



**Committee of Experts on the Transport of Dangerous Goods
and on the Globally Harmonized System of Classification
and Labelling of Chemicals**

Sub-Committee of Experts on the Transport of Dangerous Goods

**Report of the Sub-Committee of Experts on the Transport of
Dangerous Goods on its thirty-seventh session**

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Addendum

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Annex I

Draft amendments to the sixteenth revised edition of the Recommendations on the Transport of Dangerous Goods, Model Regulations

Document ST/SG/AC.10/C.3/72, Annex I

In the amendment to 3.2.1, Dangerous Goods List, for UN Nos. 3091 and 3481, delete the square brackets. In the new special provision 360, remove the square brackets. In the amendment to packing instruction P903, remove the square brackets.

(Reference document: UN/SCETDG/37/INF.72)

Chapter 1.1

Insert a new 1.1.1.7 to read as follows:

"1.1.1.7 *Transport of dangerous goods used as a coolant or conditioner*

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

(Reference document: UN/SCETDG/37/INF.85)

Chapter 1.2

1.2.1 In the definition for "Pressure receptacle", replace "and bundles of cylinders" with ", bundles of cylinders and salvage pressure receptacles".

Add the following new definition:

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

(Reference document: UN/SCETDG/37/INF.81)

Chapter 1.4

1.4.3 Amend to read as follows:

"1.4.3 *Provisions for high consequence dangerous goods*

1.4.3.1 *Definition of high consequence dangerous goods*

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

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

[Existing Table 1.4.1, with the existing NOTE, but without the introductory text and without the entry for Class 7.]

1.4.3.1.3 For dangerous goods of Class 7, high consequence radioactive material is that with an activity equal to or greater than a transport security threshold of 3000 A₂ per single package (see also 2.7.2.2.1) except for the following radionuclides where the transport security threshold is given in Table 1.4.2 below.

Table 1.4.2
Transport security thresholds for specific radionuclides

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

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

This calculation can be made with the formula:

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

Where:

A_i = activity of radionuclide i that is present in a package (TBq)

T_i = transport security threshold for radionuclide i (TBq).

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

1.4.3.2 Specific security provisions for high consequence dangerous goods

1.4.3.2.1 [Existing 1.4.3.1, without the last sentence]

1.4.3.2.2 Security plans

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

1.4.3.2.2.2 [Existing 1.4.3.2.2]

1.4.3.2.3 [Existing 1.4.3.2.3 with the following modifications: in footnote 1, replace "IAEACIRC" with "INFCIRC". In footnote 2, replace "IAEACIRC" with "INFCIRC" and delete the last sentence]."

(Reference documents: ST/SG/AC.10/C.3/2010/03 and UN/SCETDG/37/INF.66 as amended)

Chapter 2.1

2.1.1.1 (b) At the end, add "(see 2.1.3.6)" after "loud noise".

(Reference document: UN/SCETDG/37/INF.73)

2.1.1.4 (f) Delete "detonating".

2.1.2.1.1 In the table, in the description for compatibility group N, delete "detonating".

(Reference document: ST/SG/AC.10/C.3/2010/40)

2.1.3.6 Add a new 2.1.3.6.4 to read as follows:

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

- (a) No external surface shall have a temperature of more than 65° C. A momentary spike in temperature up to 200° C is acceptable;
- (b) No rupture or fragmentation of the external casing or movement of the article or detached parts thereof of more than one metre in any direction;

NOTE: Where the integrity of the article may be affected in the event of an external fire these criteria shall be examined by a fire test, such as described in ISO 12097-3.

- (c) No audible report exceeding 135 dB(C) peak at a distance of one metre;
- (d) No flash or flame capable of igniting a material such as a sheet of 80 ± 10 g/m² paper in contact with the article; and

- (e) No production of smoke, fumes or dust in such quantities that the visibility in a one cubic metre chamber equipped with appropriately sized blow out panels is reduced more than 50 percent as measured by a calibrated light (lux) meter or radiometer located one metre 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 shall be used to minimize effects of scattered or leaking light not emitted directly from the source.

NOTE 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.*

NOTE 2: *The competent authority may require testing in packaged form if it is determined that, as packaged for transport, the article may pose a greater risk."*

(Reference document: UN/SCETDG/37/INF.73 as amended)

Chapter 2.9

2.9.2 Add the following new section:

"Electric double layer capacitors

3499 CAPACITOR, electric double layer (with an energy storage capacity greater than 0.3 Wh)".

(Reference documents: ST/SG/AC.10/C.3/2010/33 and UN/SCETDG/37/INF.79)

Chapter 3.2

3.2.1 Dangerous Goods List

[UN Nos. 0012, 0014 and 0055: Add "364" in column (6) and "5 kg" in column (7a).]

(Reference document: UN/SCETDG/37/INF.80)

UN Nos. 1202, 1203, 1223, 1268, 1863 and 3475: Add "363" in column (6).

(Reference document: UN/SCETDG/37/INF.78/Rev.1)

UN No. 1792 : Add ", SOLID" at the end of the name in column (2).

(Reference document: ST/SG/AC.10/C.3/2010/42)

UN No. 1845: Delete "297" in column (6).

(Reference document: UN/SCETDG/37/INF.85)

UN No. 1950: Replace "P003" with "P207" in column (8) and delete "PP17" in column (9).

(Reference document: UN/SCETDG/37/INF.86/Rev.1)

[UN No. 2809: Insert "6.1" in column (4).]

(Reference document: ST/SG/AC.10/C.3/2010/6)

UN Nos. 3381 to 3390 and 3488 to 3491: Replace "with an inhalation toxicity" with "with an LC₅₀" in column (2).

UN Nos. 3492 and 3493: Delete these entries.

(Reference document: ST/SG/AC.10/C.3/2010/42)

Add the following new entries and amend the alphabetical index accordingly:

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
3497	KRILL MEAL	4.2		II	300	0	E2	P410 IBC06	B2	T3	TP33
3497	KRILL MEAL	4.2		III	223	0	E1	P002 IBC0 LP02	B3	T1	TP33

(Reference document: ST/SG/AC.10/C.3/2010/4 as amended)

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
3498	IODINE MONOCHLORIDE, LIQUID	8		II		1L	E2	P001 IBC02		T7	TP2

(Reference document: ST/SG/AC.10/C.3/2010/42)

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
3499	CAPACITOR, electric double layer (with an energy storage capacity greater than 0.3 Wh)	9			361	0	E0	P003			

(Reference documents: ST/SG/AC.10/C.3/2010/33 and UN/SCETDG/37/INF.79)

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
3500	CHEMICAL UNDER PRESSURE, N.O.S.	2.2			274 362	0	E0	P206			
3501	CHEMICAL UNDER PRESSURE, FLAMMABLE, N.O.S.	2.1			274 362	0	E0	P206	PP89		
3502	CHEMICAL UNDER PRESSURE, TOXIC, N.O.S.	2.2	6.1		274 362	0	E0	P206	PP89		
3503	CHEMICAL UNDER PRESSURE, CORROSIVE, N.O.S.	2.2	8		274 362	0	E0	P206	PP89		
3504	CHEMICAL UNDER PRESSURE, FLAMMABLE, TOXIC, N.O.S.	2.1	6.1		274 362	0	E0	P206	PP89		
3505	CHEMICAL UNDER PRESSURE, FLAMMABLE, CORROSIVE, N.O.S.	2.1	8		274 362	0	E0	P206	PP89		

(Reference document: UN/SCETDG/37/INF.69)

Chapter 3.3

3.3.1 **SP239** In the first sentence, replace, "sodium, sulphur and/or polysulphides" with "sodium, sulphur or sodium compounds (e.g. sodium polysulphides and sodium tetrachloroaluminate)".

(Reference document: ST/SG/AC.10/C.3/2010/30)

SP240 Amend to read as follows:

"240 This entry 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 electrically-powered cars, motorcycles, scooters, three- and four-wheeled vehicles or motorcycles, e-bikes, wheel-chairs, lawn tractors, boats and aircraft.

Examples of equipment are lawnmowers, cleaning machines or model boats and model aircraft. Equipment powered by lithium metal batteries or lithium ion batteries shall be consigned under 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.

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 shall be consigned under the entries UN 3166 VEHICLE, FLAMMABLE GAS POWERED or UN 3166 VEHICLE, FLAMMABLE LIQUID POWERED, as appropriate. Vehicles which contain a fuel cell shall be consigned under the entries UN 3166 VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED or UN 3166 VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED, as appropriate."

(Reference documents: ST/SG/AC.10/C.3/2010/15 and UN/SCETDG/37/INF.72 as amended)

SP297 Amend to read as follows: "297 (*Deleted*)".

(Reference document: UN/SCETDG/37/INF.85)

SP300 Replace "Fish meal or fish scrap" with " Fish meal, fish scrap and krill meal".

(Reference document: ST/SG/AC.10/C.3/2010/4 as amended)

SP301 In the last sentence, at the end, add ", except where special provision 363 applies".

(Reference document: UN/SCETDG/37/INF.78/Rev.1)

SP327 In the third sentence, replace "P003" with "P207".

(Reference document: UN/SCETDG/37/INF.86/Rev.1)

SP328 Add the following new paragraph at the end:

"When lithium metal or lithium ion batteries are contained in the fuel cell system, the consignment shall be consigned under this entry and under the appropriate entries for UN 3091 LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT or UN 3481 LITHIUM ION BATTERIES CONTAINED IN EQUIPMENT."

(Reference document: UN/SCETDG/37/INF.77)

SP338 Amend paragraph (b) to read as follows:

"(b) Not contain more than 200 ml liquefied flammable gas, the vapour pressure of which shall not exceed 1 000 kPa at 55 °C; and".

(Reference document: UN/SCETDG/37/INF.9)

Add the following new special provisions:

"**361** This entry applies to electric double layer capacitors with an energy storage capacity greater than 0.3 Wh. Capacitors with an energy storage capacity of 0.3 Wh or less are not subject to these Regulations. Energy storage capacity means the energy held by a capacitor, as calculated using the nominal voltage and capacitance. All capacitors to which this entry applies, including capacitors containing an electrolyte that does not meet the criteria for dangerous goods, shall meet the following conditions:

- (a) Capacitors not installed in equipment shall be transported in an uncharged state. Capacitors installed in equipment shall be transported either in an uncharged state or protected against short circuiting;
- (b) Each capacitor shall be protected against a potential short circuit hazard in transport as follows:
 - (i) When a capacitor's energy storage capacity is less than or equal to 10Wh or when the energy storage capacity of each capacitor in a module is less than or equal to 10Wh, the capacitor or module shall be protected against short circuit or be fitted with a metal strap connecting the terminals; and
 - (ii) When the energy storage capacity of a capacitor or a capacitor in a module is more than 10Wh, the capacitor or module shall be fitted with a metal strap connecting the terminals;
- (c) Capacitors containing dangerous goods shall be designed to withstand a 95 kPa pressure differential;
- [(d) Capacitors shall be designed and constructed to safely relieve pressure that may build up in use, through a vent or a weak point in the capacitor casing; and]
- (e) Capacitors shall be marked with the energy storage capacity in Wh.

Capacitors containing an electrolyte not meeting the classification criteria of any class or division of dangerous goods, including when installed in equipment, are not subject to other provisions of these Regulations.

Capacitors containing an electrolyte meeting the classification criteria of any class or division of dangerous goods, with an energy storage capacity of 10 Wh or less are not subject to other provisions of these Regulations when they are capable of withstanding a 1.2 metre drop test unpackaged on an unyielding surface without loss of contents.

Capacitors containing an electrolyte meeting the classification criteria of any class or division of dangerous goods that are not installed in equipment and with an electric storage capacity of more than 10 Wh are subject to these Regulations.

Capacitors installed in equipment and containing an electrolyte meeting the classification criteria of any class or division of dangerous goods, are not subject to other provisions of these Regulations provided the equipment is packaged in a strong outer packaging constructed of suitable material of adequate strength and design, in relation to the packaging's intended use and in such a manner as to prevent accidental functioning of capacitors during transport. Large robust equipment containing capacitors may be offered for transport unpackaged or on pallets when capacitors are afforded equivalent protection by the equipment in which they are contained."

(Reference documents: ST/SG/AC.10/C.3/2010/33 and UN/SCETDG/37/INF.79)

"**362** This entry applies to liquids, pastes or powders, pressurized with a propellant which meets the definition of a gas in 2.2.1.1 and 2.2.1.2 (a) or (b).

NOTE: A chemical under pressure in an aerosol dispenser shall be transported under UN 1950.

The following provisions shall apply:

(a) The chemical under pressure shall be classified based on the hazard properties of the components in the different states:

- The propellant;
- The liquid; or
- The solid.

If one of these components, which can be a pure substance or a mixture, needs to be classified as flammable, the chemical under pressure shall be classified as flammable in Division 2.1. Flammable components are flammable liquids and liquid mixtures, flammable solids and solid mixtures or flammable gases and gas mixtures meeting the following criteria:

- (i) A flammable liquid is a liquid having a flashpoint of not more than 93°C;
- (ii) A flammable solid is a solid which meets the criteria in 2.4.2.2 of these Regulations;
- (iii) A flammable gas is a gas which meets the criteria in 2.2.2.1 of these Regulations;

(b) Gases of Division 2.3 and gases with a subsidiary risk of 5.1 shall not be used as a propellant in a chemical under pressure;

(c) Where the liquid or solid components are classified as dangerous goods of Division 6.1, packing groups II or III, or Class 8, packing groups II or III, the chemical under pressure shall be assigned a subsidiary risk of Division 6.1 or Class 8 and the appropriate UN number shall be assigned. Components classified in Division 6.1, packing group I, or Class 8, packing group I, shall not be used for transport under this proper shipping name;

(d) In addition, chemicals under pressure with components meeting the properties of : Class 1, explosives; Class 3, liquid desensitized explosives; Division 4.1, self-reactive substances and solid desensitized explosives; Division 4.2, substances liable to spontaneous combustion; Division 4.3, substances which, in contact with water, emit flammable gases; Division 5.1 oxidizing substances; Division 5.2, organic peroxides; Division 6.2, Infectious substances or Class 7, Radioactive material, shall not be used for transport under this proper shipping name;

(e) Substances to which PP86 or TP7 are assigned and therefore require air to be eliminated from the vapour space, shall not be used for transport under this UN number but shall be transported under their respective UN numbers as listed in the Dangerous Goods List of Chapter 3.2. "

(Reference document: UN/SCETDG/37/INF.69)

"363 This entry also applies to dangerous goods above the quantity specified in column 7a of the Dangerous Goods List of Chapter 3.2 in means of containment (other than vehicles or means of containment defined in Part 6 of these Regulations subject to special provision 301) integral to equipment or machinery (e.g. generators, compressors, heating units, etc) as part of their original design type. They shall meet the following requirements:

- (a) The means of containment shall be in compliance with the construction requirements of the competent authority;
- (b) Any valves or openings (e.g. venting devices) in the means of containment containing dangerous goods shall be closed during transport;
- (c) The machinery or equipment shall be loaded in an orientation to prevent inadvertent leakage of dangerous goods and secured by means capable of restraining the machinery or equipment to prevent any movement during transport which would change the orientation or cause it to be damaged;
- (d) Where the means of containment has a capacity [of not more than 450 litres, the labelling requirements of 5.2.2 shall apply and where the capacity is] greater than [450 litres] but not more than 1500 litres the machinery or equipment shall be labelled on all four external sides in accordance with 5.2.2;
- (e) Where the means of containment has a capacity greater than 1500 litres, the machinery or equipment shall be placarded on all four external sides in accordance with 5.3.1.1.2; and
- (f) The requirement of 5.4.1 shall apply.

No other provisions of these Regulations shall apply. "

(Reference document: UN/SCETDG/37/INF.78/Rev.1)

["364 This article may only be transported under the provisions of Chapter 3.4 if, as presented for transport, the package is capable of passing the 6(d) test as determined by the competent authority."].

(Reference document: UN/SCETDG/37/INF.80)

Appendix B

In the definition for "ARTICLES, EXPLOSIVE, EXTREMELY INSENSITIVE (ARTICLES, EEI)", delete "detonating".

Replace the definition for "EXPLOSIVE, EXTREMELY INSENSITIVE DETONATING SUBSTANCE (EIDS)" with the following definition:

"EXPLOSIVE, EXTREMELY INSENSITIVE SUBSTANCE (EIS)

A substance which has demonstrated through tests that it is so insensitive that there is very little probability of accidental initiation".

Insert the following new definition:

"AUXILIARY EXPLOSIVE COMPONENT, isolated

An "isolated auxiliary explosive component" is a small device that explosively performs an operation related to the article's functioning, other than its main explosive loads' performance. Functioning of the component does not cause any reaction of the main explosive loads contained within the article."

(Reference document: ST/SG/AC.10/C.3/2010/40)

Chapter 4.1

Insert a new 4.1.1.16 to read as follows:

"4.1.1.16 Where ice is used as a coolant it shall not affect the integrity of the packaging."

Re-number existing 4.1.1.16 and 4.1.1.17 accordingly.

(Reference document: UN/SCETDG/37/INF.85 as amended)

Insert a new 4.1.1.19 to read as follows:

"4.1.1.19 Use of salvage pressure receptacles

4.1.1.19.1 In the case of damaged, defective, leaking or non-conforming pressure receptacles, salvage pressure receptacles according to 6.2.3 may be used.

NOTE: A salvage pressure receptacle may be used as an overpack in accordance with 5.1.2. When used as an overpack, markings shall be in accordance with 5.1.2.1 instead of 5.2.1.3.

4.1.1.19.2 Pressure receptacles shall be placed in salvage pressure receptacles of suitable size. More than one pressure receptacle may be placed in the same salvage pressure receptacle only if the contents are known and do not react dangerously with each other (see 4.1.1.6). Measures shall be taken to prevent movement of the pressure receptacles within the salvage pressure receptacle e.g. by partitioning, securing or cushioning.

4.1.1.19.3 A pressure receptacle may only be placed in a salvage pressure receptacle if:

- (a) The salvage pressure receptacle is in accordance with 6.2.3.5 and a copy of the approval certificate is available;
- (b) Parts of the salvage pressure receptacle which are, or are likely to be in direct contact with the dangerous goods will not be affected or weakened by those dangerous goods and will not cause a dangerous effect (e.g. catalyzing reaction or reacting with the dangerous goods); and
- (c) The contents of the contained pressure receptacle(s) is limited in pressure and volume so that if totally discharged into the salvage pressure receptacle, the pressure in the salvage pressure receptacle at 65 °C will not exceed the test pressure of the salvage pressure receptacle (for gases, see 4.1.4.1 P200 (3)). The reduction of the useable water capacity of the salvage pressure receptacle, e.g. by any contained equipment and cushioning, shall be taken into account.

4.1.1.19.4 The proper shipping name, the UN Number preceded by the letters "UN" and label(s) as required for packages in Chapter 5.2 applicable to the dangerous goods inside the contained pressure receptacle(s) shall be applied to the salvage pressure receptacle for transport.

4.1.1.19.5 Salvage pressure receptacles shall be cleaned, purged and visually inspected internally and externally after each use. They shall be periodically inspected and tested in accordance with 6.2.1.6 at least once every five years."

(Reference document: UN/SCETDG/37/INF.81 as amended)

4.1.4.1

P001 Under "Combination packagings", "Outer packagings", "Boxes", "aluminium (4B)", insert the following row:

other metal (4N)	250 kg	400 kg	400 kg
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P002 Under "Combination packagings", "Outer packagings", "Boxes", "aluminium (4B)", insert the following row:

other metal (4N)	400 kg	400 kg	400 kg
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Under "Single packagings", "Boxes", "aluminium (4B)^e", insert the following row:

other metal (4N) ^e	Not allowed	400 kg	400 kg
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(Reference documents: ST/SG/AC.10/C.3/2010/8 and UN/SCETDG/37/INF.70)

P003 In special packing provision PP17, delete "Nos. 1950 and". Delete special packing provision PP87.

(Reference document: UN/SCETDG/37/INF.86/Rev.1)

P004 Amend to read as follows:

P004	PACKING INSTRUCTION	P004
This instruction applies to UN Nos. 3473, 3476, 3477, 3478 and 3479		
The following packagings are authorized:		
(1)	For fuel cell cartridges, provided that the general provisions of 4.1.1.1, 4.1.1.2, 4.1.1.3, 4.1.1.6 and 4.1.3 are met: Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2). Packagings shall conform to the packing group II performance level.	
(2)	For fuel cell cartridges packed with equipment: strong outer packagings which meet the general provisions of 4.1.1.1, 4.1.1.2, 4.1.1.6 and 4.1.3 . When fuel cell cartridges are packed with equipment, they shall be packed in inner packagings or placed in the outer packaging with cushioning material or divider(s) so that the fuel cell cartridges are protected against damage that may be caused by the movement or placement of the contents within the outer packaging. The equipment shall be secured against movement within the outer packaging. For the purpose of this packing instruction, "equipment" means apparatus requiring the fuel cell cartridges with which it is packed for its operation.	
(3)	For fuel cell cartridges contained in equipment: strong outer packagings which meet the general provisions of 4.1.1.1, 4.1.1.2, 4.1.1.6 and 4.1.3 . Large robust equipment (see 4.1.3.8) containing fuel cell cartridges may be transported unpackaged. For fuel cell cartridges contained in equipment, the entire system shall be protected against short circuit and inadvertent operation.	

(Reference documents: UN/SCETDG/37/INF.17 and UN/SCETDG/37/INF.84)

P110(a) Under "Outer packagings", "Drums", "steel, removable head (1A2)", insert "metal, other than steel or aluminium, removable head (1N2)".

(Reference documents: ST/SG/AC.10/C.3/2010/8 and UN/SCETDG/37/INF.70)

P110(a), P111 and P140 Under "Inner packagings", insert two new rows to read:

"Receptacles
wood".

P110(a), P112(a) and P112(c) Under "Intermediate packagings", "Receptacles", insert a new row to read: "wood".

(Reference document: UN/SCETDG/37/INF.73)

P111, P112(a), P112(b), P116, P130, P131, P134, P135, P136, P137, P138, P139, P140, P141, P142, P143 and P144

Under "Outer packagings", "Boxes", "aluminium (4B)", insert "other metal (4N)".

Under "Outer packagings", "Drums", "aluminium, removable head (1B2)", insert "other metal, removable head (1N2)".

(Reference documents: ST/SG/AC.10/C.3/2010/8 and UN/SCETDG/37/INF.70)

P112(a), P114(a), P114(b), P115, P132(b), P143 and P144 Under "Inner packagings", "Receptacles", insert a new line to read: "wood".

(Reference document: UN/SCETDG/37/INF.73)

P112(c), P113 and P114(a) Under "Outer packagings", "Boxes", "steel (4A)", insert "metal, other than steel or aluminium (4N)".

Under "Outer packagings", "Drums", "aluminium, removable head (1B2)", insert "other metal, removable head (1N2)".

P114(a) In special packing provisions PP43, replace "1A2 or 1B2" with "1A2, 1B2 or 1N2".

(Reference documents: ST/SG/AC.10/C.3/2010/8 and UN/SCETDG/37/INF.70)

Under "Intermediate packagings", insert two new lines to read:

"Dividing partitions

wood".

(Reference document: UN/SCETDG/37/INF.73)

P114(b) Under "Outer packagings", "Drums", "aluminium, removable head (1B2)", insert "other metal, removable head (1N2)".

In special packing provisions PP52, replace "1A2 or 1B2" with "1A2, 1B2 or 1N2"

P115 Under "Outer packagings", "Drums", "aluminium, removable head (1B2)", insert "other metal, removable head (1N2)".

In special packing provisions PP60, after "aluminium drums, removable head (1B2)", insert "and metal, other than steel or aluminium drums, removable head (1N2)".

(Reference documents: ST/SG/AC.10/C.3/2010/8 and UN/SCETDG/37/INF.70)

Under "Intermediate packagings", insert two new rows to read:

"Receptacles

wood".

(Reference document: UN/SCETDG/37/INF.73)

P132(a), P132(b) and P133 Under "Outer packagings", "Boxes", "aluminium (4B)", insert "other metal (4N)".

(Reference documents: ST/SG/AC.10/C.3/2010/8 and UN/SCETDG/37/INF.70)

P137 Under "Inner packagings", "Boxes", insert a new row to read: "wood".

(Reference document: UN/SCETDG/37/INF.73)

P201 Amend to read as follows:

P201	PACKING INSTRUCTION	P201
This instruction applies to UN Nos. 3167, 3168 and 3169.		
The following packagings are authorized:		
(1) Compressed gas cylinders and gas receptacles conforming to the construction, testing and filling requirements approved by the competent authority.		
(2) The following combination packagings provided that the general provisions of 4.1.1 and 4.1.3 are met:		
Outer packagings:		
Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);		
Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);		
Jerricans (3A2, 3B2, 3H2).		
Inner packagings:		
(a) For non-toxic gases, hermetically sealed inner packagings of glass or metal with a maximum capacity of 5 litres per package;		
(b) For toxic gases, hermetically sealed inner packagings of glass or metal with a maximum capacity of 1 litre per package.		
Packagings shall conform to the packing group III performance level.		

(Reference document: UN/SCETDG/37/INF.84)

P203 Under "Requirements for closed cryogenic receptacles", add a new paragraph (8) to read as follows:

"(8) Periodic inspection

The periodic inspection and test frequencies of pressure relief valves in accordance with 6.2.1.6.3 shall not exceed five years."

(Reference document: ST/SG/AC.10/C.3/2010/24 as amended)

P302 Amend to read as follows:

P302	PACKING INSTRUCTION	P302
This instruction applies to UN No. 3269.		
The following combination packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
Outer packagings:		
Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);		
Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2)		
Jerricans (3A2, 3B2, 3H2);		
Inner packagings:		
The activator (organic peroxide) shall have a maximum quantity of 125 ml per inner packaging if liquid, and 500 g per inner packaging if solid.		
The base material and the activator shall be each separately packed in inner packagings.		
The components may be placed in the same outer packaging provided that they will not interact dangerously in the event of a leakage.		
Packagings shall conform to the packing group II or III performance level according to the criteria for Class 3 applied to the base material.		

(Reference document: UN/SCETDG/37/INF.84)

P400 (2), P404(1), P405(1)(a), P406(2), P501(1), P504(1), (2) and (4), P520 (1), P600, P601 (1) and (2), P602 (1) and (2), P802 (1) and (2), P803 (2), P804 (1) and (2)

Insert ", 4N" after "4B".

P400 (3) Replace "4A or 4B" with "4A, 4B or 4N".

(Reference documents: ST/SG/AC.10/C.3/2010/8 and UN/SCETDG/37/INF.70)

P401 Amend paragraph (2) to read as follows:

"(2) Combination packagings:

Outer packagings:

Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);

Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1,4 H2);

Jerricans (3A2, 3B2, 3H2).

Inner packagings:

Glass, metal or plastics which have threaded closures with a maximum capacity of 1 litre

Each inner packaging shall be surrounded by inert cushioning and absorbent material in a quantity sufficient to absorb the entire contents.

The maximum net mass per outer packaging shall not exceed 30 kg."

P402 Amend paragraph (2) to read as follows:

"(2) Combination packagings:

Outer packagings:

Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);

Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1,4 H2);

Jerricans (3A2, 3B2, 3H2).

Inner packagings with a maximum net mass as follows:

Glass 10 kg

Metal or plastics 15 kg

Each inner packaging shall be fitted with threaded closures.

Each inner packaging shall be surrounded by inert cushioning and absorbent material in a quantity sufficient to absorb the entire contents.

The maximum net mass per outer packaging shall not exceed 125 kg."

(Reference document: UN/SCETDG/37/INF.84)

P403 Under "Combination packagings", "Outer packagings", "Boxes", "aluminium (4B)", insert the following row:

other metal (4N)	400 kg
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(Reference documents: ST/SG/AC.10/C.3/2010/8 and UN/SCETDG/37/INF.70)

P407 Amend to read as follows:

P407	PACKING INSTRUCTION	P407
This instruction applies to UN Nos. 1331, 1944, 1945 and 2254.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
Outer packagings:		
Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);		
Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);		
Jerricans (3A2, 3B2, 3H2).		
Inner packagings:		
Matches shall be tightly packed in securely closed inner packagings to prevent accidental ignition under normal conditions of transport.		
The maximum gross mass of the package shall not exceed 45 kg except for fibreboard boxes which shall not exceed 30 kg.		
Packagings shall conform to the packing group III performance level.		
Special packing provision:		
PP27 [Unchanged]		

P408 Amend to read as follows:

P408	PACKING INSTRUCTION	P408
This instruction applies to UN No. 3292.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
(1) For cells:		
Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);		
Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);		
Jerricans (3A2, 3B2, 3H2).		
There shall be sufficient cushioning material to prevent contact between cells and between cells and the internal surfaces of the outer packaging and to ensure that no dangerous movement of the cells within the outer packaging occurs in transport.		
Packagings shall conform to the packing group II performance level.		
(2) Batteries may be carried unpacked or in protective enclosures (e.g. fully enclosed or wooden slatted crates): the terminals shall not support the weight of other batteries or materials packed with the batteries.		
Packagings need not meet the requirements of 4.1.1.3.		
Additional requirement:		
Cells and batteries shall be protected against short circuit and shall be isolated in such a manner as to prevent short circuits.		

(Reference document: UN/SCETDG/37/INF.84)

P410 Under "Combination packagings", "Outer packagings", "Boxes", "aluminium (4B)", insert the following row:

other metal (4N)	400 kg	400 kg
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Under "Single packagings", "Boxes", "aluminium (4B)"^c, insert the following row:

other metal (4N) ^c	400 kg	400 kg
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(Reference documents: ST/SG/AC.10/C.3/2010/8 and UN/SCETDG/37/INF.70)

P411 Amend to read as follows:

P411	PACKING INSTRUCTION	P411
This instruction applies to UN No. 3270.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2);		
provided that explosion is not possible by reason of increased internal pressure.		
The maximum net mass shall not exceed 30 kg.		

P500 Amend to read as follows:

P500	PACKING INSTRUCTION	P500
This instruction applies to UN No. 3356.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4 H2); Jerricans (3A2, 3B2, 3H2).		
Packagings shall conform to the packing group II performance level.		
The generator(s) shall be transported in a package which meets the following requirements when one generator in the package is actuated:		
(a) Other generators in the package will not be actuated;		
(b) Packaging material will not ignite; and		
(c) The outside surface temperature of the completed package shall not exceed 100 °C.		

(Reference document: UN/SCETDG/37/INF.84)

P502 and P503 Under "Combination packagings", "Boxes", "aluminium (4B)", insert the following row:

other metal (4N)	125 kg
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(Reference documents: ST/SG/AC.10/C.3/2010/8 and UN/SCETDG/37/INF.70)

P620 Amend the first sub-paragraph (b) to read as follows:

- "(b) A rigid outer packaging:
- Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);
 Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);
 Jerricans (3A2, 3B2, 3H2).
- The smallest external dimension shall be not less than 100 mm."

P621 Amend to read as follows:

P621	PACKING INSTRUCTION	P621
This instruction applies to UN No. 3291.		
The following packagings are authorized provided that the general provisions of 4.1.1 except 4.1.1.15 and 4.1.3 are met:		
<p>(1) Provided that there is sufficient absorbent material to absorb the entire amount of liquid present and the packaging is capable of retaining liquids:</p> <p style="padding-left: 40px;">Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G);</p> <p style="padding-left: 40px;">Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2);</p> <p style="padding-left: 40px;">Jerricans (3A2, 3B2, 3H2).</p> <p style="padding-left: 40px;">Packagings shall conform to the packing group II performance level for solids.</p>		
<p>(2) For packages containing larger quantities of liquid:</p> <p style="padding-left: 40px;">Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G);</p> <p style="padding-left: 40px;">Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2);</p> <p style="padding-left: 40px;">Composites (6HA1, 6HB1, 6HG1, 6HH1, 6HD1, 6HA2, 6HB2, 6HC, 6HD2, 6HG2, 6HH2, 6PA1, 6PB1, 6PG1, 6PD1, 6PH1, 6PH2, 6PA2, 6PB2, 6PC, 6PG2 or 6PD2).</p> <p style="padding-left: 40px;">Packagings shall conform to the packing group II performance level for liquids.</p>		
Additional requirement:		
Packagings intended to contain sharp objects such as broken glass and needles shall be resistant to puncture and retain liquids under the performance test conditions in Chapter 6.1.		

(Reference document: UN/SCETDG/37/INF.84)

P650 Amend paragraph (9) to read as follows:

"(9) Refrigerated or frozen specimens: Ice, dry ice and liquid nitrogen

- (a) When dry ice or liquid nitrogen is used as a coolant, all applicable requirements of these Regulations shall be met. When used, ice or dry ice shall be placed outside the secondary packagings or in the outer packaging or an overpack. Interior supports shall be provided to secure the secondary packagings in the original position after the ice or dry ice has dissipated. If ice is used, the outside packaging or overpack shall be leakproof. If carbon dioxide, solid (dry ice) is used, the packaging shall be designed and constructed to permit the release of carbon dioxide gas to prevent a build-up of pressure that could rupture the packagings and the package (the outer packaging or the overpack) shall be marked with the words "CARBON DIOXIDE, SOLID, AS COOLANT or DRY ICE, AS COOLANT."

At the end of the additional requirement, add a new sentence to read as follows:

["Packages containing a coolant or conditioner shall be transported in well ventilated cargo transport units.] [The requirements of 5.5.3 shall also apply. "].

(Reference document: UN/SCETDG/37/INF.85 as amended)

P800 In paragraph (3) (d), under "Boxes", "steel (4A)", insert the following row:

metal, other than steel or aluminium (4N)	400 kg
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(Reference documents: ST/SG/AC.10/C.3/2010/8 and UN/SCETDG/37/INF.70)

P802 (1) Insert "1G," after "1D," and "4G," after "4F," respectively.

(Reference document: ST/SG/AC.10/C.3/2010/11)

P901 Amend to read as follows:

P901	PACKING INSTRUCTION	P901
This instruction applies to UN No. 3316.		
<p>The following combination packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:</p> <p style="padding-left: 40px;">Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2).</p> <p>Packagings shall conform to the performance level consistent with the packing group assigned to the kit as a whole (see 3.3.1, special provision 251).</p> <p>Maximum quantity of dangerous goods per outer packaging: 10 kg excluding the mass of any carbon dioxide, solid (dry ice) used as a refrigerant.</p>		
<p>Additional requirement:</p> <p>Dangerous goods in kits shall be packed in inner packagings which shall not exceed either 250 ml or 250 g and shall be protected from other materials in the kit.</p>		

P902 Amend to read as follows:

P902	PACKING INSTRUCTION	P902
This instruction applies to UN No. 3268.		
<p>Packaged articles:</p> <p>The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:</p> <p style="padding-left: 40px;">Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2).</p> <p>Packagings shall conform to the packing group III performance level.</p> <p>The packagings shall be designed and constructed so as to prevent movement of the articles and inadvertent operation during normal conditions of carriage.</p>		
<p>Unpackaged articles:</p> <p>The articles may also be carried unpackaged in dedicated handling devices, vehicles or containers when moved from where they are manufactured to an assembly plant.</p>		
<p>Additional requirement:</p> <p>Any pressure vessel shall be in accordance with the requirements of the competent authority for the substance(s) contained therein.</p>		

P903 Amend to read as follows:

P903	PACKING INSTRUCTION	P903
This instruction applies to UN Nos. 3090, 3091, 3480 and 3481.		
<p>The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3, are met:</p> <p>(1) For cells and batteries: Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2); Jerricans (3A2, 3B2, 3H2).</p> <p>Cells or batteries shall be packed in packagings so that the cells or batteries are protected against damage that may be caused by the movement or placement of the cells or batteries within the packaging. Packagings shall conform to the packing group II performance level.</p> <p>(2) In addition for cells or batteries with a gross mass of 12 kg or more employing a strong, impact resistant outer casing, and assemblies of such cells or batteries: (a) Strong outer packagings, in protective enclosures (e.g., in fully enclosed or wooden slatted crates); or (b) Pallets or other handling devices.</p> <p>Cells or batteries shall be secured to prevent inadvertent movement, and the terminals shall not support the weight of other superimposed elements. Packagings need not meet the requirements of 4.1.1.3.</p> <p>(3) For cells or batteries packed with equipment: Packagings conforming to the requirements in paragraph (1) of this packing instruction., then placed with the equipment in an outer packaging; or Packagings that completely enclose the cells or battery , then placed with equipment in a package conforming to the requirements in paragraph (1) of this packing instruction. The equipment shall be secured against movement within the outer packaging. For the purpose of this packing instruction, “equipment” means apparatus requiring the lithium metal or lithium ion cells or batteries with which it is packed for its operation.</p> <p>(4) For cells or batteries contained in equipment: Strong outer packagings constructed of suitable material of adequate strength and design, in relation to the packagings capacity and its intended use. They shall be constructed in such a manner as to prevent accidental operation during transport. Packagings need not meet the requirements of 4.1.1.3. Large equipment can be offered for transport unpackaged or on pallets when the cell or battery is afforded equivalent protection by the equipment in which it is contained. Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be transported when intentionally active in strong outer packagings. When active, these devices shall meet defined standards for electromagnetic radiation to ensure that the operation of the device does not interfere with aircraft systems.</p>		
Additional requirement:		
Cells or batteries shall be protected so as to prevent short circuits.		

(Reference document: UN/SCETDG/37/INF.84)

P904 Amend the additional requirement to read as follows:

"Additional requirement:

Ice, dry ice and liquid nitrogen

When dry ice or liquid nitrogen is used as a coolant all applicable requirements of these Regulations shall be met. When used, ice or dry ice shall be placed outside the secondary packagings or in the outer packaging or an overpack. Interior supports shall be provided to secure the secondary packaging in the original position after the ice or dry ice has dissipated. If ice is used, the outside packaging or overpack shall be leakproof. If carbon dioxide, solid (dry ice) is used, the packaging shall be designed and constructed to permit the release of carbon dioxide gas to prevent a build-up of pressure that could rupture the packagings and the package (the outer packaging or the overpack) shall be marked with the words "CARBON DIOXIDE, SOLID, AS COOLANT" or "DRY ICE, AS COOLANT".

The primary receptacle and the secondary packaging shall maintain their integrity at the temperature of the refrigerant used as well as the temperatures and the pressures which could result if refrigeration were lost.

[Packages containing a coolant or conditioner shall be transported in well ventilated cargo transport units.] [The requirements of 5.5.3 shall also apply.]".

(Reference document: UN/SCETDG/37/INF.85 as amended)

4.1.4.1 Add the following new packing instructions:

P206	PACKING INSTRUCTION	P206
This instruction applies to UN Nos. 3500, 3501, 3502, 3503, 3504 and 3505.		
Unless otherwise indicated in these Regulations, cylinders and pressure drums conforming to the applicable requirements of Chapter 6.2 are authorized.		
(1) The general packing requirements of 4.1.6.1 shall be met. (2) The maximum test period for periodic inspection shall be 5 years. (3) Cylinders and pressure drums shall 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 shall not exceed the test pressure of the cylinders and pressure drums. The vapour pressures and volumetric expansion of all substances in the cylinders and pressure drums shall be taken into account. (4) The minimum test pressure shall be in accordance with P200 for the propellant but shall not be less than 20 bar.		
Additional requirement:		
Cylinders and pressure drums shall not be offered for transport when connected with spray application equipment such as a hose and wand assembly.		
Special packing provisions:		
PP89 For UN 3500, 3501, 3502, 3503, 3504 and 3505, notwithstanding 4.1.6.1.9 (b), non-refillable cylinders used may have a water capacity in litres not exceeding 1000 litres 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 litres].		

(Reference document: UN/SCETDG/37/INF.69 as amended)

P207	PACKING INSTRUCTION	P207
This instruction applies to UN No. 1950.		
The following packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
(a) Drums (1A2, 1B2, 1N2, 1H2, 1D, 1G); Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2). Packagings shall conform to the packing group II performance level.		
(b) Rigid outer packagings with a maximum net mass as follows: Fibreboard 55kg Other than fibreboard 125kg The provisions of 4.1.1.3 need not be met.		
The packagings shall be designed and constructed to prevent movement of the aerosols and inadvertent discharge during normal conditions of transport.		
Special packing provision:		
PP87 For UN 1950 waste aerosols carried in accordance with special provision 327, the packagings shall have a means of retaining any free liquid that might escape during carriage, e.g. absorbent material. The packaging shall be adequately ventilated to prevent the creation of flammable atmosphere and the build-up of pressure.		

(Reference document: UN/SCETDG/37/INF.86/Rev.1 as amended)

4.1.6.1.5 In the first sentence, add "and in case of a chemical under pressure for the propellant" after "authorized for the gas".

(Reference document: UN/SCETDG/37/INF.69)

4.1.6.1.8 In the paragraph following sub-paragraph (e), replace "ISO 11117:1998" with "either ISO 11117:1998 or ISO 11117:2008 + Cor 1:2009".

(Reference document: ST/SG/AC.10/C.3/2010/20)

4.1.6.1.10 In the first sentence, replace "or P205" with ", P205 or P206".

(Reference document: UN/SCETDG/37/INF.69)

Add a new second sentence to read as follows: "Pressure relief valves for closed cryogenic receptacles shall be subject to periodic inspections and tests according to the provisions of 6.2.6.1.3 and packing instruction P203."

Chapter 4.2

4.2.6 At the end, add the following new paragraph:

"Portable tanks and MECGs manufactured before 1 January 2014 need not comply with the requirements of 6.7.2.13.1 (f), 6.7.3.9.1 (e), 6.7.4.8.1 (e) and 6.7.5.6.1 (d) concerning the marking of the pressure relief devices."

(Reference documents ST/SG/AC.10/C.3/2010/1 as amended)

Chapter 5.2

5.2.1.3 Insert "and salvage pressure receptacles" after "salvage packagings".

(Reference document: UN/SCETDG/37/INF.81)

Chapter 5.4

5.4.1.5.3 Amend to read as follows:

"5.4.1.5.3 *Salvage packagings and salvage pressure receptacles*

For dangerous goods transported in salvage packagings or salvage pressure receptacles, the words "**SALVAGE PACKAGING**" or "**SALVAGE PRESSURE RECEPTACLE**" shall be included."

(Reference document: UN/SCETDG/37/INF.81)

Chapter 5.5

Add the following new section:

5.5.3 Special provisions applicable to packages and cargo transport units containing substances presenting a risk of asphyxiation when used for cooling or conditioning purposes (such as dry ice (UN 1845) or nitrogen, refrigerated liquid (UN 1977) or argon, refrigerated liquid (UN 1951))

5.5.3.1 *Scope*

5.5.3.1.1 This section is not applicable to substances which may be used for cooling or conditioning purposes when transported as a consignment of dangerous goods. When they are transported as a consignment, these substances shall be transported under the relevant entry of the Dangerous Goods List in Chapter 3.2 in accordance with the associated conditions of transport.

5.5.3.1.2 This section is not applicable to gases in cooling cycles.

5.5.3.1.3 Dangerous goods used for cooling or conditioning portable tanks during transport are not subject to this section.

5.5.3.2 *General*

5.5.3.2.1 Cargo transport units containing substances used for cooling or conditioning purposes (other than fumigation) during transport are not subject to any provisions of these Regulations other than those of this section.

5.5.3.2.2 When dangerous goods are loaded in cooled or conditioned cargo transport units any provisions of these Regulations relevant to these dangerous goods apply in addition to the provisions of this section.

5.5.3.2.3 For air transport, arrangements between consignor and operator shall be made for each consignment, to ensure that ventilation safety procedures are followed.

5.5.3.2.4 Persons engaged in the handling or transport of cooled or conditioned cargo transport units shall be trained commensurate with their responsibilities.

5.5.3.3 *Packages containing a coolant or conditioner*

5.5.3.3.1 Packaged dangerous goods requiring cooling or conditioning assigned to packing instructions P203, P620, P650, P800, P901 or P904 shall meet the appropriate requirements of that packing instruction.

5.5.3.3.2 For packaged dangerous goods requiring cooling or conditioning assigned to other packing instructions the packages shall be capable of withstanding very low temperatures and shall not be affected or significantly weakened by the coolant or conditioner. Packages shall be designed and constructed to permit the release of gas to

prevent a build-up of pressure that could rupture the packaging. The dangerous goods shall be packed in such a way to prevent movement after the dissipation of any coolant or conditioner.

5.5.3.3.3 Packages containing a coolant or conditioner shall be transported in well ventilated cargo transport units.

5.5.3.4 *Marking of packages containing a coolant or conditioner*

5.5.3.4.1 Packages containing dangerous goods used for cooling or conditioning shall be marked with the proper shipping name of these dangerous goods followed by the words "AS COOLANT" or "AS CONDITIONER" as appropriate.

5.5.3.4.2 The markings shall be durable, legible and placed in such a location and of such a size relative to the packaging as to be readily visible.

5.5.3.5 *Cargo transport units containing unpackaged dry ice*

5.5.3.5.1 If dry ice in unpackaged form is used, it shall not come into direct contact with the metal structure of a cargo transport unit to avoid embrittlement of the metal. Measures shall be taken to provide adequate insulation between the dry ice and the cargo transport unit by providing a minimum of 30 mm separation (e.g. by using suitable low heat conducting materials such as timber planks, pallets etc).

5.5.3.5.2 Where dry ice is placed around packages, measures shall be taken to ensure that packages remain in the original position during transport after the dry ice has dissipated.

5.5.3.6 *Marking of cargo transport units*

5.5.3.6.1 Cargo transport units containing dangerous goods used for cooling or conditioning shall be marked with a warning mark, as specified in 5.5.3.6.2 affixed at each access point in a location where it will be easily seen by persons opening or entering the cargo transport unit. This mark shall remain on the cargo transport unit until the following provisions are met:

- (a) The cargo transport unit has been ventilated to remove harmful concentrations of coolant or conditioner; and
- (b) The cooled or conditioned goods have been unloaded.

5.5.3.6.2 The warning mark shall be rectangular and shall not be less than 150 mm wide and 250 mm high. The warning mark shall include:

- (a) The word "WARNING" in red or white with lettering not less than 25 mm high; and
- (b) The proper shipping name followed by the words "AS COOLANT" or "AS CONDITIONER" as appropriate, shown below the symbol in black letters on a white background with lettering not less than 25 mm high.

For example: CARBON DIOXIDE, SOLID, AS COOLANT.

An illustration of this mark is given in Figure 5.5.2

Figure 5.5.2



* insert the proper shipping name followed by the words "AS COOLANT" or "AS CONDITIONER" as appropriate

5.5.3.7 Documentation

5.5.3.7.1 Documents (such as a bill of lading or cargo manifest) associated with the transport of cargo transport units that have been cooled or conditioned and have not been completely ventilated before transport shall include the following information:

- (a) The UN number preceded by the letters "UN"; and
- (b) The proper shipping name followed by the words "AS COOLANT" or "AS CONDITIONER" as appropriate.

For example: UN 1845, CARBON DIOXIDE, SOLID, AS COOLANT"

5.5.3.7.2 The transport document may be in any form, provided it contains the information required in 5.5.3.7.1. This information shall be easy to identify, legible and durable."

(Reference document: UN/SCETDG/37/INF.85 as amended)

Chapter 6.1

6.1.2.7 In the table, under "4. Boxes", after the entries for "H. Plastics", insert the following row:

N. Metal, other than steel or aluminium	4N	6.1.4.14
---	----	----------

6.1.4.14 Amend to read as follows:

"6.1.4.14 Steel, aluminium or other metal boxes

4A steel boxes

4B aluminium boxes

4N metal, other than steel or aluminium, boxes"

(Reference document: ST/SG/AC.10/C.3/2010/8)

Chapter 6.2

6.2.1.1.5 Amend the first sentence to read as follows: "The test pressure of cylinders, tubes, pressure drums and bundles of cylinders shall be in accordance with packing instruction P200, or, for a chemical under pressure, with P206."

6.2.1.6.1 At the end, amend the Note to read as follows:

"NOTE: For the periodic inspection and test frequencies, see packing instruction P200 or, for a chemical under pressure, P206 of 4.1.4.1."

(Reference document: UN/SCETDG/37/INF.69)

Add a new paragraph 6.2.1.6.3 to read as follows:

"6.2.1.6.3 Pressure relief valves for closed cryogenic receptacles shall be subject to periodic inspections and tests."

(Reference document: ST/SG/AC.10/C.3/2010/24 as amended)

6.2.2.3 In the first table, amend the row for ISO 11117:1998 to read as follows:

ISO 11117:2008 + Cor 1:2009	Gas cylinders – Valve protection caps and valve guards – Design, construction and tests NOTE: Construction according to ISO 11117:1998 may continue until 31 December 2014.
--------------------------------	---

At the end of the first table, add a new row to read as follows:

ISO 13340:2001	Transportable gas cylinders – Cylinders valves for non-refillable cylinders – Specification and prototype testing
----------------	---

(Reference document: ST/SG/AC.10/C.3/2010/20)

6.2.3.3 Replace "and bundles of cylinders" with ", bundles of cylinders and salvage pressure receptacles".

Add a new 6.2.3.5 to read as follows:

"6.2.3.5 Salvage pressure receptacles

To permit the safe handling and disposal of the pressure receptacles transported within the salvage pressure receptacle, the design may include equipment not otherwise used for cylinders or pressure drums such as flat heads, quick opening devices and openings in the cylindrical part.

Instructions on the safe handling and use of the salvage pressure receptacle shall be clearly shown in the documentation for the application to the competent authority and shall form part of the approval certificate. In the approval certificate, the pressure

receptacles authorized to be transported in a salvage pressure receptacle shall be indicated. A list of the materials of construction of all parts likely to be in contact with the dangerous goods shall also be included.

A copy of the approval certificate shall be delivered by the manufacturer to the owner of a salvage pressure receptacle.

The marking of salvage pressure receptacles according to 6.2.3 shall be determined by the competent authority in taking into account suitable marking provisions of 6.2.2.7 as appropriate. The marking shall include the water capacity and test pressure of the salvage pressure receptacle.

NOTE: *These provisions for salvage pressure receptacles may be applied for new salvage pressure receptacles as from 1 January 2013, unless otherwise authorized, and shall be applied for all new salvage pressure receptacles as from 1 January 2014. Salvage pressure receptacles approved in accordance with national regulations may be used with the approval of the competent authorities of the countries of use."*

(Reference document: UN/SCETDG/37/INF.81 as amended)

Chapter 6.6

Add a new 6.6.3.3 to read as follows:

"6.6.3.3 The maximum permitted stacking load applicable when the large packaging is in use shall be displayed on a symbol as follows:



Large packaging capable of being stacked

Large packaging NOT capable of being stacked

The symbol shall be not less than 100 mm × 100 mm, be durable and clearly visible. The letters and numbers indicating the mass shall be at least 12 mm high.

The mass marked above the symbol shall not exceed the load imposed during the design type test (see 6.6.5.3.3.4) divided by 1.8.

NOTE: *The provisions of 6.6.3.3 shall apply to all large packagings manufactured, repaired or remanufactured as from [1 January 2015]."*

(Reference document: ST/SG/AC.10/C.3/2010/2 as amended)

Chapter 6.7

6.7.2.13.1 After sub-paragraph (e), add the following new sub-paragraph (f):

"(f) The cross sectional flow areas of the spring loaded pressure-relief devices, frangible discs and fusible elements in mm²."

Re-number existing sub-paragraph (f) as sub-paragraph (g).

6.7.2.13.2, 6.7.3.9.2, 6.7.4.8.2 and 6.7.5.6.2 Replace "ISO 4126-1:1991" with "ISO 4126-1:2004 and ISO 4126-7:2004".

6.7.3.9.1 and 6.7.4.8.1 After sub-paragraph (d), add the following new sub-paragraph (e):

"(e) The cross sectional flow areas of the spring loaded pressure-relief devices and frangible discs in mm²".

Re-number existing sub-paragraph (e) as sub-paragraph (f).

6.7.5.6.1 After sub-paragraph (c), add the following new sub-paragraph (d):

"(d) The cross sectional flow areas of the spring loaded pressure-relief devices and frangible discs in mm²".

(Reference document: ST/SG/AC.10/C.3/2010/1 as amended)

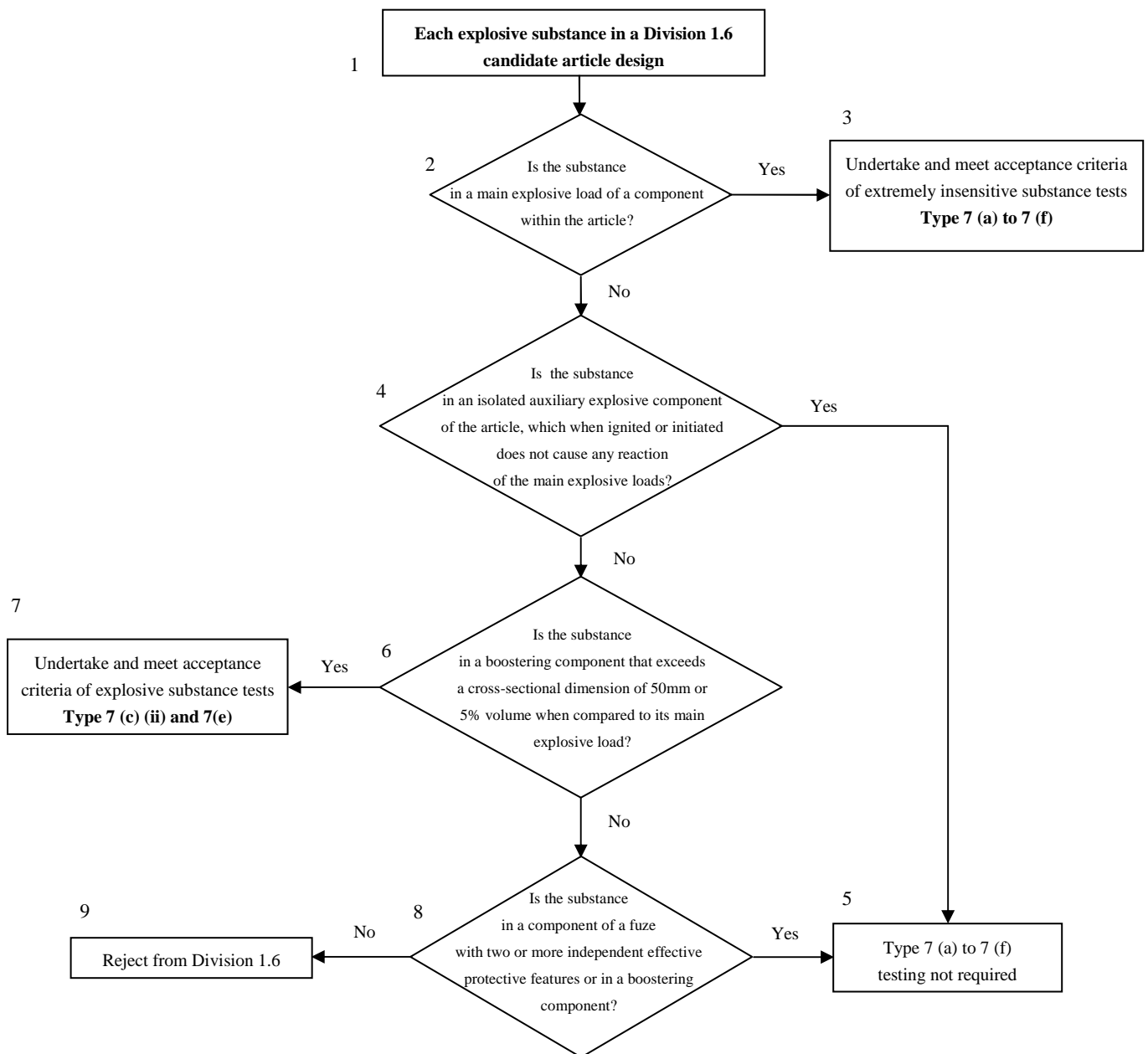
Annex II

Draft amendments to the fifth revised edition of the Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria

Section 10

After Figure 10.4, insert new Figure 10.5 as follows:

"Figure 10.5 Procedure to determine required substance testing for Division 1.6



Consequential amendments:

Re-number Figures 10.5 to 10.9 as Figures 10.6 to 10.10. In 10.5.1, replace "Figures 10.5 to 10.8" with "Figures 10.6 to 10.9". In 10.5.2, replace "Figure 10.9" with "Figure 10.10".

10.4.2.4 Amend the first paragraph to read as follows:

"The question "Is it an extremely insensitive explosive article?" (box 40, Figure 10.3) is answered by series 7 tests and any candidate for Division 1.6 should be assessed against each of the eleven types of test comprising the series. The protocol for determining the test requirements is given in Figure 10.5. The first six types of test (7(a)-7(f)) are used to establish if a substance is an Extremely Insensitive Substance (EIS). The purpose of these tests is to develop an understanding of the sensitivity of substance(s) contained within the article, which informs and provides confidence in the article tests. The remaining five types of test (7(g), 7(h), 7(j), 7(k) and 7 (l)) are used to determine if an article predominantly containing EIS may be assigned to Division 1.6. The eleven test types are:".

After test "Type 7 (k)", add a new test to read as follows:

"Type 7 (l): a test to determine the sensitivity of an article to shock directed at vulnerable components."

10.4.3.6 Amend to read as follows:

"10.4.3.6 Tests types 7 (a) to 7 (f) should be used to establish that a substance is an extremely insensitive substance and then test types 7 (g), 7 (h), 7 (j), 7 (k) and 7 (l) used to establish that the articles predominantly containing EIS(s) may be assigned to Division 1.6."

Add a new paragraph 10.4.3.7 to read as follows:

"10.4.3.7 Tests of types 7 (g), 7 (h), 7 (j), 7 (k) and 7(l) should be performed to determine if an article with EIS main explosive load(s) and appropriately insensitive boosting components may be assigned to Division 1.6. These tests are applied to articles in the condition and form in which they are offered for transport, except that non-explosive components may be omitted or simulated if the competent authority is satisfied that this does not invalidate the results of the tests. The procedure detailing testing requirements is given in Figure 10.5 and some points of explanation are given below.

(a) Complex articles may contain multiple substances and this procedure should be completed for all substances within the article to be classified.

(b) The question "Is the substance in a main explosive load of a component within the article?" (Box 2 of Figure 10.5) is answered by examining the design of the article. Main explosive load substances are those loaded into components within the article that are not fuze, boosting, or isolated auxiliary explosive components. All substances in main explosive loads must "Undertake and meet acceptance criteria of extremely insensitive substance tests, Type 7 (a) to 7 (f)" (Box 3 of Figure 10.5). If a '+' result is obtained for any main explosive load substance to any Type 7 (a) to 7 (f) test, the substance is not an EIS and the answer to the question in Box 24 of Figure 10.3 is "No." The article is not a candidate for Division 1.6.

(c) Answering the question "Is the substance in an isolated auxiliary explosive component of the article, which when ignited or initiated does not cause any reaction of the main explosive loads?" (Box 4 of Figure 10.5) requires knowledge of the design of the article plus the explosive effects that occur when such components are initiated or ignited, either in their design mode or accidentally. Typically these will be small

explosive actuators or pyromechanical devices that produce movement, cutting or opening functions. If the answer is 'yes' to this question, Type 7 (a) to 7 (f) testing is not required for substances in isolated auxiliary explosive components and the article remains a candidate for Division 1.6.

(d) The question "Is the substance in a boosting component that exceeds a cross-sectional dimension of 50 millimetres or 5 percent volume when compared to its main explosive load?" (Box 6 of Figure 10.5) is answered by examining the design of the article. All substances in such larger boosting components, including those contained in explosive components of dual-protected fuzes in an article, must "Undertake and meet acceptance criteria of explosive substance tests, Type 7 (c) (ii) and 7 (e)" (box 7 of Figure 10.5). If a '+' result is obtained for any such larger boosting component substance to either Type 7 (c) (ii) and 7 (e) tests, the answer to the question in Box 24 of Figure 10.3 is "No." The article is not a candidate for Division 1.6.

(e) The question "Is the substance in a component of a fuze with two or more independent effective protective features or in a boosting component" (Box 8 of Figure 10.5) is answered by an understanding of the design and development of the article. If the answer is 'no', the article is not considered to have suitable intrinsic safety characteristics and the answer to the question in Box 24 of Figure 10.3 is 'No' the article is not a candidate for Division 1.6.

NOTE: Knowledge of the design and explosive effects can be obtained by modelling or indicative tests etc."

Section 17

17.1 Amend the first paragraph to read as follows:

"The question "Is it an extremely insensitive explosive article?" (box 40 of Figure 10.3) is answered by series 7 tests and any candidate for Division 1.6 should be assessed against each of the eleven types of test comprising the series. The first six types of test (7(a) to 7(f)) are used to establish if a substance is an Extremely Insensitive Substance (EIS) and the remaining five types of test (7 (g), 7 (h), 7 (j), 7 (k) and 7 (l)) are used to determine if an article predominantly containing EIS(s) may be assigned to Division 1.6. The eleven test types are:"

After test "Type 7 (k)", add a new test to read as follows:

"Type 7 (l): a test to determine the sensitivity of the article to shock directed at vulnerable components."

Table 17.1 Replace "EIDS" with "EIS" wherever it appears.

At the end of the table, add a new row to read as follows:

"7 (l)	1.6 article fragment impact test	17.4.1"
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17.3 Add a new paragraph 17.3.1 to read as follows:

"17.3.1 All explosive components must always be present in articles during Series 7 testing of types 7 (g) to 7 (l). Smaller explosive components containing substances not subjected to tests of type 7 (a) to 7 (f) shall be specifically targeted in tests 7(j) and 7(l) when it is assessed that they will cause the most severe reaction from the test article, to ensure the probability of accidental initiation or propagation of a Division 1.6 article remains negligible."

Renumber existing 17.3.1 to 17.3.3 as 17.3.2 to 17.3.4.

17.3.1 (renumbered 17.3.2) In the first sentence, replace "use as the explosive load" with "use as a main explosive load". Insert a new second sentence to read as follows: "A substance intended for use as a larger (dimensionally) boosting component in an article of Division 1.6, where the volumetric size limit relative to the main explosive load it is boosting is met, should be tested in accordance with Test Series 3 and tests of type 7 (c) (ii) and 7 (e).".

17.3.2 (renumbered 17.3.3) Amend to read as follows:

"17.3.3 An article being considered for inclusion in Division 1.6 should not undergo Series 7 testing until after main explosive load and certain boosting component substances have undergone appropriate tests of type 7 (a) to 7 (f) to determine whether they meet the substance requirements for Division 1.6. Guidance on the substance testing determination process is given under section 10.4.3.6."

17.3.3 (renumbered 17.3.4) Amend the first sentence to read as follows: "Tests of types 7 (g), 7 (h), 7 (j), 7 (k) and 7 (l) should be performed to determine if an article with EIS main load(s) and appropriately insensitive boosting components may be assigned to Division 1.6."

Insert a new paragraph 17.3.5 to read as follows:

"17.3.5 Response levels referred to within the following individual Test Series 7 test prescriptions are provided at Appendix 8 (Response descriptors), to aid in the assessment of the results of tests of types 7 (g), 7 (h), 7 (j), 7 (k) and 7 (l) and should be reported to the competent authority to support assignment to Division 1.6."

17.10.1 Amend to read as follows:

"17.10.1 Test 7 (g): 1.6 article (or component level) external fire test".

17.10.1.3 Renumber existing paragraph as 17.10.1.3.1 and add the following new paragraphs:

"17.10.1.3.2 Colour still photographs are taken to document the condition of the test item and the test equipment before and after the test. Explosive substance remains, fragmentation, blast, projections, cratering, witness screen damage, and thrust are documented as an indication of the article's response level.

17.10.1.3.3 Colour video for the duration of each trial can be vital to assessment of response. In sitting the camera(s), it is important to ensure that the field of view will not be obstructed by any of the test facilities or instrumentation and that the field of view will include all necessary information.

17.10.1.3.4 To classify complex articles containing multiple EIS main explosive loads, external fire testing at the individual main load component level should be conducted to fully characterise the article's response level."

17.10.1.4 Replace "If there is a reaction more severe than burning" with "If there is a response level more severe than burning as outlined in Appendix 8".

17.11.1 Amend to read as follows:

"17.11.1 Test 7 (h): 1.6 article or component level slow cook-off test".

17.11.1.3.2 Amend to read as follows:

"17.11.1.3.2 Colour still photographs are taken to document the condition of the test item and the test equipment before and after test. Explosive substance remains, fragmentation, blast, projections, cratering, witness plate damage, and thrust are documented as an

indication of the article's response level. Colour video for the duration of each trial can be vital to assessment of response. In sitting the camera(s), it is important to ensure that the field of view will not be obstructed by any of the test facilities or instrumentation and that the field of view will include all necessary information."

17.11.1.3.3 Add a new second sentence to read as follows: "To classify complex articles containing multiple EIS main explosive loads, slow cook-off testing at the individual main load component level should be conducted to fully characterise the article's response level."

17.11.1.4 Amend the sentence to read as follows: "If there is a response level more severe than burning as outlined in Appendix 8, the result is noted as "+" and the items are not classified as Division 1.6 articles."

17.12.1 Amend to read as follows:

"17.12.1 Test 7 (j): 1.6 article or component level bullet impact test".

17.12.1.2 to 17.12.1.4 Amend to read as follows:

"17.12.1.2 *Apparatus and materials*

Three 12.7 mm guns are used to fire service 12.7 mm armour-piercing ammunition with a projectile mass of 0.046 kg. Standard propellant loads may require adjustment to achieve projectile velocities within tolerance. The guns are fired by remote control and protected from fragment damage by firing through a hole in a heavy steel plate. The firing gun muzzles should be at a minimum range of at least 10 m from the test item to assure bullet stabilization prior to impact, and at a maximum range of 30 m from the test item depending upon the explosive weight of the test item. The test item should be secured in a holding device capable of restraining the test item against dislodgement by the projectiles.

17.12.1.3 *Procedure*

17.12.1.3.1 The candidate Division 1.6 article is subjected to a three-round burst fired at 840 ± 40 m/s velocity and 600 rounds/minute rate of fire. The test is repeated in three different orientations, striking the test item in the most vulnerable areas as assessed by the competent authority. These are areas for which an assessment of the explosive sensitivity (explosiveness and sensitiveness) combined with knowledge of the article design indicate the potential producing the most violent response level.

17.12.1.3.2 Colour still photographs are taken to document the condition of the test item and the test equipment before and after the test. Explosive substance remains, fragmentation, blast, projections, cratering, witness plate damage, and thrust are documented as an indication of the article's response level.

17.12.1.3.3 Colour video for the duration of each trial can be vital to assessment of response. In sitting the camera(s), it is important to ensure that the field of view will not be obstructed by any of the test facilities or instrumentation and that the field of view will include all necessary information.

17.12.1.3.4 To classify complex articles containing multiple EIS main explosive loads, bullet impact testing at the individual main load component level should be conducted to fully characterise the article's response level.

17.12.1.4 *Test criteria and method of assessing results*

If there is a response level more severe than burning as outlined in Appendix 8, the result is noted as "+" and the items are not classified as Division 1.6 articles."

17.13.1.2 Amend to read as follows:

"17.13.1.2 *Apparatus and materials*

The experimental set-up is the same as for test 6 (b) (see 16.5.1.2), with one trial conducted confined, and another unconfined. The test should only be conducted on detonable candidate Division 1.6 articles; the test 7 (k) article stack test is waived for non-detonable candidates for Division 1.6 (evidence is available to demonstrate that the article cannot support a detonation). Where the article is designed to provide a detonation output, the article's own means of initiation or a stimulus of similar power shall be used to initiate the donor. If the article is not designed to detonate but is capable of supporting a detonation, the donor shall be detonated using an initiation system selected to minimise the influence of its explosive effects on the acceptor article(s)."

17.13.1.3 Amend to read as follows:

"17.13.1.3 *Procedure*

The experimental set-up is the same as for test 6 (b) (see 16.5.1.3). The test is performed twice unless detonation of an acceptor is observed earlier. Colour still photographs are taken to document the condition of the test item and the test equipment before and after the test. Explosive substance remains, fragmentation, blast, projections, cratering, witness plate damage, and thrust are documented and used to assess whether or not any acceptor has detonated (including partially). Blast data may be used to supplement this decision. Colour video for the duration of each trial can be vital to assessment of response. In siting the camera(s), it is important to ensure that the field of view will not be obstructed by any of the test facilities or instrumentation and that the field of view will include all necessary information. Comparing data from the two stack test trials to data from a single donor calibration shot, or to a calculated donor detonation pressure, can be useful in assessing the response level of acceptors."

17.13.1.4 Amend the second sentence to read as follows: "Acceptor article response levels assessed as no reaction, burning, deflagration, or explosion as outlined in Appendix 8 are considered as negative results and noted as "—"."

Add the following new sub-section 17.14:

"17.14 Series 7 type (I) test prescription

17.14.1 Test 7 (I): 1.6 article (or component level) fragment impact test

17.14.1.1 *Introduction*

This test is used to determine the response of an article in its transport configuration to a localised shock input representative of a fragment strike typical of that produced from a nearby detonating article.

17.14.1.2 *Apparatus and materials*

To reduce variability due to yaw, a gun system is recommended for firing a standard 18.6 gram steel fragment in the shape of a right-circular cylinder with a conical nose, as detailed in Figure 17.14.1, at a candidate Division 1.6 article. The distance between the firing device and the test item should ensure that the fragment is ballistically stable at impact. Barricades should protect the remote control gun system from the potential damaging effects of the test item's reaction.

17.14.1.3 *Procedure*

17.14.1.3.1 The test is repeated in two different orientations, striking the test item in the most vulnerable areas as assessed by the competent authority. These are areas for which an

assessment of the explosive sensitivity (explosiveness and sensitiveness) combined with knowledge of the article design indicate the potential for producing the most violent response level. Typically, one test would be conducted targeting a non-EIS boosting component and the second test would target the centre of the main explosive load. The orientation of impact should generally be normal to the outer surface of the article. The fragment impact velocity should be 2530 ± 90 m/s.

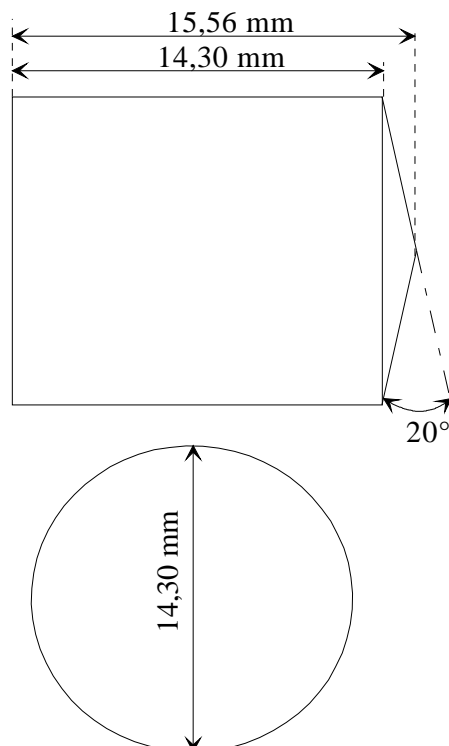
17.14.1.3.2 Colour still photographs are taken to document the condition of the test item and the test equipment before and after the test. Explosive substance remains, fragmentation, blast, projections, cratering, witness plate damage, and thrust are documented as an indication of the article's response level.

17.14.1.3.3 Colour video for the duration of each trial can be vital to assessment of response. In sitting the camera(s), it is important to ensure that the field of view will not be obstructed by any of the test facilities or instrumentation and that the field of view will include all necessary information.

17.14.1.3.4 To classify complex articles containing multiple EIS main explosive loads, fragment impact testing at the individual main load component level should be conducted to fully characterise the article's response level.

17.14.1.4 *Test criteria and method of assessing results*

If there is a response level more severe than burning as outlined in Appendix 8, the result is noted as "+" and the items are not classified as Division 1.6 articles.



Notes:

Shape: a conical ended cylinder with the ratio $\frac{L \text{ (length)}}{D \text{ (diameter)}} > 1$ for stability;
 Tolerances: $\pm 0.05 \text{ mm}$ and $\pm 0^\circ30'$
 Fragment Mass: 18.6 grams
 Fragment Material: a mild carbon steel with a Brinell Hardness (HB) less than 270

Figure 17.14.1 Standard fragment for 1.6 article fragment impact test

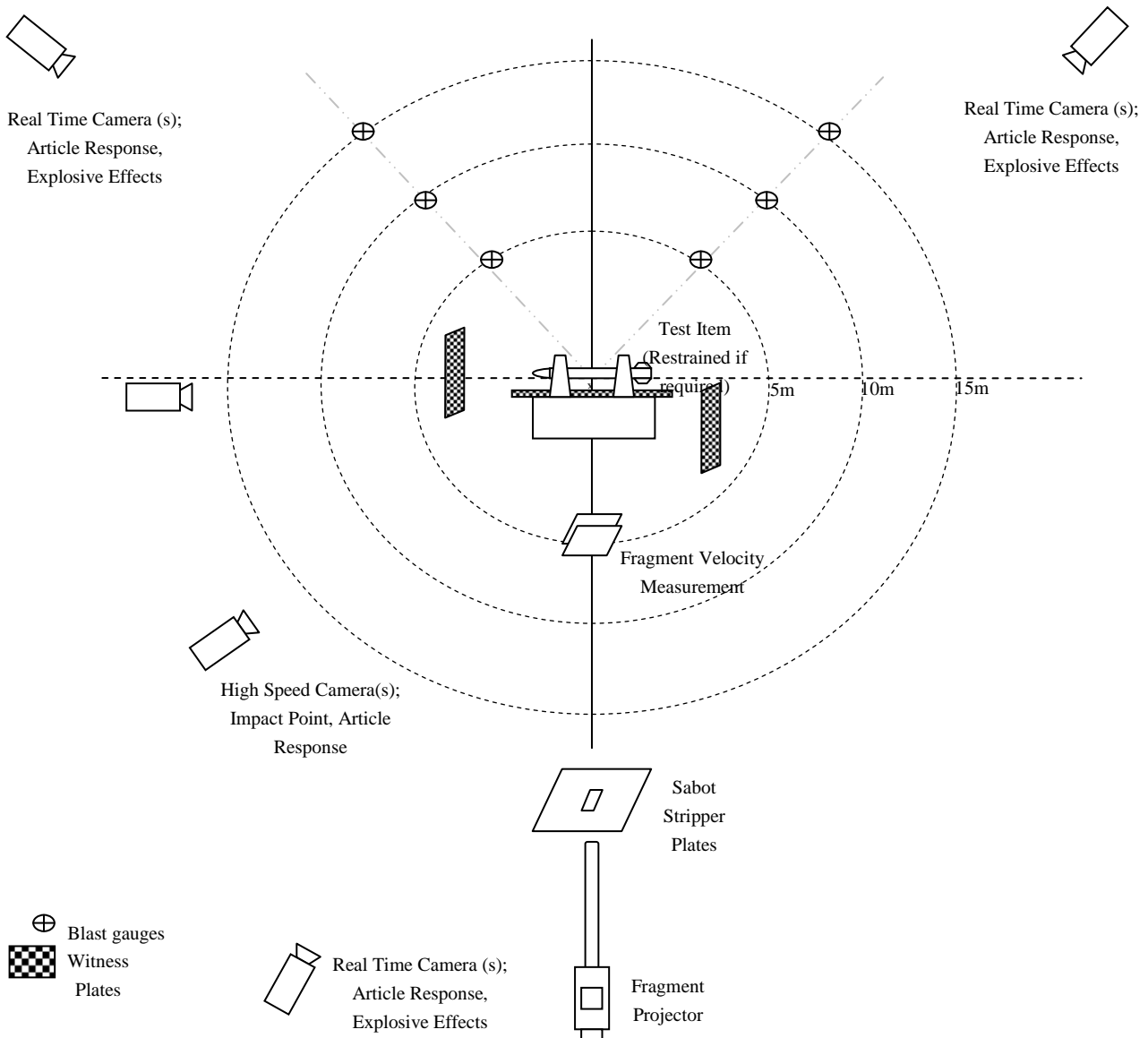


Figure 17.14.2 Typical setup for 1.6 article fragment impact test

Consequential amendments:

In Table 1.2 and in sub-sections 17.4, 17.5, 17.6, 17.7, 17.8 and 17.9, replace "MDEPS" with "MEPS" wherever it appears.

(Reference documents: ST/SG/AC.10/C.3/2010/40 and UN/SCETDG/37/INF.73)

Section 38

38.3.2, Table 38.3.2.2 In the second row, first column, amend to read as follows: $1g \leq M < 5g$

(Reference document: ST/SG/AC.10/C.3/2010/42)

[Section 41

41.2.2 Amend to read as follows:

"41.2.2 MEGCs

- (a) A decrease in the maximum design temperature, not affecting thickness;
- (b) An increase in the minimum design temperature, not affecting thickness;
- (c) A decrease in the maximum permissible gross mass;
- (d) A decrease in the mass of each individual element and its lading or a decrease in the total mass of the elements and their lading;
- (e) An increase of no more than 10% or a decrease of no more than 40% in the diameter of the elements;
- (f) A change of no more than 10% in the length of the elements;
- (g) A decrease of no more than 3.1 metres (10 feet) in the length of the MEGC framework;
- (h) A decrease of no more than 50% in the height of the MEGC;
- (i) A change of no more than 50% in the number of elements;
- (j) An increase in the thickness of the materials of the framework provided the thickness stays within the range permitted by the welding procedures specifications;
- (k) A change to the service equipment and manifold such that the total mass of the service equipment and manifold changes no more than 10% of the maximum permissible gross mass (but not resulting in an increase in the maximum permissible gross mass as compared to that of the already-tested prototype);
- (l) The use of a different grade of the same type of material for the construction of the framework, provided that:
 - (i) The results of the design calculations for the different grade, using the most unfavourable specified values of mechanical properties for that grade, meet or exceed the results of the design calculation for the existing grade; and

- (ii) The alternate grade is permitted by the welding procedures specifications.".]

(Reference document: ST/SG/AC.10/C.3/2010/19)

Appendices

Add a new Appendix 8 to read as follows:

"APPENDIX 8

RESPONSE DESCRIPTORS

These response descriptors are to be used for the purposes of Test Series 7 criteria and designed to be used by the competent authority to determine the response type of articles. For example, articles vary greatly in size, type, packaging and explosive substances; these differences need to be taken into account. For a reaction to be judged a particular type, the primary evidence (denoted P in the table below) for that type would need to be present. The entire (both primary and secondary) body of evidence must be weighed carefully and used in its entirety by the competent authority to assess the reaction. The secondary evidence provides other indicators that may be present.

Response level	Observed or measured effects				
	Explosive Substances(ES)	Case	Blast	Fragment or ES projection	Other
Detonation	Prompt consumption of all ES once the reaction starts	(P) Rapid plastic deformation of the metal casing contacting the ES with extensive high shear rate fragmentation	(P) Shock wave with magnitude & timescale = to a calculated value or measured value from a calibration test	Perforation, fragmentation and/or plastic deformation of witness plates	Ground craters of a size corresponding to the amount of ES in the article
Partial detonation		(P) Rapid plastic deformation of some, but not all, of the metal casing contacting the ES with extensive high shear rate fragmentation	(P) Shock wave with magnitude & timescale < that of a calculated value or measured value from a calibration test Damage to neighboring structures	Perforation, plastic deformation and/or fragmentation of adjacent witness plates. Scattered burned or unburned ES.	Ground craters of a size corresponding to the amount of ES that detonated.
Explosion	(P) Rapid combustion of some or all of the ES once the article reaction starts	(P) Extensive fracture of metal casings with no evidence of high shear rate fragmentation resulting in larger and fewer fragments than observed from purposely detonated calibration tests ☐	Observation or measurement of a pressure wave throughout the test arena with peak magnitude << and significantly longer duration than of a measured value from a calibration test	Witness plate damage. Significant long distance scattering of burning or unburned ES.	Ground craters.
Deflagration	(P) Combustion of some or all of the ES	(P) Rupture of casings resulting in a few large pieces that might include enclosures or attachments. *	Some evidence of pressure in the test arena which may vary in time or space.	(P) At least one piece (casing, enclosure or attachment) travels beyond 15m with an energy level > 20J based on the distance/mass relationship of Figure 16.6.1.1. Significant scattered burning or unburned ES, generally beyond 15 m.	(P) There is no primary evidence of a more severe reaction and there is evidence of thrust capable of propelling the article beyond 15m. Longer reaction time than would be expected in an explosion reaction.

Response level	Observed or measured effects				
	Explosive Substances(ES)	Case	Blast	Fragment or ES projection	Other
Burn	(P) Low pressure burn of some or all of the ES	(P) The casing may rupture resulting in a few large pieces that might include enclosures or attachments. *	Some evidence of insignificant pressure in the test arena.	(P) No item (casing, enclosure, attachment or ES) travels beyond 15m with an energy level > 20J based on the distance/mass relationship detailed at Figure 16.6.1.1 . (P) A small amount of burning or unburned ES relative to the total amount in the article may be scattered, generally within 15m but no farther than 30m.	(P) No evidence of thrust capable of propelling the article beyond 15m. For a rocket motor a significantly longer reaction time than if initiated in its design mode.
No Reaction	(P) No reaction of the ES without a continued external stimulus. (P) Recovery of all or most of the unreacted ES with no indication of a sustained combustion.	(P) No fragmentation of the casing or packaging greater than that from a comparable inert test item. *	None	None	None

** Note: Mechanical threats will directly induce damage causing disruption of the article or even a pneumatic response resulting in parts, particularly closures, being projected. This evidence can be misinterpreted as being driven by the reaction of the explosive substance contained in the article, which may result in a more severe response descriptor being assigned. Comparison of observed evidence with that of a corresponding inert article can be useful in helping to determine the article's response."*

(Reference documents: ST/SG/AC.10/C.3/2010/40 and UN/SCETDG/37/INF.73)

Annex III

Draft amendments to the Guiding Principles

[English only]

Chapter 4.3

In the table under "Guidance for groups of substances", in the last column for "6.1 Liquids (TIH)" and in footnote d, replace "with an inhalation toxicity" with "with an LC₅₀".
