup>5</sup>	1 x 10 <sup>8</sup>
Ni-65		0.4	0.4	1 x 10 <sup>1</sup>	1 x 10 <sup>6</sup>
...					
Sr-82 <sup>a</sup>	Strontium (38)	0.2	0.2	1 x 10 <sup>1</sup>	1 x 10 <sup>5</sup>
<a href="#">Sr-83</a>		<a href="#">1</a>	<a href="#">1</a>	<a href="#">1 x 10<sup>1</sup></a>	<a href="#">1 x 10<sup>6</sup></a>
...					
<a href="#">Tb-149</a>	<a href="#">Terbium (65)</a>	<a href="#">0.8</a>	<a href="#">0.8</a>	<a href="#">1 x 10<sup>1</sup></a>	<a href="#">1 x 10<sup>6</sup></a>
Tb-157	<a href="#">Terbium (65)</a>	40	40	1 x 10 <sup>4</sup>	1 x 10 <sup>7</sup>
Tb-158		1	1	1 x 10 <sup>1</sup>	1 x 10 <sup>6</sup>
Tb-160		1	0.6	1 x 10 <sup>1</sup>	1 x 10 <sup>6</sup>
<a href="#">Tb-161</a>		<a href="#">30</a>	<a href="#">0.7</a>	<a href="#">1 x 10<sup>3</sup></a>	<a href="#">1 x 10<sup>6</sup></a>
...					

(b): Parent nuclides and their progeny included in secular equilibrium are listed in the following [\(the activity to be taken into account is that of the parent nuclide only\)](#):

Sr-90—Y-90

Zr-93—Nb-93m  
 Zr-97—Nb-97  
 Ru-106—Rh-106  
 Ag-108m—Ag-108  
 Cs-137—Ba-137m  
 Ce-144—Pr-144  
 Ba-140—La-140  
 Bi-212—Tl-208 (0.36), Po-212 (0.64)  
 Pb-210—Bi-210, Po-210  
 Pb-212—Bi-212, Tl-208 (0.36), Po-212 (0.64)  
 Rn-222—Po-218, Pb-214, Bi-214, Po-214  
 Ra-223—Rn-219, Po-215, Pb-211, Bi-211, Tl-207  
 Ra-224—Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)  
 Ra-226—Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210  
 Ra-228—Ac-228  
 Th-228—Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)  
 Th-229—Ra-225, Ac-225, Fr-221, At-217, Bi-213, Po-213, Pb-209  
 Th-nat★—Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)  
 Th-234—Pa-234m  
 U-230—Th-226, Ra-222, Rn-218, Po-214  
 U-232—Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64)  
 U-235—Th-231  
 U-238—Th-234, Pa-234m  
 U-nat★—Th-234, Pa-234m, U-234, Th-230, Ra-226, Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210  
 Np-237—Pa-233  
 Am-242m—Am-242  
 Am-243—Np-239

★ [In the case of Th-natural, the parent nuclide is Th-232, in the case of U-natural, the parent nuclide is U-238.](#)

(c): The quantity may be determined from a measurement of the rate of decay or a measurement of the [radiation level/dose rate](#) at a prescribed distance from the source.

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#### I.10.3.4 Special Form

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##### I.10.3.4.3 Tests

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###### I.10.3.4.3.2 Percussion Test

The specimen must be placed on a sheet of lead, which is supported by a smooth solid surface and struck by the flat face of a mild steel bar so as to cause an impact equivalent to that resulting from a free drop of 1.4 kg [through from a height of](#) 1 m. The lower part of the bar must be 25 mm in diameter with the edges rounded off to a radius of 3 mm ± 0.3 mm. The lead, of hardness number 3.5 to 4.5 on the Vickers scale and not more than 25 mm thick, must cover an area greater than that covered by the specimen. A fresh surface of lead must be used for each impact. The bar must strike the specimen so as to cause maximum damage.

###### I.10.3.4.3.3 Bending Test

The test need apply only to long, slender sources with both a minimum length of 10 cm and a length to minimum width ratio of not less than 10. The specimen must be rigidly clamped in a horizontal position so that one half of its length protrudes from the face of the clamp. The orientation of the specimen must be such that the specimen will suffer maximum damage when its free end is struck by the flat face of a steel bar. The bar must strike the specimen so as to produce an impact equivalent to that resulting from a free vertical drop of 1.4 kg [from a height of/through](#) 1 m. The flat face of the bar must be 25 mm in diameter with the edges rounded off to a radius of 3 mm ± 0.3 mm.

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###### I.10.3.4.4 Leaching and Volumetric Leakage Assessment Methods



#### I.10.3.4.4.1 Indispersible Solid Material

For specimens, which comprise or simulate indispersible solid material, a leaching assessment must be performed as follows:

- (a) the specimen must be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test must be sufficient to ensure that at the end of the 7-day test period the free volume of the unabsorbed and unreacted water remaining must be at least 10% of the volume of the solid test sample itself. The water must have an initial pH of 6 to 8 and a maximum conductivity of 1 mS/m at 20°C;
- (b) the water ~~with-and~~ specimen must then be heated to a temperature of 50°C ± 5°C and maintained at this temperature for 4 hours;
- (c) the activity of the water must then be determined;
- (d) the specimen must then be stored for at least 7 days in still air at not less than 30°C and relative humidity not less than 90%;
- (e) the specimen must then be immersed in water of the same specification as shown in 10.3.4.4.1(a) and the water ~~with-and~~ the specimen heated to 50°C ± 5°C and maintained at this temperature for 4 hours;
- (f) the activity of the water must then be determined.

#### 10.3.4.4.2 Encapsulated Material

For specimens, which comprise or simulate radioactive material enclosed in a sealed capsule, either a leaching assessment or a volumetric leakage assessment must be performed as follows:

- (a) The leaching assessment must consist of the following steps:
  1. the specimen must be immersed in water at ambient temperature. The water must have an initial pH of 6 to 8 with a maximum conductivity of 1 mS/m at 20°C;
  2. the water and specimen must then be heated to a temperature of 50°C ± 5°C and maintained at this temperature for 4 hours;
  3. the activity of the water must then be determined;
  4. the specimen must then be stored for at least 7 days in still air at a temperature at not less than 30°C and relative humidity of not less than 90%;
  5. the process in 1, 2 and 3 must be repeated;
- (b) the alternative volumetric leakage assessment may comprise any of the tests prescribed in ISO 9978:1992 "Radiation Protection—Sealed Radioactive Sources—Leak Test Methods", provided that they are acceptable to the competent authority.

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#### I.10.3.5 Low Specific Activity (LSA) Material

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##### I.10.3.5.1.3 LSA-III

LSA-III material is a solid (e.g. consolidated wastes, activated materials), excluding powders ~~that meet the requirements of 10.3.5.1.3.1~~, in which:

- (a) the radioactive material is distributed throughout a solid or a collection of solid objects, or is essentially uniformly distributed in a solid compact binding agent (such as concrete, bitumen and ceramic); and
- ~~(b) the radioactive material is relatively insoluble, or it is intrinsically contained in a relatively insoluble matrix, so that, even under loss of packaging, the loss of radioactive material per package by leaching when placed in water for 7 days would not exceed 0.1 A<sub>2</sub>; and~~
- ~~(c)~~ the estimated average specific activity of the solid, excluding any shielding material, does not exceed  $2 \times 10^{-3}$  A<sub>2</sub>/g.

~~10.3.5.1.3.1 LSA-III material must be a solid of such a nature that if the entire contents of the package were subjected to the tests specified in 10.3.5.1.3.3 the activity in the water would not exceed 0.1 A<sub>2</sub>.~~

~~10.3.5.1.3.2~~—1.10.3.5.1.3.1 Demonstration of compliance with the performance standards in ~~10.3.5.1.3.3~~1.10.3.5.1.3.2 must be in accordance with 10.6.3.1.1 and 10.6.3.1.2.

~~10.3.5.1.3.3~~ 10.3.5.1.3.2 LSA-III material must be tested as follows:

Solid material representing the entire contents of the package must be immersed for 7 days in water at ambient temperature. The volume of water to be used in the test must be sufficient to ensure that at the end of the 7 day test period the free volume of the unabsorbed and unreacted water remaining will be at least 10% of the volume of the solid test sample itself. The water must have an initial pH of 6 to 8 and a maximum conductivity of 1 mS/m at 20°C. The total activity of the free volume of water must be measured following the 7-day immersion of the test sample.

### **I.10.3.6 Surface Contaminated Object (SCO)**

#### **I.10.3.6.1 Definition**

Surface Contaminated Object (SCO) means a solid object which is not itself radioactive but which has radioactive material distributed on its surfaces. SCO is classified in one of ~~two~~three groups:

- SCO-I;
- SCO-II;
- SCO-III.

...

#### **I.10.3.6.1.3 SCO-III**

A large solid object which, because of its size, cannot be transported in a type of package described in these Regulations.

##### Note:

SCO-III material is forbidden in air transport.

### **I.10.3.7 Fissile Material**

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#### **I.10.3.7.2 Fissile Excepted**

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**I.10.3.7.2.5** Fissile nuclides with a total mass not greater than 45 g subject to ~~limits provided in the requirements of~~ 10.9.3.5.3(e).

**I.10.3.7.2.6** A fissile material that meets the requirements of 10.3.7.3, 10.8.7 and 10.9.3.5.3(b).

#### **I.10.3.7.3 Requirements for Material Excepted from Classification as Fissile**

~~A~~F fissile material excepted from classification as fissile under 10.3.7.2.6 must be subcritical without the need for accumulation control under the following conditions:

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### **I.10.3.8 Low Dispersible Material**

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#### **I.10.3.8.2 Requirements**

The design for low dispersible radioactive material requires multilateral approval. Low dispersible radioactive material must be such that the total amount of this radioactive material in a package, taking into account the provisions of 10.6.2.5.15, must meet the following requirements:

- (a) the ~~radiation level dose rate~~ at 3 m from the unshielded radioactive material does not exceed 10 mSv/h;
- (b) if subjected to the tests specified in 10.6.3.7.3 and 10.6.3.7.4, the airborne release in gaseous and particulate forms of up to 100 µm aerodynamic equivalent diameter would not exceed 100 A<sub>2</sub>. A separate specimen may be used for each test; and
- (c) if subjected to the test specified in 10.3.5.1.3.3, the activity in the water would not exceed 100 A<sub>2</sub>. In the application of this test, the damaging effects of the tests specified in (b) above, must be taken into account.

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### **I.10.3.11 Classification of Packages**

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### **I.10.3.11.1 Classification as Excepted Packages**

#### 10.3.11.1.1 General

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10.3.11.1.1.2 A package containing radioactive material may be classified as an excepted package provided that the [radiation level-dose rate](#) at any point on its external surface does not exceed 5 µSv/h (0.5 mrem/h).

#### **I.10.3.11.1.2 Radioactive Material in Limited Quantities**

Radioactive material in forms other than as specified in 10.3.11.1.3 with an activity not exceeding the limit specified in the column headed “Materials—Package Limits” in Table 10.3.C may be classified as UN 2910, Radioactive material, excepted package—Limited quantity of material, provided that:

- (a) these materials are packaged in such a manner that, in conditions likely to be encountered during routine transport (incident-free conditions), there can be no leakage of radioactive material from the package; ~~and~~
- (b) the packaging bears the mark “RADIOACTIVE” on either:
  1. an internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package; or
  2. the outside of the package, where it is impractical to mark an internal surface; ~~and~~

[\(c\) if the package contains fissile material, one of the provisions of 10.3.7.2.1 to 10.3.7.2.6 must be met.](#)

**Note:**

*Categorisation, hazard labels and Shipper's Declaration are NOT required.*

#### **I.10.3.11.1.3 Instruments and Manufactured Articles**

Radioactive material which is enclosed in or is included as a component part of an instrument or other manufactured article may be classified as UN 2911, Radioactive material, excepted package—articles or Radioactive material, excepted package—instruments, provided that:

- (a) the [radiation level-dose rate](#) at 10 cm from any point on the external surface of any unpacked instrument or article does not exceed 0.1 mSv/h (10 mrem/h);
- (b) the activity of an instrument or article does not exceed the relevant exception limits listed in the column headed “Instruments and Articles—Item Limits” in Table 10.3.C;
- (c) the total activity per package does not exceed the relevant exception limit listed in the column headed “Instruments and Articles—Package Limits” in Table 10.3.C;
- (d) each instrument or article bears the mark “RADIOACTIVE”, on its external surface except for the following:
  1. radioluminescent time-pieces or devices;
  2. consumer products that either have received regulatory approval in accordance with 10.0.1.4 (c), following their sale to the end user or do not individually exceed the activity limit for an exempt consignment in Table 10.3.A (column 6), provided such products are transported in a package that bears the mark “RADIOACTIVE” on an internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package; and
  3. other instruments or articles too small to bear the mark “RADIOACTIVE”, provided that they are transported in a package that bears the mark “RADIOACTIVE” on its internal surface in such a manner that a warning of the presence of radioactive material is visible on opening the package.
- (e) the active material is completely enclosed by non-active components (a device performing the sole function of containing radioactive material must not be considered to be an instrument or manufactured article); ~~and~~
- [\(f\) if the package contains fissile material, one of the provisions of 10.3.7.2.1 to 10.3.7.2.6 must be met.](#)

**Note:**

*Categorisation, hazard labels and Shipper's Declaration are NOT required.*

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#### **I.10.3.11.1.6 Empty Packagings**

An empty packaging which had previously contained radioactive material may be classified as UN 2908, Radioactive material, excepted package empty packaging, provided that:

- (a) it is in a well-maintained condition and securely closed;
- (b) the outer surface of any uranium or thorium in its structure is covered with an inactive sheath made of metal or some other substantial material;
- (c) the level of internal non-fixed contamination when averaged over any 300 cm<sup>2</sup> does not exceed:
  - 1. 400 Bq/cm<sup>2</sup> for beta and gamma emitters and low toxicity alpha emitters; and
  - 2. 40 Bq/cm<sup>2</sup> for all other alpha emitters.
- (d) any labels which may have been displayed on it in conformity with 10.7.4 are no longer visible; and
- (e) if the package has contained fissile material, one of the provisions of [10.3.7.2.1 to 10.3.7.2.6] or one of the provisions for exclusion for fissile nuclides as described the definition of "Fissile Nuclides" in the Glossary must be met.

**Notes:**

- 1. *The external ~~radiation level~~ dose rate at the surface of empty Type B(U) or Type B(M) packages may exceed 5 µSv/h due to the presence of depleted uranium in the shielding material. Such empty packages cannot be transported as UN 2908— Radioactive material, excepted package—empty packaging as they do not meet the conditions specified in 10.3.11.1.2. These packages remain subject to all applicable parts of these Regulations and may be classified either as low specific material (LSA-I) due to the presence of depleted uranium as specified in 10.3.5.1.1(b) or as Type B(U) or Type B(M) package as specified in 10.3.11.6.2.*
- 2. *Categorisation, hazard labels and Shipper's Declaration are NOT required.*

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**I.10.4 Identification**

**I.10.4.1 Proper Shipping Name**

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**TABLE 10.4.A**  
**Assignment of Proper Shipping Name/UN Number (10.4.1.1)**

UN Number	Proper Shipping Name
...	
<b>Surface Contaminated Objects (SCO) (10.3.11.3)</b>	
UN 2913	<b>Radioactive material, surface contaminated objects (SCO-I), non-fissile or fissile excepted<sup>a</sup></b>
UN 2913	<b>Radioactive material, surface contaminated objects (SCO-II), non-fissile or fissile excepted<sup>a</sup></b>
<u>UN 2913</u>	<u><b>Radioactive material, surface contaminated objects (SCO-III), non-fissile or fissile excepted<sup>a</sup></b></u>
UN 3326	<b>Radioactive material, surface contaminated objects (SCO-I), fissile</b>
...	

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## I.10.5 Packing

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### 10.5.2 Packaging Criteria

#### 10.5.2.1 Explanatory Information on Packing of Radioactive Materials

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10.5.2.1.2 As noted in 10.5.2.1.1, the [radiation level/dose rate](#) depends on several factors—and the activity (quantity) of the radioactive material is only one of those factors. Equal quantities of two different radionuclides, each packed in the same type of packaging, may produce very different [radiation levels/dose rates](#) both on the external surface of the package and at any specific distance. Therefore, to ensure that [radiation levels/dose rates](#) comply with specified permissible limits, the specified permitted quantities vary with the particular radionuclides involved.

...

#### I.10.5.3 General Requirements

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**I.10.5.3.3** In the case of overpacks and freight containers, the level of non-fixed contamination on the external and internal surfaces must not exceed the limits specified in 10.5.3.2. [This requirement does not apply to the internal surfaces of freight containers being used as packagings, either loaded or empty.](#) An overpack or freight container dedicated to the transport of radioactive material under exclusive use is excepted from the requirements of this paragraph solely with regard to its internal surfaces and only for as long as it remains under that specific exclusive use.

...

#### 10.5.6 Overpacks Containing Packages of Radioactive Materials

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10.5.6.2 Only the original shipper of the packages contained within an overpack is permitted to use the method of direct measurement of [radiation level/dose rate](#) to determine the transport index of a rigid overpack.

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#### I.10.5.7 Requirements Before Shipment

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##### I.10.5.7.2 Requirements Before Each Shipment

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10.5.7.2.1 Before each shipment of any package, it must be ensured that all the requirements specified in the relevant provisions of these Regulations and in the applicable certificates of approval have been fulfilled. If applicable, the following requirements must also be fulfilled:

- (a) each Type B(U) and Type B(M) and Type C package must be held until equilibrium conditions have been approached closely enough to demonstrate compliance with the requirements for temperature and pressure, unless an exemption from these requirements has received unilateral approval;
- (b) for each Type B(U), Type B(M) and Type C package it must be ensured by examination and/or appropriate tests that all closures, valves and other openings of the containment system through which the radioactive contents might escape are properly closed and where appropriate, sealed in the manner for which the demonstrations of compliance with the requirements of 10.6.2.5.8 and 10.6.2.7.4 were made;
- (c) it must be ensured that lifting attachments which do not meet the requirements of 10.6.0.3, have been removed or otherwise rendered incapable of being used to lift the package, in accordance with 10.6.0.4;
- (d) for packages containing fissile material the measurement specified in 10.6.2.8.1.5(b) and the tests to demonstrate closure of each package as specified in 10.6.2.8.3 must be performed;

[\(e\) for packages intended to be used for shipment after storage, it must be ensured that all packaging components and radioactive contents have been maintained during storage in a manner such that all the requirements specified in the relevant provisions of these Regulations and in the applicable certificates of approval have been fulfilled.](#)

...

## 10.5.8 Excepted Packages

### 10.5.8.1 General

Radioactive materials in limited quantities, instruments, manufactured articles and empty packagings as specified in 10.3.11.1 may be transported as excepted packages, provided that:

- (a) the [radiation level/dose rate](#) at any point on the external surface of the package does not exceed 5 µSv/h (0.5 mrem/h);
- (b) if the excepted package contains fissile material, one of the requirements provided by 10.3.7.2 must be met and the smallest dimension of the package must not be less than 10 cm; and
- (c) the non-fixed radioactive contamination on any external surface of the excepted package does not exceed the limits of 10.5.3.2;
- (d) if transported by air mail, the requirements of Subsection 10.2.2 are met.

...

## 10.5.9 Requirements and Controls for Transport of LSA Material and SCO

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### 10.5.9.2 Activity Limit

The total activity in a single package of LSA material or in a single package of SCO must be so restricted that the [radiation level/dose rate](#) specified in 10.5.9.6 is not exceeded and the activity in a single package must also be so restricted that the activity limits for an aircraft specified in Table 10.9.B are not exceeded. A single package of non-combustible solid LSA-II or LSA-III material must not contain an activity greater than 3,000 A2.

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### 10.5.9.6 LSA and SCO Quantity Limit

The quantity of Low Specific Activity material (LSA) or Surface Contaminated Objects (SCO) in a single Industrial Package Type 1, Industrial Package Type 2, Industrial Package Type 3 must be so restricted that the external [radiation level/dose rate](#) at 3 m from the unshielded material does not exceed 10 mSv/h (1 rem/h).

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## I.10.5.14 Determination of Transport Index and Criticality Safety Index

### I.10.5.14.1 Determination of Transport Index (TI)

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#### 10.5.14.1.1 Transport Index—Radiation Exposure Control

The TI based on radiation exposure control for a package, overpack or freight container is the number derived using the following procedure:

- (a) determine the maximum [radiation level/dose rate](#) at a distance of 1 m from the external surfaces of the package, overpack or freight container. Where the [radiation level/dose rate](#) is determined in units of millisievert per hour (mSv/h), the value determined must be multiplied by 100. (Where the [radiation level/dose rate](#) is determined in units of millirem per hour (mrem/h), the value determined is not changed). For uranium and thorium ores and concentrates, the maximum radiation dose rate at any point 1 m from the external surface of the load may be taken as:
  - 0.4 mSv/h (40 mrem/h)—for ores and physical concentrates of uranium and thorium;
  - 0.3 mSv/h (30 mrem/h)—for chemical concentrates of thorium; or
  - 0.02 mSv/h (2 mrem/h)—for chemical concentrates of uranium, other than uranium hexafluoride.
- (b) for freight containers the value determined in (a) must be multiplied by the appropriate factor from Table 10.5.B;
- (c) the figure obtained in (a) and (b) must be rounded up to the first decimal place (e.g. 1.13 becomes 1.2), except that a value of 0.05 or less may be considered as zero. [The resulting number is the transport index value.](#)

**Note:**

If the measured dose rate comprises more than one type of radiation, then the transport index should be based on the sum of all the dose rates from each type of radiation (see paragraph 523.1 of the IAEA Specific Safety Guide No. SSG-26 (Rev. 1) (2012/2019 Edition)).

#### 10.5.14.1.2 Transport Index—Consignment

The transport index for each rigid overpack or freight container must be determined as either the sum of the transport indices of all the packages contained, or by direct measurement of radiation level dose rate, ~~except in the case of~~ For non-rigid overpacks ~~for which~~ the transport index must be determined only as the sum of the transport indices of all the packages within the overpack.

...

### 10.6 Packaging Specifications and Performance Testing

#### 10.6.0 General Requirements

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10.6.0.8 The package must be capable of withstanding the effects of any acceleration, vibration or vibration resonance which may arise under conditions likely to be encountered in routine transport without any deterioration in the effectiveness of the closing devices on the various receptacles or in the integrity of the package as a whole. In particular, nuts, bolts and other securing devices must be so designed as to prevent them from becoming loose or being released unintentionally, even after repeated use.

**Note:**

Information on vibration in commercial aircraft is given in 5.0.4.3.

#### 10.6.0.9 The design of the package must take into account ageing mechanisms.

10.6.0.~~9~~10 The materials of the packaging and any other components or structures must be physically and chemically compatible with each other and with the radioactive contents. Account must be taken of their behaviour under irradiation.

10.6.0.~~10~~11 All valves through which the radioactive contents could otherwise escape must be protected against unauthorized operation. The design of the package must take into account ambient temperatures and pressures that are likely to be encountered under normal conditions of transport.

10.6.0.~~11~~12 A package must be so designed that it provides sufficient shielding to ensure that, under routine conditions of transport and with the maximum radioactive contents that the package is designed to contain, the radiation level at any point on the external surface of the package would not exceed, for excepted packages 5  $\mu\text{Sv/h}$ , for all other packages 2 mSv/h and 10 mSv/h for exclusive use, as applicable, with account taken of 10.9.3.6.3(c).

10.6.0.~~12~~13 For radioactive material having other dangerous properties, the package design must take into account those properties (see 3.10.3, 6.1, 6.2, 10.0.5 and 10.5.3.4).

...

#### 10.6.2 Packaging Requirements

##### 10.6.2.1 Requirements for Excepted Packages

An Excepted Package is a packaging containing radioactive material that is designed to meet the requirements specified in 10.6.0 and 10.6.1. The smallest overall external dimension of the package must not be less than 10 cm if the package contains fissile material allowed by one of the provisions of 10.3.7.2.1 to 10.3.7.2.6.

...

##### 10.6.2.3 Requirements for Packages Containing Uranium Hexafluoride

...

10.6.2.3.2 Each package designed to contain 0.1 kg or more of uranium hexafluoride must be designed so that the package would meet the following requirements:

(a) withstand without leakage and without unacceptable stress, as specified in ISO 7195:2005, the structural test as specified in 10.6.3.8 except as allowed in 10.6.2.3.4;

(b) withstand without loss or dispersal of the uranium hexafluoride the free drop test specified in 10.6.3.4.3; and

(c) withstand without rupture of the containment system the thermal test specified in 10.6.3.6.2 except as allowed in 10.6.2.3.4.

...

#### 10.6.2.4 Requirements for Type A Packages

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##### 10.6.2.4.2 Containment System

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10.6.2.4.2.3 If the containment system forms a separate unit of the package, ~~the containment system~~ must be capable of being securely closed by a positive fastening device which is independent of any other part of the packaging.

...

##### 10.6.2.4.4 Additional Requirements for Type A Packages Designed to Contain Gases

10.6.2.4.4.1 A Type A package designed for gases must prevent loss or dispersal of the radioactive contents if the package were subjected to the tests specified in 10.6.3.5 ~~A~~, except for a Type A package designed for tritium gas or for noble gases ~~must be excepted from this requirement~~.

#### 10.6.2.5 Requirements for Type B(U) Packages

...

10.6.2.5.3 A package must be so designed that, under the ambient conditions specified below, the heat generated within the package by the radioactive contents does not, under normal conditions of transport, as demonstrated by the tests in 10.6.3.4, adversely affect the package in such a way that it would fail to meet the applicable requirements for containment and shielding if left unattended for a period of one week. Particular attention must be paid to the effects of heat, which may cause one or more of the following:

(a) alter the arrangement, the geometrical form or the physical state of the radioactive contents or, if the material is enclosed in a can or receptacle (for example, clad fuel elements), cause the can, receptacle or material to deform or melt;

(b) lessening of the efficiency of the packaging through differential thermal expansion or cracking or melting of the radiation shielding material;

(c) in combination with moisture, accelerate corrosion.

...

10.6.2.5.8 A package must be so designed that, if it were subjected to:

(a) the tests specified in 10.6.3.4, it would restrict the loss of radioactive contents to not more than  $10^{-6}$  A<sub>2</sub> per hour; and

(b) the tests specified in 10.6.3.6.0, 10.6.3.6.1.2 Drop Test 2, 10.6.3.6.2 and 10.6.3.6.3.1 and either the test in:

1. 10.6.3.6.1.3 Drop Test 3 when the package has a weight less than or equal to 500 kg, an overall density not greater than 1,000 kg/m<sup>3</sup> based on the external dimensions and radioactive contents greater than 1,000 A<sub>2</sub> not as Special Form radioactive material; or

2. 10.6.3.6.1.1 Drop Test 1 for all other packages.

it would meet the following requirements:

(a) retain sufficient shielding to ensure that the ~~radiation level~~ dose rate at 1 m from the surface of the package would not exceed 10 mSv/h with the maximum radioactive contents for which the package is designed to contain; and

(b) restrict the accumulated loss of radioactive contents in a period of one week to not more than 10 A<sub>2</sub> for Krypton-85 and not more than A<sub>2</sub> for all other radionuclides.

10.6.2.5.9 Where mixtures of different radionuclides are present, the provisions of 10.3.2.4 and 10.3.2.5 must apply except that for Krypton-85 an effective A<sub>2</sub> value equal to 100 TBq may be used. For 10.6.2.5.8(a), the evaluation must take into account the external non-fixed contamination limitations of 10.5.3.2.

...



### 10.6.2.6 Requirements for Type B(M) Packages

Type B(M) packages must meet the requirements for Type B(U) packages specified in 10.6.2.5.2 except that for packages to be transported solely within a specified State or solely between specified States, conditions other than those given in 10.6.2.4.1.4, 10.6.2.5.4, 10.6.2.5.6, 10.6.2.5.10 to 10.6.2.5.16 may be assumed with the approval of the competent authorities of those States. ~~Notwithstanding, t~~he requirements for Type B(U) packages specified in 10.6.2.5.6, 10.6.2.5.10 to 10.6.2.5.16 must be met as far as practicable.

...

### 10.6.2.8 Requirements for Packages Containing Fissile Materials

#### 10.6.2.8.1 General

...

10.6.2.8.1.3 Packages containing fissile material that meet the provisions in of subparagraph (d) and one of the provisions of (a) to (c) below are excepted from the requirements of 10.5.14.2.1, 10.6.2.8.1.5 to 10.6.2.8.1.8, 10.6.2.8.2 and 10.6.2.8.3:

...

(c) packages containing fissile material in any form provided that:

1. the smallest external dimension of the package is not less than 10 cm;
2. the package, after being subjected to the tests specified in 10.6.3.4:
  - retains its fissile material contents;
  - preserves the minimum overall outside dimensions of the package to at least 10 cm;
  - prevents the entry of a 10 cm cube.
3. the criticality safety index of the package is calculated using the following formula:
  - \* Plutonium may be of any isotopic composition provided that the amount of Pu-241 is less than that of Pu-240 in the package.
4. the ~~maximum-total~~ mass of fissile nuclides in any package does not exceed 15 g.

(d) the total mass of beryllium, hydrogenous material enriched in deuterium, graphite and other allotropic forms of carbon in an individual package must not be greater than the mass of fissile nuclides in the package except where ~~their-the~~ total concentration of these materials does not exceed 1 g in any 1,000 g of material. Beryllium incorporated in copper alloys up to 4% in weight of the alloy does not need to be considered.

...

#### 10.6.2.8.2 Assessment of an Individual Package in Isolation

10.6.2.8.2.1 For a package in isolation, it must be assumed that water can leak into or out of all void spaces of the package, including those within the containment system. However, if the design incorporates special features to prevent such leakage of water into or out of certain void spaces, even as a result of human error, absence of leakage may be assumed in respect of those void spaces. Special features must include either of the following:

- (a) multiple high standard water barriers, not less than two of which would remain leak-tight if the package were subject to the tests prescribed in 10.6.2.8.3.2(b); a high degree of quality control in the production and maintenance of packagings; and tests to demonstrate the closure of each package before shipment; or
- (b) for packages containing uranium hexafluoride only, with a maximum enrichment of 5 mass per cent uranium-235:
  1. packages where, following the tests prescribed in 10.6.2.8.3.2(b), there is no physical contact between the valve or the plug and any other component of the packaging other than at its original point of attachment and where, in addition, following the thermal test prescribed in 10.6.3.6.2 the valves and the plug remain leaktight; and
  2. a high degree of quality control in the manufacture, maintenance and repair of packagings coupled with tests to demonstrate closure of each package before each shipment.

...

10.6.2.8.2.5 In the assessment of 10.6.2.8.2.3 ~~allowance must not be made for use of~~ special features ~~of as specified in~~ 10.6.2.8.2.1 ~~unless, following the Type C package tests specified in 10.6.3.7.1 and subsequently, the~~

water in-leakage test of 10.6.3.6.4.3, leakage of water into or out of the void spaces is prevented is allowed provided that leakage of water into or out of the void spaces is prevented when the package is submitted to the Type C package tests specified in 10.6.3.7.1 followed by the water leakage test specified in 10.6.3.6.4.3.

...

### **10.6.3 Package Tests Procedures**

#### **10.6.3.1 Test Procedures and Demonstration of Compliance**

10.6.3.1.1 Demonstration of compliance with the performance standards required in this section may be accomplished by any of the following methods or by a combination thereof:

- (a) performance of tests with specimens representing ~~LSA-III material, or~~ Special Form radioactive material, or low dispersible radioactive material or with prototypes or samples of the packaging, provided that the contents of the specimen or the packaging for the tests simulate as closely as practicable the expected range of radioactive contents and the packaging to be tested is prepared as normally presented for transport;
- (b) reference to previous satisfactory demonstrations of sufficiently similar nature;
- (c) performance of tests with models of appropriate scale incorporating those features which are significant with respect to the item under investigation when engineering experience has shown the results of such tests to be suitable for design purposes. When a scale model is used, the need for adjusting certain test parameters, such as the penetrator diameter or the compressive load, must be taken into account;
- (d) calculation, or reasoned argument, when the calculation procedures and parameters are generally agreed to be reliable or conservative.

...

#### **10.6.3.2 Testing the Integrity of the Containment System and Shielding and Evaluating Criticality Safety**

After each test or group of tests or sequence of the applicable tests, as appropriate, specified in 10.6.3.4 to 10.6.3.8:

- (a) faults and damage must be identified and recorded;
- (b) it must be determined whether the integrity of the containment system and shielding has been retained to the extent required in 10.6.0 to 10.6.2 for the packaging under test; and
- (c) for packages containing fissile material, it must be determined whether the assumptions made in 10.5.14.2.1 and 10.6.2.8 regarding the most reactive configuration and degree of moderation of the fissile contents, of any escaped material and of one or more packages are valid.

...

#### **10.6.3.4 Tests for Demonstrating Ability to Withstand Normal Conditions of Transport**

...

##### **10.6.3.4.3 Free Drop Test**

The specimen must drop onto the target so as to suffer maximum damage in respect of the safety features to be tested:

- (a) the height of the drop, measured from the lowest point of the package to the upper surface of the target, must be not less than the distance specified in Table 10.6.C for the applicable weight. The target must be as defined in 10.6.3.3;
- (b) for rectangular fibreboard or wood packages not exceeding a mass of 50 kg, a separate specimen must be subjected to a free drop onto each corner from a height of 0.3 m;
- (c) for cylindrical fibreboard packages not exceeding a mass of 100 kg, a separate specimen must be subjected to a free drop onto each of the quarters of each rim from a height of 0.3 m.

...

##### **10.6.3.4.5 Penetration Test**

The specimen must be placed on a rigid, flat, horizontal surface which will not move significantly while the test is being carried out. A bar of 32 mm diameter with a hemispherical end and a weight of 6 kg must be dropped and directed to fall, with its longitudinal axis vertical, onto the centre of the weakest part of the package, so that, if it

penetrates sufficiently far, it will hit the containment system. The bar must not be significantly deformed by the test performance. The height of the drop of the bar, measured from its lower end to the intended point of impact on the upper surface of the specimen, must be 1 m.

...

### 10.6.3.6 Tests for Demonstrating Ability to Withstand Accident Conditions in Transport

...

#### 10.6.3.6.1 Mechanical Test

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##### 10.6.3.6.1.2 Drop Test 2

The specimen must be dropped onto a bar rigidly mounted perpendicularly on the target so as to suffer the maximum damage. The height of the drop measured from the intended point of impact of the package to the upper surface of the bar must be 1 m. The bar must be of solid mild steel of circular cross-section 150 mm ± 5 mm in diameter and 200 mm long, unless a longer bar would cause greater damage in which case a bar of sufficient length to cause maximum damage must be used. The upper end of the bar must be flat and horizontal with its edge rounded off to a radius of not more than 6 mm. The target on which the bar is mounted must be as described in 10.6.3.3.

...

#### 10.6.3.6.2 Thermal Test

...

10.6.3.6.2.2 The thermal test must then consist of:

- (a) exposure of a specimen for a period of 30 minutes to a thermal environment which provides a heat flux at least equivalent to that of a hydrocarbon fuel/air fire in sufficiently quiescent ambient conditions to give a minimum average flame emissivity coefficient of 0.9 and an average temperature of at least 800°C, fully engulfing the specimen, with a surface absorptivity coefficient of 0.8 or that value which the package may be demonstrated to possess if exposed to the fire specified, followed by;
- (b) exposure of the specimen to an ambient temperature of 38°C, subject to the solar insolation conditions specified in Table 10.6.A and subject to the design maximum rate of internal heat generation within the package by the radioactive contents for a sufficient period to ensure that temperatures in the specimen are everywhere decreasing in all parts of the specimen and/or are approaching initial steady state conditions. Alternatively, any of these parameters are allowed to have different values following cessation of heating, providing due account is taken of them in the subsequent assessment of package response.

During and following the test the specimen must not be artificially cooled and any combustion of materials of the specimen must be permitted to proceed naturally.

...

### 10.6.4 Transitional Measures for Class 7

#### 10.6.4.1 Packages Not Requiring Competent Authority Approval of Design Under the 1985, ~~and 1985 (as amended 1990)~~, 1996 edition, 1996 edition (revised), 1996 edition (as amended 2003, 2005, 2009 Editions of IAEA Safety Series No. 6 and 2012 edition of IAEA safety Standards Series No. SSR-6

10.6.4.1.1 Packages not requiring competent authority approval of design (excepted packages, Type IP-1, Type IP-2, Type IP-3 and Type A packages) must meet these Regulations in full, except that:

(a) packages that meet the requirements of the 1985 or 1985 (As Amended 1990) Editions of IAEA Regulations for the Safe Transport of Radioactive Material (IAEA Safety Series No.6):

- ~~(a)~~ 1. may continue in transport provided that they were prepared for transport prior to 31 December 2003 and are subject to the requirements of 6.4.24.4 of the UN Model Regulations, if applicable;
- ~~(b)~~ 2. may continue to be used provided that all of the following conditions are met:
  - ~~1.~~ i. they were not designed to contain uranium hexafluoride;
  - ~~2.~~ ii. the applicable requirements of 10.0.3 of these Regulations are applied;
  - ~~3.~~ iii. the activity limits and classification in 10.3 of these Regulations are applied;

~~4.iv~~ the requirements and controls for transport in this Section are applied;

~~5.v~~ the packaging was not manufactured or modified after 31 December 2003.

~~(b) packages that meet the requirements of the 1996, 1996 (revised), 1996 (as amended 2003), 2005 or 2009 Editions of IAEA Safety Series No. 6, or 2012 Edition of IAEA Safety Standards Series No. SSR-6:~~

~~1. may continue in transport provided that they were prepared for transport prior to 31 December 2025 and are subject to the requirements of 6.4.24.4 of the Model Regulations, if applicable; or~~

~~2. may continue to be used, provided that all the following conditions are met:~~

~~i the applicable requirements of 10.0.3 of these Regulations are applied;~~

~~ii the activity limits and classification in 10.3 of these Regulations are applied;~~

~~iii the requirements and controls for transport in this Section are applied; and~~

~~iv the packaging was not manufactured or modified after 31 December 2025.~~

~~10.6.4.1.2 Any packaging modified, unless to improve safety, or manufactured after 31 December 2003, must meet the requirements of these Regulations in full. Packages prepared for transport not later than 31 December 2003 under the 1985 or 1985 (As amended 1990) Editions of IAEA Safety Series No. 6 may continue in transport. Packages prepared for transport after this date must meet the requirements of these Regulations in full.~~

~~**10.6.4.2 Packages Approved Under the 1973, 1973 (as amended), 1985 and 1985 (as amended 1990) Editions of IAEA Safety Series No. 6 Package designs approved under the 1985, 1985 (as amended 1990), 1996, 1996 (revised), 1996 (as amended 2003), 2005 and 2009 Editions of IAEA Safety Series No. 6 and 2012 Edition of IAEA Safety Standards Series No. SSR-6**~~

~~10.6.4.2.1 Packages requiring competent authority approval of the design must meet these Regulations in full unless the following conditions are met except that:~~

~~(a) the packagings that were manufactured to a package design approved by the competent authority under the provisions of the 1973 or 1973 (As Amended) or the 1985 or 1985 (As Amended 1990) Editions of IAEA Safety Series No. 6; 1985 or 1985 (as amended 1990) Editions of IAEA Safety Series No. 6 may continue to be used provided that all of the following conditions are met:~~

~~1. the applicable requirements of 10.0.3 of these Regulations are applied;~~

~~2. the activity limits and classification in 10.3 of these Regulations are applied;~~

~~3. the requirements and controls for transport in this Section are applied;~~

~~4. for a package containing fissile material the requirements of 10.6.2.8.2.4 and 10.6.2.8.2.5 are met.~~

~~(b) packagings that were manufactured to a package design approved by the competent authority under the provisions of the 1996, 1996 (revised), 1996 (as amended 2003), 2005 or 2009 Editions of IAEA Safety Series No. 6, or 2012 Edition of IAEA Safety Standards Series No. SSR-6 may continue to be used provided that all of the following conditions are met:~~

~~(b)1. the package design is subject to multilateral approval after 31 December 2025;~~

~~(c)2. the applicable requirements of 10.0.3 of these Regulations are applied;~~

~~(d)3. the activity limits and classification in 10.3 of these Regulations are applied;~~

~~(e)4. the requirements and controls for transport in this Section are applied;~~

~~(f) for a package containing fissile material, the requirements of 10.6.2.8.2.4 and 10.6.2.8.2.5 are met;~~

~~(g) for packages that meet the requirements of the 1973 or 1973 (As Amended) Editions of these Regulations:~~

~~1. the packages retain sufficient shielding to ensure that the radiation level at 1 m from the surface of the package would not exceed 10 mSv/h in the accident conditions of transport defined in the 1973 Revised or 1973 Revised (As Amended) Editions of IAEA Safety Series No. 6 with the maximum radioactive contents which the package is authorized to contain~~

~~2. the packages do not utilize continuous venting;~~

~~3. a serial number that uniquely identifies the packaging is assigned to and marked on the outside of each packaging~~

10.6.4.2.2 No new manufacture of packagings to a package design meeting the provisions of the 1973, 1973 (As Amended), 1985 and 1985 (As Amended 1990) Editions of IAEA Safety Series No.6 ~~must be~~ permitted to commence.

10.6.4.2.3 No new manufacture of packagings of a package design meeting the provisions of the 1996, 1996 (revised), 1996 (as amended 2003), 2005 or 2009 Editions of IAEA Safety Series No. 6, or 2012 Edition of IAEA Safety Standards Series No. SSR-6 is permitted to commence after 31 December 2028.

**10.6.4.3 Special Form Radioactive Material Approved Under the ~~1973, 1973 (As Amended)~~, 1985 and 1985 (~~As Amended 1990~~), 1996, 1996 (revised), 1996 (as amended 2003), 2005 or 2009 Editions of IAEA Safety Series No. 6 or 2012 Edition of IAEA Safety Standards Series No. SSR-6**

Special Form radioactive material manufactured to a design ~~which that~~ had received unilateral approval by the competent authority under the ~~1973, 1973 (As Amended)~~, 1985 or 1985 (~~As Amended 1990~~), 1996, 1996 (revised), 1996 (as amended 2003), 2005 and 2009 Editions of IAEA Safety Series No. 6 and 2012 Edition of IAEA Safety Standards Series No. SSR-6 may continue to be used when in compliance with the mandatory management system in accordance with the applicable requirements of 10.0.3. There must be no new manufacture of special form radioactive material to a design that had received unilateral approval by the competent authority under the 1985 or 1985 (as amended 1990) Editions of IAEA Safety Series No. 6. No new manufacture of special form radioactive material to a design that had received unilateral approval by the competent authority under the 1996, 1996 (revised), 1996 (as amended 2003), 2005 and 2009 Editions of IAEA Safety Series No. 6, and 2012 Edition of IAEA Safety Standards Series No. SSR-6 is permitted to commence after 31 December 2025.~~No new manufacture of such special form radioactive material must be permitted to commence.~~

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## **I.10.7 Marking and Labelling**

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### **10.7.3 Applicability of Hazard Labels**

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#### **I.10.7.3.3 Label Marking**

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##### **I.10.7.3.3.3 Transport Index (TI)**

For Category II and Category III Yellow labels only, the Transport Index determined in accordance with 10.5.14.1 must be inscribed in the box provided. It must be rounded up to one decimal place, e.g. 1.04 becomes 1.1.

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## **10.9 Handling**

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### **10.9.3 Loading of Radioactive Material**

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#### **10.9.3.6 Stowage During Transport and Storage in Transit**

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10.9.3.6.3 Loading of freight containers and accumulation of packages, overpacks and freight containers must be controlled as follows:

(a) except under the conditions of exclusive use, the total number of packages, overpacks and freight containers on board a single aircraft must be so limited that the total sum of the transport indexes aboard the aircraft does not exceed the values shown in Table 10.9.B. For consignments of LSA-I material there is no limit on the sum of the transport indexes;

(b) where a consignment is transported under exclusive use, there is no limit on the sum of the transport indexes aboard a single aircraft, but the requirement of minimum separation distances established in 10.9.3.7 applies;

(c) The radiation level dose rate under routine conditions of transport must not exceed 2 mSv/h at any point on and 0.1 mSv/h at 2 m from, the external surface of the aircraft.

(d) in the case of fissile material, the total sum of criticality safety indexes in a freight container and aboard an aircraft must not exceed the values shown in Table 10.9.B.

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## I.10.10 Additional Shipment Preparation

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### I.10.10.2 Design and Shipment Approvals and Notification

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#### I.10.10.2.3 Notification

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**I.10.10.2.3.3** For each shipment listed below, the shipper must notify the competent authority of the country of origin of the shipment and to the competent authorities of each State through or into which the package is to be transported. This notification must be in the hands-possession of each competent authority prior to the commencement of the shipment and preferably at least 7 (seven) days in advance:

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## APPENDIX A—GLOSSARY

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### D

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**DETONATORS** Articles consisting of a small metal or plastic tube containing explosives such as lead azide, PETN or combinations of explosives. They are designed to start a detonation train. They may be constructed to detonate instantaneously, or may contain a delay element. The term includes:

- Detonators for ammunition and Detonators for blasting, both electric, and non-electric and electronic programmable;
- Detonating relays without flexible detonating cord are included.

**DETONATORS, ELECTRONIC programmable for blasting** Detonators with enhanced safety and security features, utilizing electronic components to transmit a firing signal with validated commands and secure communications. Detonators of this type cannot be initiated by other means.

**DOSE RATE** Means the ambient dose equivalent or the directional dose equivalent, as appropriate, per unit time, measured at the point of interest.

**DRESSING, LEATHER** May contain liquids or solvents of low flash point and hence be classified as flammable liquids.

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### R

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**RADIATION LEVEL** (Radioactive Material Only). The corresponding dose equivalent rate expressed in millisieverts per hour (previously in millirem per hour) or microsieverts per hour.

**Note:**

*It is recognised that millisieverts (or millirem) are not the correct units that should apply to radiation exposures in all cases; nevertheless, these units are used exclusively in these Regulations for convenience.*

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### S

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**SELF-ACCELERATING DECOMPOSITION TEMPERATURES (SADT)** The lowest temperature at which self-accelerating decomposition may occur with-in a substance in the packaging as used/offered for in-transport. The



