



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

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Item 2 of the provisional agenda

Recommendations made by the Sub-Committee on its forty-third, forty-fourth and forty-fifth sessions and pending issues

Consolidated list of adopted texts

Note by the secretariat¹

This document contains a consolidated list of texts adopted by the Sub-Committee of Experts at its forty-third, forty-fourth and forty-fifth sessions, as follows:

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¹ In accordance with the programme of work of the Sub-Committee for 2013-2014 approved by the Committee at its sixth session (refer to ST/SG/AC.10/C.3/84, para. 86 and ST/SG/AC.10/40, para. 14).

Part I

Draft amendments to the 18th revised edition of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations

Chapter 1.1

1.1.1.7 Add the following new sentence at the end of the paragraph under 1.1.1.7: “The requirements of the standard that do not conflict with these Regulations shall be applied as specified, including the requirements of any other standard, or part of a standard, referenced within that standard as normative.”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

Chapter 1.2

1.2.1 In the definition of “Aerosol or aerosol dispenser”, insert “an article consisting of” after “means”.

(Reference document: ST/SG/AC.10/C.3/88)

1.2.1 In the definition of “Large salvage packaging”, replace “or leaking” by “, leaking or non-conforming”.

(Reference document: ST/SG/AC.10/C.3/88)

1.2.1 In the definition of “Salvage pressure receptacle” replace “1 000” by “3 000”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

1.2.1 In the definition of “Tube”, replace “a seamless transportable pressure receptacle” by “a transportable pressure receptacle of seamless or composite construction having”.

(Reference document: ST/SG/AC.10/C.3/88)

1.2.1 Add the following new definitions in alphabetical order:

“Design life, for composite cylinders and tubes, means the maximum life (in number of years) to which the cylinder or tube is designed and approved in accordance with the applicable standard;”.

(Reference document: ST/SG/AC.10/C.3/88)

“Service life, for composite cylinders and tubes, means the number of years the cylinder or tube is permitted to be in service;”

(Reference document: ST/SG/AC.10/C.3/88)

Chapter 2.1

2.1.1.4 (f) Insert the word “predominantly” after “articles which”. Delete the word “only” before “extremely insensitive”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

2.1.2.1.1 Amend the description for Compatibility Group N to read as follows:
 “Articles predominantly containing extremely insensitive substances”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

Chapter 2.3

2.3.2.2 Amend sub-paragraph (a) to read as follows:

“(a) The viscosity¹ and flash-point are in accordance with the following table:

Kinematic viscosity (extrapolated) v (at near-zero shear rate) mm²/s at 23°C	Flow-time t in seconds	Jet diameter (mm)	Flash-point, closed-cup (°C)
20 < v ≤ 80	20 < t ≤ 60	4	above 17
80 < v ≤ 135	60 < t ≤ 100	4	above 10
135 < v ≤ 220	20 < t ≤ 32	6	above 5
220 < v ≤ 300	32 < t ≤ 44	6	above -1
300 < v ≤ 700	44 < t ≤ 100	6	above -5
700 < v	100 < t	6	No limit

“

Footnote 1 reads as follows:

¹ *Viscosity determination: Where the substance concerned is non-Newtonian, or where a flow-cup method of viscosity determination is otherwise unsuitable, a variable shear-rate viscometer shall be used to determine the dynamic viscosity coefficient of the substance, at 23°C, at a number of shear rates. The values obtained are plotted against shear rate and then extrapolated to zero shear rate. The dynamic viscosity thus obtained, divided by the density, gives the apparent kinematic viscosity at near-zero shear rate.*”

Renumber existing footnote 1 in 2.3.4 as footnote 2.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

Chapter 2.5

2.5.3.2.4 In the table, amend the entries listed below as follows:

<i>Organic peroxide</i>		<i>Column</i>	<i>Amendment</i>
DIBENZOYL PEROXIDE	(first row)	Concentration (%)	Replace ">51 - 100" with ">52 - 100"
tert-BUTYL CUMYL PEROXIDE	(first row)	Number (Generic entry)	Replace "3107" with "3109"
DICETYL PEROXYDICARBONATE	(first row)	Packing Method	Replace "OP7" with "OP8"
DICETYL PEROXYDICARBONATE	(first row)	Number (Generic entry)	Replace "3116" with "3120"
tert-BUTYL PEROXY-3,5,5-TRIMETHYLHEXANOATE	(first row)	Concentration (%)	Replace ">32-100" with ">37-100"

<i>Organic peroxide</i>		<i>Column</i>	<i>Amendment</i>
tert-BUTYL PEROXY-3,5,5-TRIMETHYLHEXANOATE	(third row)	Concentration (%)	Replace "≤ 32" with "≤37"
tert-BUTYL PEROXY-3,5,5-TRIMETHYLHEXANOATE	(third row)	Diluent type B (%)	Replace "≥ 68" with "≥ 63"

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

Chapter 2.9

2.9.2, under *Substances and articles which, in the event of fire, may form dioxins*

After "3151 POLYHALOGENATED BIPHENYLS, LIQUID or", add a new entry to read as follows: "3151 HALOGENATED MONOMETHYLDIPHENYLMETHANES, LIQUID or".

(Reference document: ST/SG/AC.10/C.3/88)

After "3152 POLYHALOGENATED BIPHENYLS, SOLID or", add a new entry to read as follows: "3152 HALOGENATED MONOMETHYLDIPHENYLMETHANES, SOLID or".

(Reference document: ST/SG/AC.10/C.3/88)

Chapter 3.2, Dangerous Goods List

For UN Nos. 1005 and 3516 Add "379" in column (6).

(Reference document: ST/SG/AC.10/C.3/88)

For UN Nos. 1006, 1013, 1046, 1056, 1065, 1066, 1956, 2036 , add "378" in column (6).

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

For UN No. 1415 Add "T9" in column (10). Add "TP7" and "TP33" in column (11).

(Reference document: ST/SG/AC.10/C.3/88)

For UN No. 1950, in column (8), replace "LP02" by "LP200" and insert "381" in column (6).

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

For UN No. 1966 Delete "TP23" in column (11).

(Reference document: ST/SG/AC.10/C.3/88)

For UN No. 2213 Insert "223" in column (6).

(Reference document: ST/SG/AC.10/C.3/88)

For UN No. 2813, all entries, in column (9), delete "PP83".

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

For UN Nos. 2977 and 2978, in column (4), insert "6.1".

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

For UN No. 2983 Replace "P200" by "P001" in column (8).

(Reference document: ST/SG/AC.10/C.3/88)

For UN Nos. 3091 and 3481, insert “310” in column (6).

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

For UN No. 3151, amend column (2) to read as follows: “POLYHALOGENATED BIPHENYLS, LIQUIDS or HALOGENATED MONOMETHYLDIPHENYLMETHANES, LIQUIDS or POLYHALOGENATED TERPHENYLS, LIQUIDS”.

(Reference document: ST/SG/AC.10/C.3/88)

For UN No. 3152, amend column (2) to read as follows: “POLYHALOGENATED BIPHENYLS, SOLIDS or HALOGENATED MONOMETHYLDIPHENYLMETHANES, SOLIDS or POLYHALOGENATED TERPHENYLS, SOLIDS”.

(Reference document: ST/SG/AC.10/C.3/88)

For UN No. 3166 Add “380” in column (6).

(Reference document: ST/SG/AC.10/C.3/88)

For UN No. 3170, in column (10) delete “BK1”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

For UN No. 3269, packing groups II and III, in column (2) add the following text at the end of the description: “, liquid base material”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

For UN No. 3507, in column (3), replace “8” by “6.1” and in column (4), insert “8”. In column (8), replace “P805” by “P603”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

Add the following entries:

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
3527	POLYESTER RESIN KIT, solid base material	4.1		II	236 340	5kg	E0	P412			
3527	POLYESTER RESIN KIT, solid base material	4.1		III	236 340	5kg	E0	P412			
3528	ROCKET MOTORS†	1.4C				0	E0	P130 LP101	PP67 L1		

Consequential amendment to the Guiding principles:

In part 3, in the table “Methodology for determining limited quantities”, in table note d, add “For UN No. 3527: 5kg/30kg”.

(Reference documents: ST/SG/AC.10/C.3/90/Add.1, ST/SG/AC.10/C.3/2014/39 and informal document INF.61/Add.1 of the forty-fifth session)

Chapter 3.3

3.3.1 Add the following second sentence: “Where a special provision includes a requirement for package marking, the provisions of 5.2.1.2 (a)-(d) shall be met. If the required mark is in the form of specific wording indicated between speech marks (”), such

as “Damaged Lithium Batteries”, the size of the mark shall be at least 12 mm, unless otherwise indicated in the special provision or elsewhere in these Regulations.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

SP204 At the end, add a new paragraph to read as follows:

“Articles containing smoke-producing substance(s) toxic by inhalation according to the criteria for Division 6.1 shall be labelled with a “TOXIC” subsidiary risk label (Model No 6.1, see 5.2.2.2.2).”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

SP225 Amend the second sentence to read as follows:

“Fire extinguishers shall be manufactured, tested, approved and labelled according to the provisions applied in the country of manufacture.”.

SP225 After the second sentence, insert the following NOTE:

“NOTE: Provisions applied in the country of manufacture” means the provisions applicable in the country of manufacture or those applicable in the country of use.”.

SP225 At the end, insert the following NOTE:

“NOTE: Pressure receptacles which contain gases for use in the above-mentioned extinguishers or for use in stationary fire-fighting installations shall meet the requirements in Chapter 6.2 and all requirements applicable to the relevant dangerous good when these pressure receptacles are transported separately.”.

(Reference document: ST/SG/AC.10/C.3/88)

3.3, SP236 Amend to read as follows:

“236 Polyester resin kits consist of two components: a base material (either Class 3 or Division 4.1, packing group II or III) and an activator (organic peroxide). The organic peroxide shall be type D, E, or F, not requiring temperature control. The packing group shall be II or III, according to the criteria of either Class 3 or Division 4.1, as appropriate, applied to the base material. The quantity limit shown in column 7a of the Dangerous Goods List of Chapter 3.2 applies to the base material.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

SP244 Add the following paragraphs at the end:

“Before loading, these by-products shall be cooled to ambient temperature, unless they have been calcined to remove moisture. Cargo transport units containing bulk loads shall be adequately ventilated and protected against ingress of water throughout the journey.

Notwithstanding the provisions of 4.3.2.2, sheeted bulk containers (BK1) may be used for inland transport.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

SP310 Amend to read as follows:

“310 The testing requirements in Chapter 38.3 of the Manual of Tests and Criteria do not apply to production runs consisting of not more than 100 cells and batteries, or to pre-production prototypes of cells and batteries when these prototypes are transported for testing, if the following conditions are met:

- (a) Cells and batteries including when packed with equipment:

- (i) The cells or batteries are transported in an outer packaging that is a metal (1A, 1B, 1N), plastics (1H) or plywood (1D) drum or a metal (3A, 3B) or plastics (3H) jerrican or a metal (4A, 4B, 4N), plastics (4H) or wooden (4C, 4D, 4F) box or a metal (50A, 50B, 50N), plastics (50H) or wooden (50C, 50D, 50F) large packaging that meets the requirements of 4.1.1.3 at the packing group II performance level;
- Batteries and cells, including equipment, of different sizes, shapes or masses may be packaged in an outer packaging of a tested design type listed above provided the total gross mass of the package does not exceed the mass for which the design type has been tested;
- (ii) Each cell or battery is individually packed in an inner packaging inside an outer packaging;
- (iii) Each inner packaging has been completely surrounded by sufficient non-combustible and non-conductive thermal insulation material to protect against a dangerous evolution of heat;
- (iv) Appropriate measures have been taken to minimize the effects of vibration and shocks and prevent movement of the cells or batteries within the package that may lead to damage and a dangerous condition during transport. When cushioning material is used to meet this requirement it shall be non-combustible and non-conductive;
- (v) Non-combustibility has been assessed according to a standard recognized in the country where the packaging is designed or manufactured;
- (vi) The cells and batteries are protected against short circuit; and
- (vii) A cell or battery with a net mass of more than 30 kg shall be limited to one cell or battery per outer packaging.
- (b) Cells and batteries contained in equipment:
- (i) The equipment is transported in an outer packaging that is a metal (1A, 1B, 1N), plastics (1H) or plywood (1D) drum or a metal (3A, 3B) or plastics (3H) jerrican or a metal (4A, 4B, 4N), plastics (4H) or wooden (4C, 4D, 4F) box or a metal (50A, 50B, 50N), plastics (50H) or wooden (50C, 50D, 50F) large packaging that meets the requirements of 4.1.1.3 at the packing group II performance level;
- Equipment of different sizes, shapes and masses may be packaged in an outer packaging of a tested design type listed above provided the total gross mass of the package does not exceed the mass for which the design type has been tested;
- (ii) The equipment is constructed or packaged in such a manner as to prevent accidental operation during transport;
- (iii) Appropriate measures have been taken to minimize the effects of vibration and shocks and prevent movement of the cells or batteries within the package that may lead to damage and a dangerous condition during transport. When cushioning material is used to meet this requirement it shall be non-combustible and non-conductive;
- (iv) Non-combustibility has been assessed according to a standard recognized in the country where the packaging is designed or manufactured; and
- (v) The cells and batteries are protected against short circuit.

- (c) The equipment or the batteries may be transported unpackaged under conditions specified by the competent authority. Additional conditions that may be considered in the approval process include, but are not limited to:
 - (i) The equipment or the battery shall be strong enough to withstand the shocks and loadings normally encountered during transport, including trans-shipment between cargo transport units and between cargo transport units and warehouses as well as any removal from a pallet for subsequent manual or mechanical handling; and
 - (ii) The equipment or the battery shall be fixed in cradles or crates or other handling devices in such a way that they will not become loose during normal conditions of transport.
- (d) Identified damaged or defective cells and batteries shall be transported in accordance with special provision 376 and packaged in accordance with P908 of 4.1.4.1 or LP904 of 4.1.4.3, as applicable.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

SP 327 In the second sentence, insert “movement and” after “protected against”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

SP327 In the third sentence, replace “LP02” by “LP200”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

SP361 Amend sub-paragraph (e) to read as follows:

“(e) Capacitors manufactured after 31 December 2013, shall be marked with the energy storage capacity in Wh.”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

SP369 Amend the first paragraph to read as follows:

“In accordance with 2.0.3.2, this radioactive material in an excepted package possessing toxic and corrosive properties is classified in Division 6.1 with radioactive material and corrosivity subsidiary risks.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

SP369 Amend the third paragraph to read as follows:

“In addition to the provisions applicable to the transport of Division 6.1 substances with a corrosivity subsidiary risk, the provisions of 5.1.3.2, 5.1.5.2.2, 5.1.5.4.1 (b), 7.1.8.5.1 to 7.1.8.5.4 and 7.1.8.6.1 shall apply.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

SP 370 In the second indent, replace “that is not too sensitive for acceptance into Class 1.” with “that gives a positive result”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

SP 372 Amend sub-paragraph (c) to read as follows:

“(c) Capacitors manufactured after 31 December 2015, shall be marked with the energy storage capacity in Wh.”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

SP373 (b) (i) and (c) (ii) Insert “or adsorbent” after “absorbent”. Insert “or adsorb” after “absorb”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

Add the following new special provision:

“378 Radiation detectors containing this gas in non-refillable pressure receptacles not meeting the requirements of Chapter 6.2 and packing instruction P200 of 4.1.4.1 may be transported under this entry provided:

- (a) The working pressure in each receptacle does not exceed 50 bar;
- (b) The receptacle capacity does not exceed 12 litres;
- (c) Each receptacle has a minimum burst pressure of at least 3 times the working pressure when a relief device is fitted and at least 4 times the working pressure when no relief device is fitted;
- (d) Each receptacle is manufactured from material which will not fragment upon rupture;
- (e) Each detector is manufactured under a registered quality assurance programme;

NOTE: ISO 9001:2008 may be used for this purpose.

- (f) Detectors are transported in strong outer packagings. The complete package shall be capable of withstanding a 1.2 metre drop test without breakage of the detector or rupture of the outer packaging. Equipment that includes a detector shall be packed in a strong outer packaging unless the detector is afforded equivalent protection by the equipment in which it is contained; and
- (g) The transport document includes the following statement “Transport in accordance with special provision 378”.

Radiation detectors, including detectors in radiation detection systems, are not subject to any other requirements of these Regulations if the detectors meet the requirements in (a) to (f) above and the capacity of detector receptacles does not exceed 50 ml.”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

“379 Anhydrous ammonia adsorbed or absorbed on a solid contained in ammonia dispensing systems or receptacles intended to form part of such systems shall not be subject to the other provisions of these Regulations if the following conditions are observed:

- (a) The adsorption or absorption presents the following properties:
 - (i) The pressure at a temperature of 20° C in the receptacle is less than 0.6 bar;
 - (ii) The pressure at a temperature of 35° C in the receptacle is less than 1 bar;
 - (iii) The pressure at a temperature of 85° C in the receptacle is less than 12 bar.
- (b) The adsorbent or absorbent material shall not have dangerous properties listed in Classes 1 to 8;
- (c) The maximum contents of a receptacle shall be 10 kg of ammonia; and
- (d) Receptacles containing adsorbed or absorbed ammonia shall meet the following conditions:
 - (i) Receptacles shall be made of a material compatible with ammonia as specified in ISO 11114-1: 2012;
 - (ii) Receptacles and their means of closure shall be hermetically sealed and able to contain the generated ammonia;

(iii) Each receptacle shall be able to withstand the pressure generated at 85° C with a volumetric expansion no greater than 0.1%;

(iv) Each receptacle shall be fitted with a device that allows for gas evacuation once pressure exceeds 15 bar without violent rupture, explosion or projection; and

(v) Each receptacle shall be able to withstand a pressure of 20 bar without leakage when the pressure relief device is deactivated.

When carried in an ammonia dispenser, the receptacles shall be connected to the dispenser in such a way that the assembly is guaranteed to have the same strength as a single receptacle.

The properties of mechanical strength mentioned in this special provision shall be tested using a prototype of a receptacle and/or dispenser filled to nominal capacity, by increasing the temperature until the specified pressures are reached.

The test results shall be documented, shall be traceable and shall be communicated to the relevant authorities upon request.”.

(Reference document: ST/SG/AC.10/C.3/88)

“380 If a vehicle is powered by a flammable liquid and a flammable gas internal combustion engine, it shall be assigned to UN 3166 VEHICLE, FLAMMABLE GAS POWERED.”.

(Reference document: ST/SG/AC.10/C.3/88)

“381 Large packagings conforming to the packing group III performance level used in accordance with packing instruction LP02 of 4.1.4.3, as prescribed in the 18th revised edition of the United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations, may be used until 31 December 2022.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

Chapter 3.5

3.5.2 (b) After the first sentence, amend the remainder of sub-paragraph (b) to read as follows:

“For liquid dangerous goods, the intermediate or outer packaging shall contain sufficient absorbent material to absorb the entire contents of the inner packagings. When placed in the intermediate packaging, the absorbent material may be the cushioning material. Dangerous goods shall not react dangerously with cushioning, absorbent material and packaging material or reduce the integrity or function of the materials. Regardless of its orientation, the package shall completely contain the contents in case of breakage or leakage.”.

(Reference document: ST/SG/AC.10/C.3/88)

Alphabetic index

Amend the entry for “POLYESTER RESIN KIT” to read as follows:

POLYESTER RESIN KIT, liquid base material	3	3269
POLYESTER RESIN KIT, solid base material	4.1	3527

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

In the entry for ROCKET MOTORS, insert “1.4C” after “1.3C” and “3528” after “0186”.

Add the following new entries in alphabetical order:

“HALOGENATED MONOMETHYLDIPHENYLMETHANES, LIQUIDS 9 3151
HALOGENATED MONOMETHYLDIPHENYLMETHANES, SOLIDS 9 3152”.

(Reference documents: ST/SG/AC.10/C.3/88, ST/SG/AC.10/C.3/2014/39 and informal document INF.61/Add.1 of the forty-fifth session)

Chapter 4.1

4.1.1.18 Amend the heading to read as follows: “*Use of salvage packagings and large salvage packagings*”

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

4.1.1.18.1 In the first sentence, insert “and 6.6.5.1.9” after “6.1.5.1.11”. Amend the second sentence to read as follows: “This does not prevent the use of a larger size packaging or large packaging of appropriate type and performance level and under the conditions of 4.1.1.18.2 and 4.1.1.18.3.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

4.1.1.19.2 Add a second sentence to read as follows: “The maximum size of the placed pressure receptacle is limited to a water capacity of 1 000 litres.”. Add a penultimate sentence to read as follows: “In this case the total sum of water capacities of the placed pressure receptacles shall not exceed 1 000 litres.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

4.1.4.1, packing instructions P112 (c), P114 (b) and P406 In special packing provision PP48, add a new last sentence to read as follows: “Packagings of other material with a small amount of metal, for example metal closures, are not considered metal packagings.”.

(Reference documents: ST/SG/AC.10/C.3/2014/20 and informal document INF.61/Add.1 of the forty-fifth session)

4.1.4.1, packing instruction 137 In special packing provision PP70, replace “THIS SIDE UP” by “... the package be marked in accordance with 5.2.1.7.1”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

4.1.4.1, packing instruction P200 (2) Amend to read as follows:

- "(2) The following three tables cover compressed gases (Table 1), liquefied and dissolved gases (Table 2) and substances not in Class 2 (Table 3). They provide:
- (a) The UN number, name and description, and classification of the substance;
 - (b) The LC₅₀ for toxic substances;
 - (c) The types of pressure receptacles authorised for the substance, shown by the letter “X”;
 - (d) The maximum test period for periodic inspection of the pressure receptacles.

NOTE: For pressure receptacles which make use of composite materials, the maximum test period shall be 5 years. The test

period may be extended to that specified in Tables 1 and 2 (i.e. up to 10 years), if approved by the competent authority of the country of use.

- (e) The minimum test pressure of the pressure receptacles;
- (f) The maximum working pressure of the pressure receptacles for compressed gases (where no value is given, the working pressure shall not exceed two thirds of the test pressure) or the maximum filling ratio(s) dependent on the test pressure(s) for liquefied and dissolved gases;
- (g) Special packing provisions that are specific to a substance."

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

4.1.4.1, packing instruction P200 (3) Insert a new paragraph (e) to read as follows:

“(e) For liquefied gases charged with compressed gases, both components – the liquid phase and the compressed gas – have to be taken into consideration in the calculation of the internal pressure in the pressure receptacle.

The maximum mass of contents per litre of water capacity shall not exceed 0.95 times the density of the liquid phase at 50 °C; in addition, the liquid phase shall not completely fill the pressure receptacle at any temperature up to 60 °C.

When filled, the internal pressure at 65 °C shall not exceed the test pressure of the pressure receptacles. The vapour pressures and volumetric expansions of all substances in the pressure receptacles shall be considered. When experimental data is not available, the following steps shall be carried out:

- (i) Calculation of the vapour pressure of the liquid component and of the partial pressure of the compressed gas at 15 °C (filling temperature);
- (ii) 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;
- (iii) 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 shall be considered.*

- (iv) Calculation of the vapour pressure of the liquid component at 65 °C;
- (v) The total pressure is the sum of the vapour pressure of the liquid component and the partial pressure of the compressed gas at 65 °C;
- (vi) Consideration of the solubility of the compressed gas at 65 °C in the liquid phase;

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

If the solubility of the compressed gas in the liquid component is not known for the calculation, the test pressure can be calculated without taking the gas solubility (paragraph (vi)) into account.”

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

4.1.4.1, packing instruction P200 Insert a new paragraph (4) to read as follows:

“(4) The filling of pressure receptacles shall be carried out by qualified staff using appropriate equipment and procedures.

The procedures should include checks of:

- The conformity to regulations of receptacles and accessories;
- 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;
- Markings 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 liquified 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 24431:2006	Gas cylinders – Cylinders for compressed and liquefied gases (excluding acetylene) – Inspection at time of filling

” (Reference document: *ST/SG/AC.10/C.3/90/Add.1*)

4.1.4.1, packing instruction P200 Renumber existing paragraph (4) as (5) and amend as follows:

In special provision p, in the two first paragraphs, replace “or ISO 3807-2:2000” by “, ISO 3807-2:2000 or ISO 3807:2013”, twice. In the last paragraph, replace “conforming to ISO 3807-2:2000” by “fitted with a fusible plug”.

(Reference document: *ST/SG/AC.10/C.3/88*)

In special provision u, replace “ISO 7866:1999” by “ISO 7866:2012”.

(Reference document: *ST/SG/AC.10/C.3/86/Add.1*)

4.1.4.1, packing instruction P200, Table 3 At the end, delete the entry for UN No. 2983.

(Reference document: *ST/SG/AC.10/C.3/88*)

4.1.4.1, packing instruction P206 (3) At the end add the following paragraph:

For liquids charged with a compressed gas both components – the liquid phase and the compressed gas – have to be taken into consideration in the calculation of the internal pressure in the pressure receptacle. When experimental data is not available, the following steps shall be carried out:

- (a) Calculation of the vapour pressure of the liquid component and of the partial pressure of the compressed gas at 15 °C (filling temperature);

(b) 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;

(c) 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 shall be considered.*

(d) Calculation of the vapour pressure of the liquid component at 65 °C;

(e) The total pressure is the sum of the vapour pressure of the liquid component and the partial pressure of the compressed gas at 65 °C;

(f) Consideration of the solubility of the compressed gas at 65 °C in the liquid phase.

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

If the solubility of the compressed gas in the liquid component is not known for the calculation, the test pressure can be calculated without taking the gas solubility (paragraph (f)) into account.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

4.1.4.1, packing instruction P207 In the last sentence before the special packing provision, insert the word “excessive” after “to prevent”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

4.1.4.1, packing instruction P208 (1) Amend to read as follows:

“(1) The following packagings are authorized provided the general packing requirements of **4.1.6.1** are met:

(a) Cylinders constructed as specified in 6.2.2 and in accordance with ISO 11513:2011 or ISO 9809-1:2010; and

(b) Cylinders constructed before 1 January 2016 in accordance with 6.2.3 and a specification approved by the competent authorities of the countries of transport and use.”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

4.1.4.1, packing instructions P403 and P410: Delete special packing provision “PP83” and insert “PP83 Deleted”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

4.1.4.1, packing instruction P502: Amend special packing provision “PP28” to read as follows:

“PP28 For UN No. 1873, parts of packagings which are in direct contact with perchloric acid shall be constructed of glass or plastics.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

4.1.4.1, P805 Renumber as “P603” and reorder accordingly.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

4.1.4.1, P906 (1) Amend to read as follows: “For liquids and solids containing or contaminated with PCBs, polyhalogenated biphenyls, polyhalogenated terphenyls or

halogenated monomethyldiphenylmethanes: Packagings in accordance with P001 or P002, as appropriate.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

4.1.4.1, P906 (2) (b) Amend the end of the first sentence to read as follows: “PCBs, polyhalogenated biphenyls, polyhalogenated terphenyls or halogenated monomethyldiphenylmethanes present in them.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

4.1.4.1 Add a new packing instruction to read as follows:

P412	PACKING INSTRUCTION	P412
This instruction applies to UN No. 3527		
The following combination packagings are authorized, provided that the general provisions of 4.1.1 and 4.1.3 are met:		
(1) Outer packagings:		
Drums (1A1, 1A2, 1B1, 1B2, 1N1, 1N2, 1H1, 1H2, 1D, 1G);		
Boxes (4A, 4B, 4N, 4C1, 4C2, 4D, 4F, 4G, 4H1, 4H2)		
Jerricans (3A1, 3A2, 3B1, 3B2, 3H1, 3H2);		
(2) Inner packagings:		
(a) 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.		
(b) 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 Division 4.1 applied to the base material.		

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

4.1.4.2

IBC520 Add the following new entries:

UN No.	Organic peroxide	Type of IBC	Maximum quantity (litres)	Control temperature	Emergency Temperature
3109	tert-Butyl cumyl peroxide	31HA1	1000		
3119	1,1,3,3-Tetramethylbutyl peroxy-2-ethylhexanoate, not more than 67%, in diluent type A	31HA1	1000	+15 °C	+20 °C

IBC520 For UN No. 3119, in the entry for “Di-(2-ethylhexyl) peroxydicarbonate, not more than 62%, stable dispersion, in water”, add the following new row:

<i>Type of IBC</i>	<i>Maximum quantity (litres)</i>	<i>Control temperature</i>	<i>Emergency Temperature</i>
31HA1	1000	-20 °C	-10 °C

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

4.1.4.3, LP02 Delete special packing instruction L2 and insert “L2 Deleted”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

4.1.4.3 Add the following large packaging provision:

LP200	PACKING INSTRUCTION	LP200
This instruction applies to UN No. 1950.		
The following large packagings are authorized for aerosols, provided that the general provisions of 4.1.1 and 4.1.3 are met: Rigid large packagings conforming to the packing group II performance level, made of: steel (50A); aluminium (50B); metal other than steel or aluminium (50N); rigid plastics (50H); natural wood (50C); plywood (50D); reconstituted wood (50F); rigid fibreboard (50G).		
Special packing provision		
L2 The large packagings shall be designed and constructed to prevent dangerous movement of the aerosols and inadvertent discharge during normal conditions of transport. For waste aerosols carried in accordance with special provision 327, the large packagings shall have a means of retaining any free liquid that might escape during transport, e.g. absorbent material. The large packagings shall be adequately ventilated to prevent the creation of a flammable atmosphere and the build-up of pressure.		

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

4.1.6.1.2 Replace “ISO 11114-2:2000” with “ISO 11114-2:2013”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

Chapter 4.2

4.2.5.3 Delete TP23 and insert “TP23 Deleted.”.

(Reference document: ST/SG/AC.10/C.3/88)

Chapter 4.3

4.3.1.16.2 In the last sentence, insert “or the ingress of water” after “foreign substances”.

(Reference document: ST/SG/AC.10/C.3/88)

Chapter 6.1

6.1.5.1.6 In the NOTE, replace “assembling” by “using”. Add a new last sentence to read as follows: “These conditions do not limit the use of inner packagings when applying 6.1.5.1.7.”.

(Reference document: ST/SG/AC.10/C.3/88)

Chapter 6.2

6.2.1.5.1 (g) Amend the text before the Note to read as follows:

“(g) A hydraulic pressure test. Pressure receptacles shall meet the acceptance criteria specified in the design and construction technical standard or technical code;”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

6.2.2.1.1 In the table, for ISO 7866:1999, in the column “Applicable for manufacture”, replace “Until further notice” with “Until 31 December 2020”.

After the entry for ISO 7866:1999, insert a new entry to read as follows:

ISO 7866: 2012	Gas cylinders – Refillable seamless aluminium alloy gas cylinders – Design, construction and testing <i>NOTE: Aluminium alloy 6351A or equivalent shall not be used.</i>	Until further notice
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(Reference document: ST/SG/AC.10/C.3/86/Add.1)

6.2.2.1.1 At the end of the table, replace the three last entries (corresponding to standards “ISO 11119-1:2002”, “ISO 11119-2:2002” and “ISO 11119-3:2002”) with the following entries:

ISO 11119-1:2002	Gas cylinders of composite construction – Specification and test methods – Part 1: Hoop wrapped composite gas cylinders	Until 31 December 2020
ISO 11119-1:2012	Gas cylinders – Refillable composite gas cylinders and tubes – Design, construction and testing – Part 1: Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 l	Until further notice
ISO 11119-2:2002	Gas cylinders of composite construction – Specification and test methods – Part 2: Fully wrapped fibre reinforced composite gas cylinders with load-sharing metal liners	Until 31 December 2020
ISO 11119-2:2012	Gas cylinders – Refillable composite gas cylinders and tubes – Design, construction and testing – Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with load-sharing metal liners	Until further notice
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	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	Until further notice

(Reference document: ST/SG/AC.10/C.3/88)

6.2.2.1.1, Note 1 Replace “unlimited service life” with “a design life of not less than 15 years.”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

6.2.2.1.1 Amend Note 2 to read as follows:

“NOTE 2: Composite cylinders with a design life longer than 15 years shall not be filled after 15 years from the date of manufacture, unless the design has successfully passed a service life test programme. The programme shall be part of the initial design type approval and shall specify inspections and tests to demonstrate that cylinders manufactured accordingly remain safe to the end of their design life. The service life test programme and the results shall be approved by the competent authority of the country of approval that is responsible for the initial approval of the cylinder design. The service life of a composite cylinder shall not be extended beyond its initial approved design life.”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

6.2.2.1.2 After the entry for standard “ISO 11120:1999”, add the following new entries:

ISO 11119-1:2012	Gas cylinders – Refillable composite gas cylinders and tubes – Design, construction and testing – Part 1: Hoop wrapped fibre reinforced composite gas cylinders and tubes up to 450 l	Until further notice
ISO 11119-2:2012	Gas cylinders – Refillable composite gas cylinders and tubes – Design, construction and testing – Part 2: Fully wrapped fibre reinforced composite gas cylinders and tubes up to 450 l with load-sharing metal liners	Until further notice
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	Until further notice

[6.2.2.1.2 Insert a new last row in the table in 6.2.2.1.2 to read as follows:

ISO 11515:2013	Gas cylinders – Refillable composite reinforced tubes of water capacity between 450 L and 3 000 L – Design, construction and testing	Until further notice
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]

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

6.2.2.1.2 Add the following NOTES after the table:

“NOTE 1: In the above referenced standards composite tubes shall be designed for a design life of not less than 15 years.

NOTE 2: Composite tubes with a design life longer than 15 years shall not be filled after 15 years from the date of manufacture, unless the design has successfully passed a service life test programme. The programme shall be part of the initial design type approval and shall specify inspections and tests to demonstrate that tubes manufactured accordingly remain safe to the end of their design life. The service life test programme and the results shall be approved by the competent authority of the country of approval that is responsible for the initial approval of the tube design. The service life of a composite tube shall not be extended beyond its initial approved design life.”.

(Reference document: ST/SG/AC.10/C.3/88)

6.2.2.1.3 In the table, for standards “ISO 3807-1:2000” and “ISO 3807-2:2000”, amend the text in column “Applicable for manufacture” to read “Until 31 December 2020”. After this standard, add the following new row:

ISO 3807:2013	Gas cylinders – Acetylene cylinders – Basic requirements and type testing	Until further notice
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(Reference document: ST/SG/AC.10/C.3/88)

6.2.2.2 In the table, replace the entry for “ISO 11114-2:2000” with the following entry:

ISO 11114-2:2013	Gas cylinders – Compatibility of cylinder and valve materials with gas contents – Part 2: Non-metallic materials
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(Reference document: ST/SG/AC.10/C.3/86/Add.1)

6.2.2.4 In the table, for ISO 10462: 2005, replace “Until further notice” by “Until 31 December 2018”.

6.2.2.4 In the table, after ISO 10462: 2005, insert a new row to read as follows:

ISO 10462: 2013	Gas cylinders – Acetylene cylinders – Periodic inspection and maintenance.	Until further notice
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(Reference document: ST/SG/AC.10/C.3/90/Add.1)

6.2.2.7.4 Insert the following new sub-paragraphs and note at the end:

- “(q) For composite cylinders and tubes having a limited design life, the letters “FINAL” followed by the design life shown as the year (four digits) followed by the month (two digits) separated by a slash (i.e. “/”).
- (r) For composite cylinders and tubes having a limited design life greater than 15 years and for composite cylinders and tubes having non-limited design life, the letters “SERVICE” followed by the date 15 years from the date of manufacture (initial inspection) shown as the year (four digits) followed by the month (two digits) separated by a slash (i.e. “/”).

NOTE: *Once the initial design type has passed the service life test programme requirements in accordance with 6.2.2.1.1 NOTE 2 or 6.2.2.1.2 NOTE 2, future production no longer requires this initial service life mark. The initial service life mark shall be made unreadable on cylinders and tubes of a design type that has met the service life test programme requirements.”*

(Reference document: ST/SG/AC.10/C.3/88)

6.2.2.7.5 Add the following text at the end of the first indent: “...except for the marks described in 6.2.2.7.4 (q) and (r) which shall be adjacent to the periodic inspection and test marks of 6.2.2.7.7.”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

Chapter 6.5

6.5.2.2.4 Amend the beginning of the first sentence to read as follows: “Inner receptacles that are of composite IBC design type shall be identified by the application of the markings...”, remainder unchanged.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

6.5.2.2.4 Renumber the existing Note as Note 1. Add a new Note 2 to read as follows:

NOTE 2: *The date of manufacture of the inner receptacle may be different from the marked date of manufacture (see 6.5.2.1), repair (see 6.5.4.5.3) or remanufacture (see 6.5.2.4) of the composite IBC.”*

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

Chapter 6.7

6.7.2.19.8 (a) and 6.7.3.15.8 (a) Add a new last sentence to read as follows:

“The wall thickness shall be verified by appropriate measurement if this inspection indicates a reduction of wall thickness.”

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

6.7.5.2.4 (a) Replace “ISO 11114-2:2000” with “ISO 11114-2:2013”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

Chapter 7.1

7.1.3.2.3 Insert the phrase“, ammonium nitrate emulsion or suspension or gel (UN 3375)” after “(UN Nos. 1942 and 2067)”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

Part II

Draft amendments to the 5th revised edition of the United Nations Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria

Section 1

1.1.2 Add the following new sentence at the end:

“Examples may also be listed within various test procedures. These are primarily to be used for purposes of illustration.”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

1.1.3 Add a new section 1.1.3 to read as follows:

“1.1.3 In situations where the proper classification of substances and articles of certain Hazard Classes or Divisions for transport is the responsibility of the Competent Authority, it is normal and accepted practice that due consideration will be given to testing or classification results of other Competent Authorities when provided.”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

1.2.1 At the end, after “...on screening procedures.” insert a new sentence to read as follows: “Examples which may be listed within various test procedures are for illustrative purposes and are provided for guidance only.”.

(Reference documents: ST/SG/AC.10/C.3/2014/37 as amended and informal document INF.61/Add.2 of the forty-fifth session)

Section 10

Figures 10.3 and 10.9 Amend as follows:

Figure 10.3: PROCEDURE FOR ASSIGNMENT TO A DIVISION OF CLASS 1

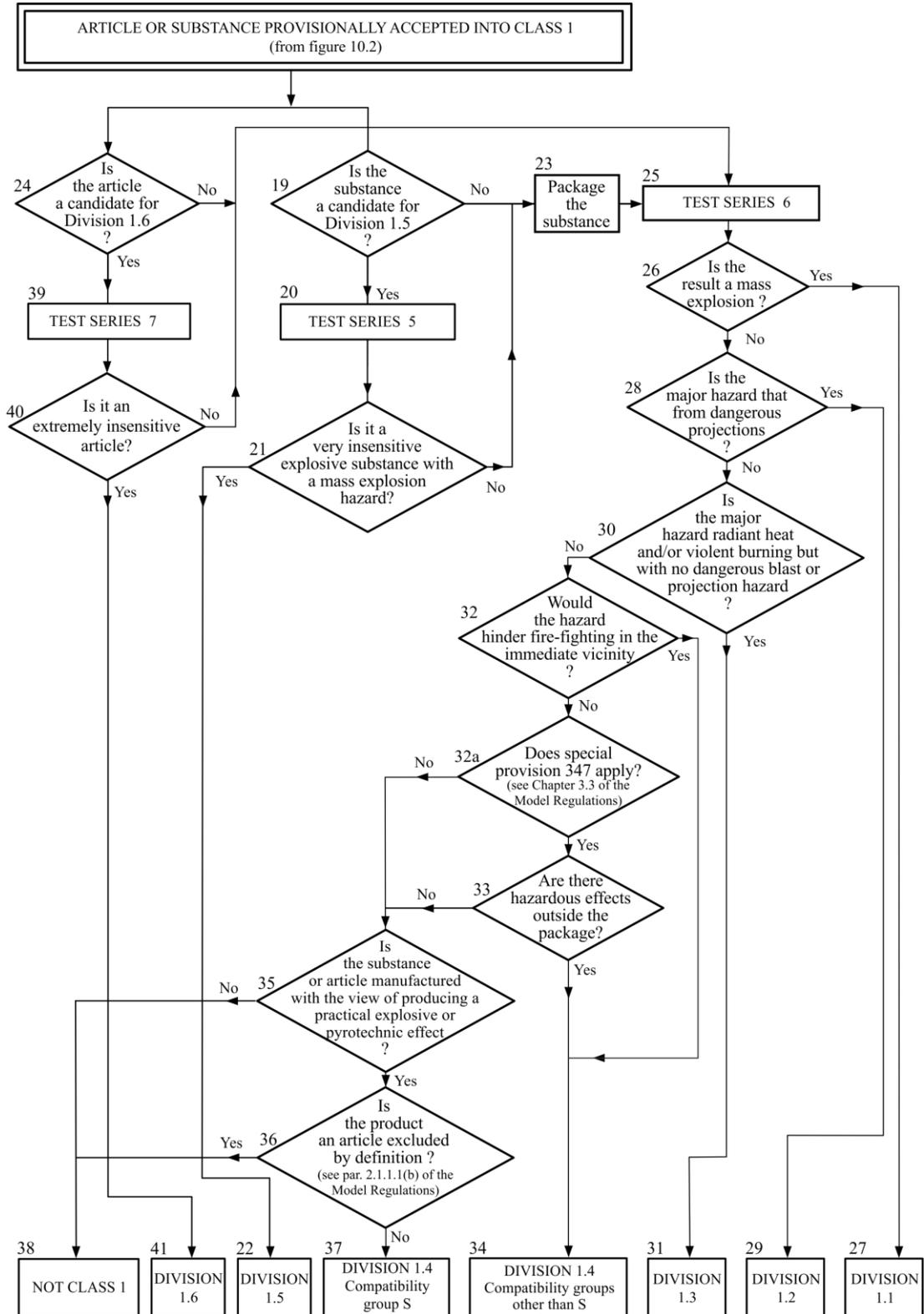
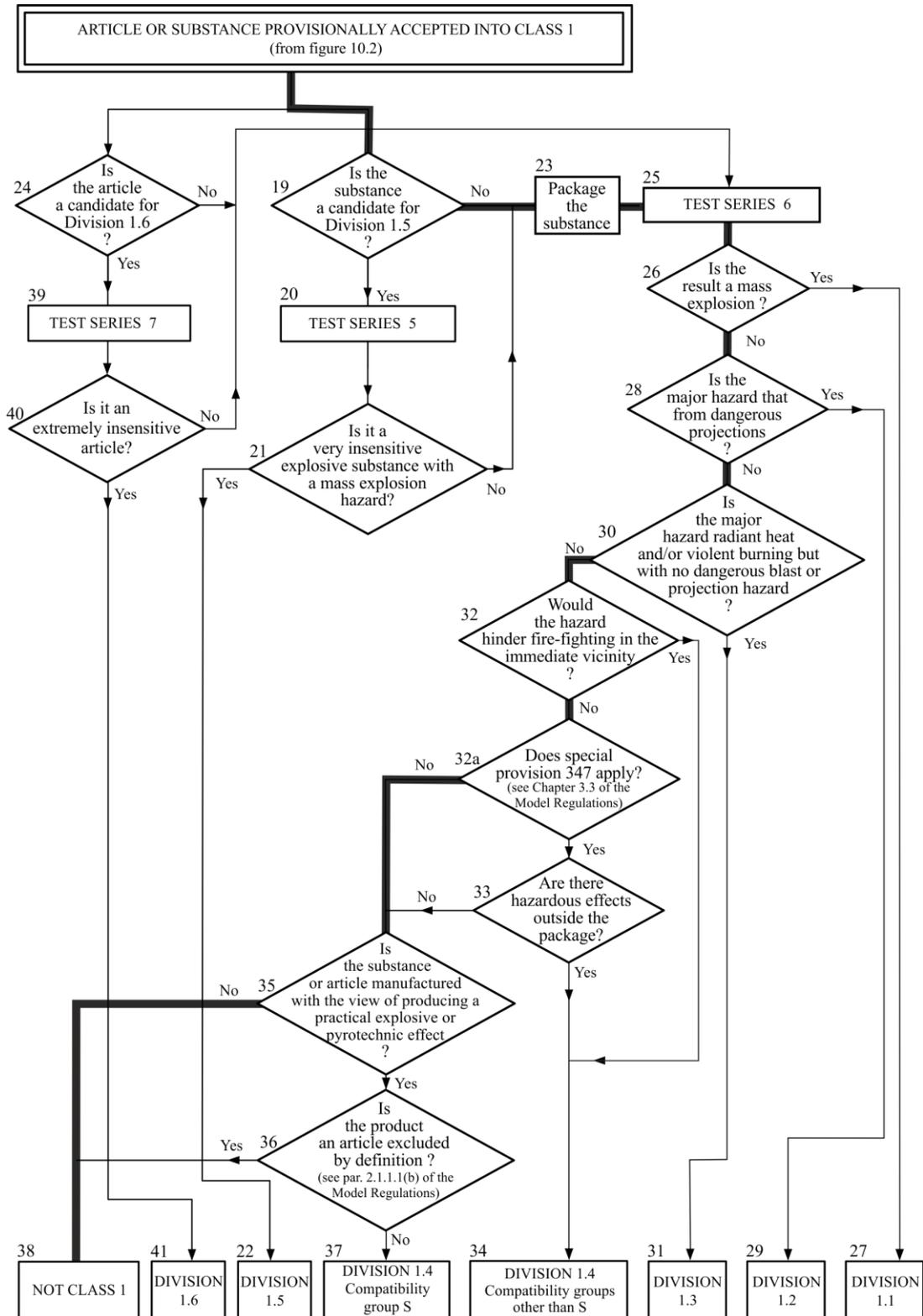


Figure 10.9: PROCEDURE FOR EXEMPTION OF MUSK XYLENE FROM CLASS 1



(Reference documents: ST/SG/AC.10/C.3/2014/4 and informal document INF.61/Add.2 of the forty-fifth session)

Consequential amendment: Figure 10.8 In 6.2, replace “box 35” by “box 32a”. After 6.2, insert new lines to read as follows:

“7. Box 32a : Does special provision 347 apply?”

7.1. Answer : No

7.2. Exit : Go to box 35”

Renumber existing lines 7 and 8 accordingly.

10.4.2.5 In the last paragraph, insert “of ANEs” after “the suitability” and “portable” before “tanks”.

(Reference documents: ST/SG/AC.10/C.3/2014/11 and informal document INF.61/Add.2 of the forty-fifth session)

10.4.3.4 Amend as follows:

In the first sentence, insert “normally” after “and 6 (d) are”. In the second sentence, insert “follow this order or to” after “necessary to”.

Third and fourth sentences become new sub-paragraphs (a) and (b) respectively. At the end of both add the following phrase: “, (see also section 10.4.3.4.(d));”.

Former sub-paragraphs (a) and (b) become indents (i) and (ii) under new sub-paragraph (b).

Next two sentences after (i) and (ii), former sub-paragraphs (a) and (b), become sub-paragraphs (c) and (d) respectively. At the end of (d) insert a new sentence to read as follows: “When testing articles to which special provision 347 applies, test type 6 (d) may be performed first. If the results of test type 6 (d) indicate that a 1.4S classification is appropriate, then test types 6 (a) and 6 (b) may be waived.”.

Delete the last sentence, starting with “The results of test series 6 (c)...”.

(Reference documents: ST/SG/AC.10/C.3/2014/4 as amended and informal document INF.61/Add.2 of the forty-fifth session)

Section 11

11.1.1 In the first sentence, delete “national and international definitions of an explosive substance and”.

(Reference documents: informal document INF.61/Add.2 of the forty-fifth session)

11.3.2 At the end insert “, if known”.

(Reference documents: informal document INF.61/Add.2 of the forty-fifth session)

11.3.5 Insert ““Low” or” after “F.1 or F.2 or F.3 test is”.

(Reference documents: informal document INF.61/Add.2 of the forty-fifth session)

11.4.1.2.1 Amend as follows:

In the second sentence, delete “cold drawn” and replace “ 4.0 ± 0.1 ” by “4”.

In the fourth sentence, replace “two layers of 0.08 mm thick polythene” by “a plastics”, insert “tightly” before “in place” and delete the remainder of the sentence after “in place”.

Amend the fifth and sixth sentences to read as follows: “The plastics sheet shall be compatible with the substance under test. The booster charge consists of 160 g RDX/wax (95/5) or PETN/TNT that has a minimum of 50% PETN in the mixture, 50 ± 1 mm in diameter with a density of $1\,600 \pm 50$ kg/m³.”

In the seventh sentence, replace “RDX/wax charge” by “charges”.

In the eighth sentence, replace “ 3.2 ± 0.2 ” by “3” and “is mounted” by “may be mounted”.

(Reference documents: ST/SG/AC.10/C.3/2014/6 and informal document INF.61/Add.2 of the forty-fifth session)

11.4.1.3.1 Delete the last sentence.

(Reference documents: informal document INF.61/Add.2 of the forty-fifth session)

11.4.1.4 In the first sentence, replace “and” by “or”. Amend the end of the sentence after the indents to read as follows: “substance is considered not to be able to propagate a detonation”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

11.6.1.2.2 In the third sentence, after “lead washer” insert “or a washer of a suitable deformable material (for example, polyoxymethylene)”.

(Reference documents: ST/SG/AC.10/C.3/2014/6 and informal document INF.61/Add.2 of the forty-fifth session)

Section 12

12.3.2 At the end insert “, if known”.

(Reference documents: informal document INF.61/Add.2 of the forty-fifth session)

12.3.4 Insert ““Low” or” after “F.1 or F.2 or F.3 test is”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

12.4.1.2 Amend as follows:

In the second sentence, delete “cold drawn” and replace “ 4.0 ± 0.1 ” by “4”.

In the fourth sentence, replace “two layers of 0.08 mm thick polythene” by “a plastics”, insert “tightly” before “in place” and delete the remainder of the sentence after “in place”.

Amend the fifth and sixth sentences to read as follows: “The plastics sheet shall be compatible with the substance under test. The booster charge consists of 160 g RDX/wax (95/5) or PETN/TNT that has a minimum of 50% PETN in the mixture, 50 ± 1 mm in diameter with a density of $1\,600 \pm 50$ kg/m³.”

In the seventh sentence, replace “RDX/wax charge” by “charges”.

In the eighth sentence, replace “ 3.2 ± 0.2 ” by “3” and “is mounted” by “may be mounted”.

(Reference documents: ST/SG/AC.10/C.3/2014/6, informal document INF.61/Add.2 of the forty-fifth session)

12.4.1.3.1 Delete the last sentence.

(Reference documents: informal document INF.61/Add.2 of the forty-fifth session)

12.4.1.4 In the first sentence, replace “and” by “or”. Amend the end of the sentence after the indents to read as follows: “substance is considered to be not sensitive to detonative shock.”

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

12.6.1.2.2 In the third sentence, after “lead washer” insert “or a washer of a suitable deformable material (for example, polyoxymethylene)”.

(Reference documents: ST/SG/AC.10/C.3/2014/6 and informal document INF.61/Add.2 of the forty-fifth session)

Section 13

13.2, Table 13.1 Renumber existing “3 (c)” as “3 (c) (i)”. Add the following new entries in the corresponding order:

Test code	Name of Test	Section
3 (a) (vii)	Modified Bureau of Mines impact machine test	13.4.7
3 (b) (iv)	ABL friction machine test	13.5.4
3 (c) (ii)	SBAT thermal stability test at 75 °C	13.6.2

(Reference documents: ST/SG/AC.10/C.3/2014/48, -2014/51, -2014/52 as amended and informal document INF.61/Add.2 of the forty-fifth session)

13.4 Add a new subsection 13.4.7 to read as follows:

“13.4.7 Test 3 (a) (vii): Modified Bureau of Mines impact machine test

13.4.7.1 *Introduction*

This test is used to measure the sensitiveness of the substance to drop-mass impact and to determine if the substance is too dangerous to transport in the form tested. The test substance is subjected to a vertical impact force through an intermediate hammer via a drop mass. It is applicable to solid, semisolid, liquid, and powder substances.

13.4.7.2 *Apparatus and materials*

13.4.7.2.1 The general design of the MBOM impact test apparatus is given in Figure 13.4.7.1. The following components are required:

A mechanism containing a drop mass of 2.0 kg, two drop mass guide rails, a drop mass holding, lifting, and dropping mechanism, and a 1.0 kg intermediate hammer containing a 1.27 cm diameter steel insert with a surface roughness of 1.3 – 1.8 µm that is resting on a sample placed on an steel anvil (impact surface 3.8 cm diameter) with a surface roughness of 1.3 – 1.8 µm. Details of the target area are given in Figure 13.4.7.2.

13.4.7.3 *Procedure*

13.4.7.3.1 Solid sample placement

As a rule substances are tested in the form in which they are received. Wetted substances should be tested with the minimum quantity of wetting agent required for transport. Depending on the physical form, the substances should then be subjected to the following procedures:

- (a) Powders are to be tested on the anvil in a monolayer; i.e., the thickness of the granular material. Place enough granules on the anvil to cover an area in excess of the 1.3 cm² area of the insert.
- (b) Solid propellants are tested in the form of thin, uniform slices. The slices are usually square, having a minimum edge length of 1.6 cm and a thickness of 0.08 ± 0.01 cm. This thickness is easily obtainable with the use of a microtome cutting tool.

The intermediate hammer is raised. The test substance is placed centrally on the anvil. The intermediate hammer is then carefully lowered onto the substance on the anvil.

13.4.7.3.2 Liquids and semisolids sample placement

Depending on the physical form, the substances should then be subjected to the following procedures:

- (a) Liquids are tested with a controlled thickness and a fixed gap of 0.05 cm above the liquid level using a spring between the hammer collar and the guide collar (adjustable tension). The thickness of the liquid sample is controlled by putting a piece of 0.015 cm thick tape (compatible with the substance) with a 1.6 cm diameter hole in it on the anvil. The intermediate hammer is raised. The hole in the tape is centrally positioned on the anvil such that the intermediate hammer insert does not touch the tape. A 0.05 cm feeler gauge is used to set the proper gap above the liquid. The tape hole is filled with the liquid substance and levelled-off using a straight-edge ensuring that no air gaps are present in the sample. The intermediate hammer is then carefully lowered to 0.05 cm above the substance on the anvil.
- (b) Semisolids (slurries, gels, etc.) are prepared and tested in much the same way as liquid samples; however, the sample thickness is governed by the largest particle size. If the largest particle size is greater than the 0.015 cm thickness then a monolayer sample is spread on the anvil in a monolayer; i.e., the thickness of the granular material. If the cohesive properties of the semisolid are not practical for a 0.015 cm thickness, then the minimum attainable thickness is used. Place enough granules on the anvil to cover an area in excess of the 1.3 cm² area of the intermediate hammer insert.

13.4.7.3.3 Machine operation

The drop mass is raised to the desired height (17 cm for solids and semisolids and 11 cm for liquids) and released to drop onto the intermediate hammer. Observations are made on whether a “reaction” occurs as evidenced by audible report or production of smoke, fire, charring or visible light as observed by human senses. The type of reaction that occurs is documented. The surfaces are cleaned with a cloth or light abrasive pad to remove any residual material from the anvil or intermediate hammer insert. The anvil and intermediate hammer insert are inspected for scratches, scoring, divots, or other damage which may affect the surface roughness. If damaged these items should be replaced before use on the next trial. Six trials are performed for each test sample.

13.4.7.4 *Maintenance and calibration*

Moving parts should be inspected to ensure that they are freely moving and that friction between them is minimal. The distance between the drop mass and the intermediate hammer that is resting on the anvil should be verified. The contact area between the intermediate hammer insert and anvil should be uniform. The test machine should be periodically cleaned and calibrated according to a schedule based on the amount of usage. At a minimum, the machine should be calibrated on an annual basis.

13.4.7.5 *Test criteria and method of assessing results*

13.4.7.5.1 Solids

The test result is considered “+” if a reaction (see 13.4.7.3.3) is observed in at least 1 out of 6 trials at a drop height of 17 cm and the substance is considered too

dangerous for transport in the form in which it was tested. Otherwise, the result is considered “-”. Borderline cases may be resolved using the Bruceton method (see Appendix 2).

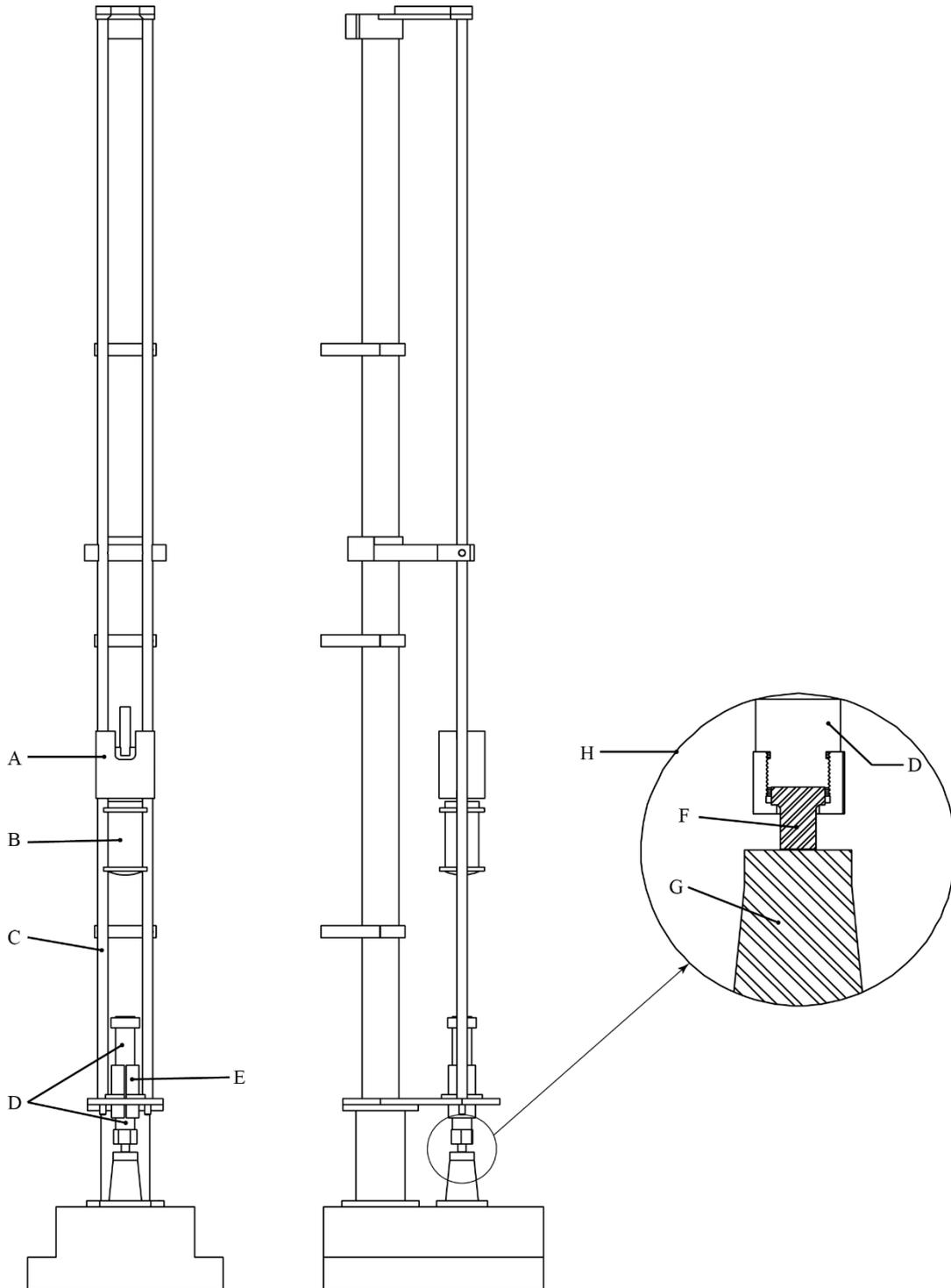
13.4.7.5.2 Liquids

The test result is considered “+” if a reaction (see 13.4.7.3.3) is observed in at least 1 out of 6 trials at a drop height of 11 cm and the substance is considered too dangerous for transport in the form in which it was tested. Otherwise, the result is considered “-”. Borderline cases may be resolved using the Bruceton method (see Appendix 2).

13.4.7.6 *Examples of results*

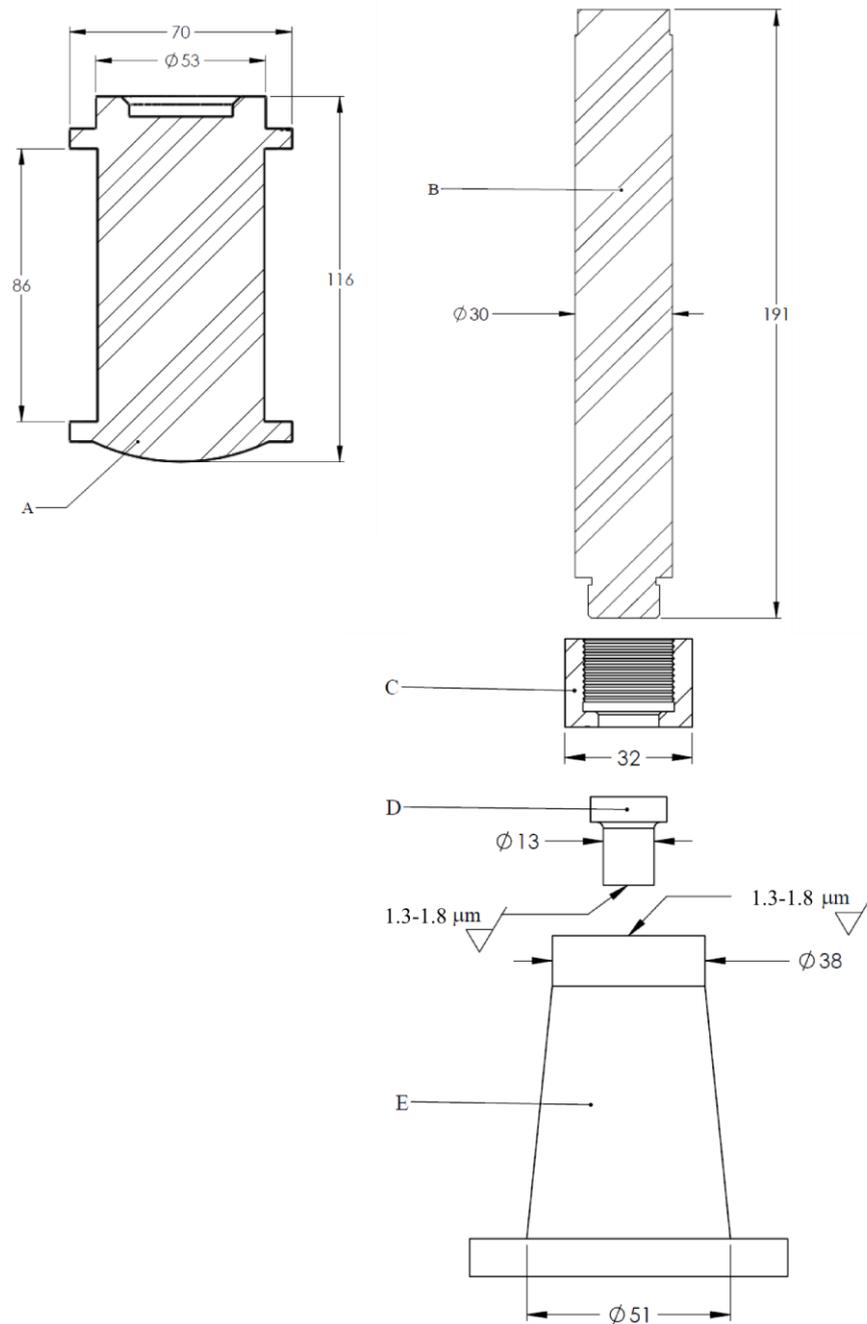
Substances¹	Result
RDX (dry)	+
PBXN-8	-
Nitrocellulose/DNT (90/10)	-
PETN (dry)	+
Nitroglycerin	+

¹ *Data acquired at relative humidity of 10-30% and temperature of 16-24 °C*



(A)	Drop mass lifting, holding, and dropping device	(B)	Drop mass
(C)	Drop mass guide rails	(D)	Intermediate hammer
(E)	Intermediate hammer guide	(F)	Intermediate hammer insert
(G)	Anvil	(H)	Magnified view of target area

Figure 13.4.7.1: MBOM Impact machine



- (A) Drop mass
- (B) Intermediate hammer
- (C) Intermediate hammer insert retaining nut
- (D) Intermediate hammer insert
- (E) Anvil

Figure 13.4.7.2: MBOM Impact machine drop mass and target area detail”.

(Reference documents: ST/SG/AC.10/C.3/2014/51 and informal document INF.61/Add.2 of the forty-fifth session)

Consequential correction: 13.5.3 In the title, replace “Test 3 (b) (iv)” by “Test 3 (b) (iii).”

13.5 Add a new subsection 13.5.4 to read as follows:

“13.5.4 Test 3 (b) (iv): ABL friction machine test

13.5.4.1 *Introduction*

This test is used to measure the sensitiveness of the substance to friction stimuli and to determine if the substance is too dangerous to transport in the form tested. The test substance is subjected to a vertical compression force under a non-rotating wheel, while the substance is moved in a horizontal direction on a sliding anvil. It is applicable to solid, semisolid, and powder substances.

13.5.4.2 *Apparatus and materials*

13.5.4.2.1 The following apparatus and materials are required:

- (a) A mechanism capable of applying a force hydraulically through a non-rotating steel wheel to a sample placed on steel anvil. Both the wheel and anvil have a surface roughness of $1.3 - 1.8 \mu\text{m}$ and a Rockwell C hardness of 55 – 62.
- (b) A pendulum system that is capable of being positioned and released at an angle that will impart a predetermined velocity to the sliding anvil. A travel distance of approximately 2.5 cm perpendicular to the applied force on the wheel is achieved with this system.

13.5.4.3 *Procedure*

13.5.4.3.1 As a rule, substances are tested in the form in which they are received. Wetted substances should be tested with the minimum quantity of wetting agent required for transport. Depending on the physical form, the substances should then be subjected to the following procedures:

- (a) Powders are to be tested on the anvil in a monolayer; i.e., the thickness of the granular material, if possible. Place enough granules on the anvil to approximately cover an area 1.3 cm long by 0.65 cm wide starting about 0.65 cm behind the initial contact point of the wheel with the anvil such that the wheel will be in total contact with the sample when lowered onto it.
- (b) Solid propellants are tested in the form of thin, uniform slices with a thickness of 0.08 ± 0.01 cm. This thickness is easily obtainable with the use of a microtome cutting tool.
- (c) Semisolids will be smoothed with a spatula to a thin layer with uniform thickness approximately 0.015 cm.

With the friction wheel raised, the test substance is placed on the anvil below the wheel such that the wheel will be in total contact with the sample when lowered onto it. The friction wheel is then carefully lowered onto the substance on the anvil and the desired normal force is applied to the wheel [250 N at 2.4 m/s or 445 N at 1.2 m/s]. The pendulum is raised to the desired angle to achieve the appropriate test velocity and released. Observations are made on whether a “reaction” occurs as evidenced by audible report or production of smoke, fire, charring or visible light as observed by human senses. The type of reaction that occurs is documented. The force on the wheel is removed and any excess test substance is cleaned from the area. The wheel is indexed and shifted across the anvil in order to ensure that fresh surfaces are used for each trial.

13.5.4.4 *Maintenance and calibration*

The maximum speed of the anvil should be calibrated to 2.4 m/s and 1.2 m/s. The downward force on the wheel should be verified. The test machine should be periodically cleaned and calibrated according to a schedule based on the amount of usage. At a minimum, the machine should be calibrated on an annual basis.

13.5.4.5 *Test criteria and method of assessing results*

The test result is considered “+” if the lowest friction load at which at least one reaction occurs in six trials is 250 N at 2.4 m/s or 445 N at 1.2 m/s or less and the substance is considered too dangerous for transport in the form in which it was tested. Otherwise, the result is considered “-”.

13.5.4.6 *Examples of results*

Substances¹	Result
RDX (class 5)	-
RDX (class 7)	-
PBXN-8	-
PBXN-10	-
Aluminum/TNT (80/20 Mixture)	-
PETN (dry) ²	+

¹ *Data acquired at 2.4 m/s, relative humidity of 10-30%, and temperature of 16-24 °C unless noted otherwise.*

² *Data acquired at 2.4 m/s and 1.2 m/s.*

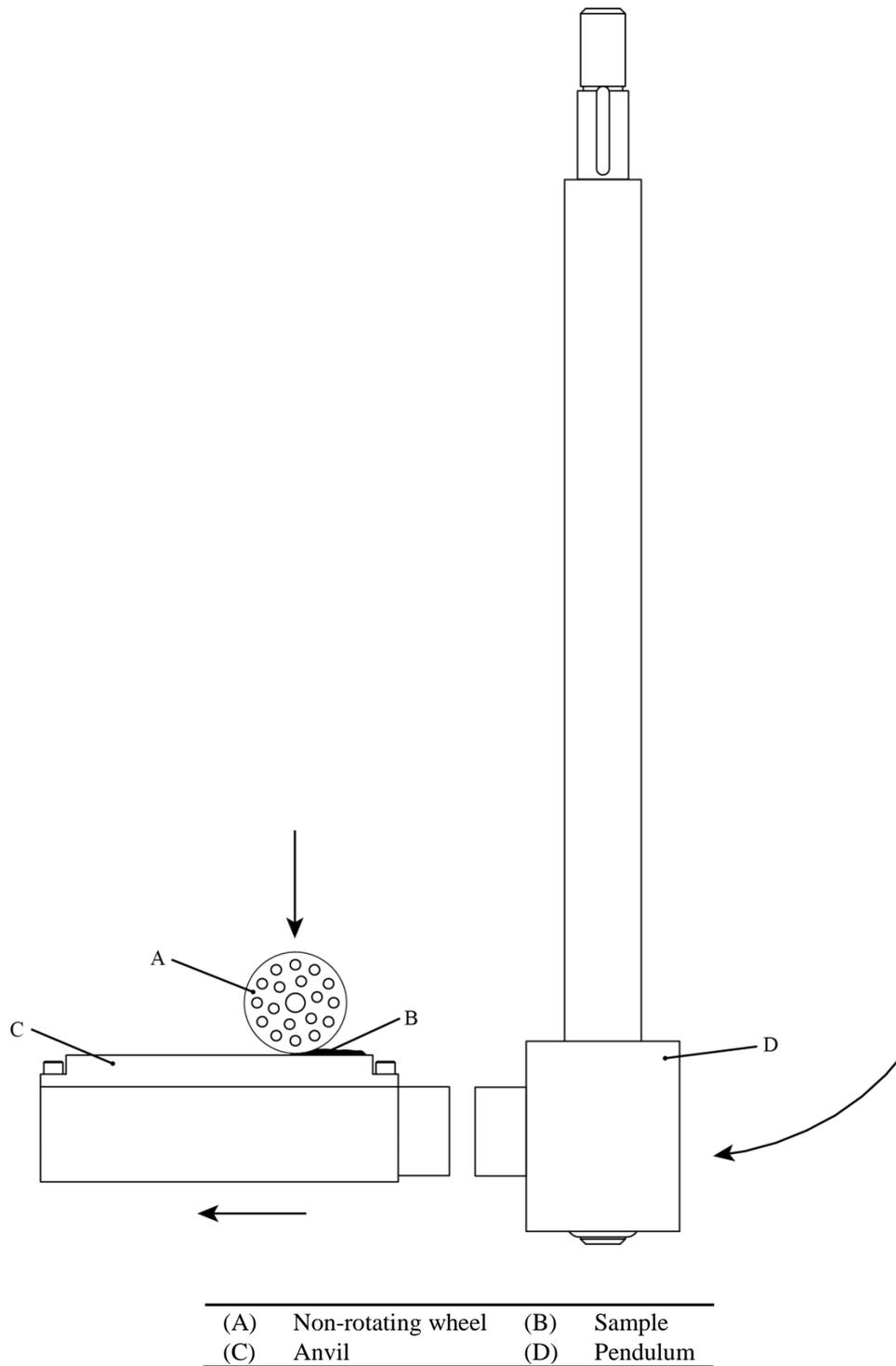


Figure 13.5.4.1: ABL Friction machine

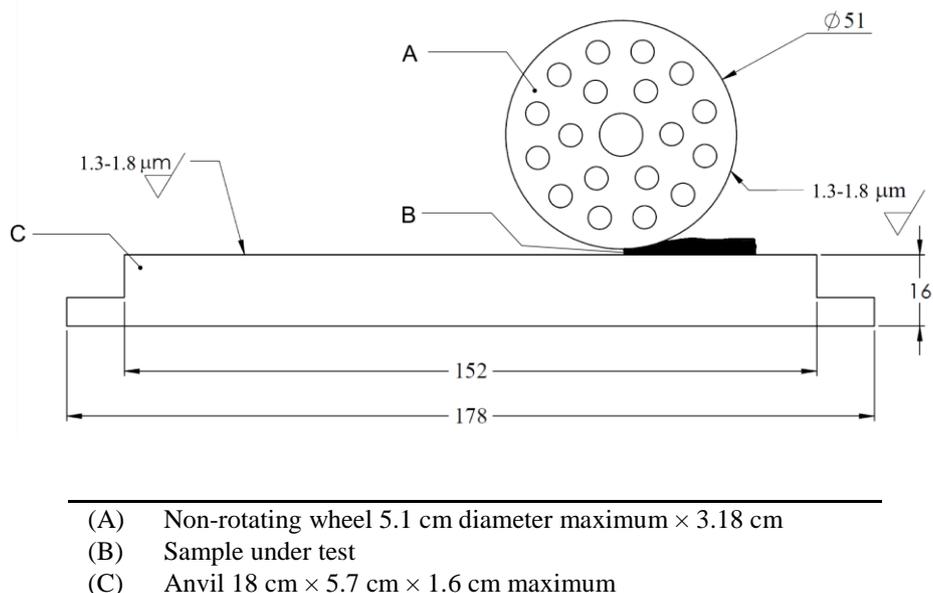


Figure 13.5.4.2: ABL Friction machine wheel and anvil detail”.

(Reference documents: ST/SG/AC.10/C.3/2014/48 as amended and informal document INF.61/Add.2 of the forty-fifth session)

13.6 Rename 13.6.1 as “Test 3 (c) (i): Thermal stability test at 75 °C”. Add a new subsection 13.6.2 to read as follows:

“13.6.2 Test 3(c) (ii): SBAT thermal stability test at 75 °C

13.6.2.1 *Introduction*

This test is used to measure the stability of the substance when subjected to elevated thermal conditions to determine if the substance is too dangerous for transport.

13.6.2.2 *Apparatus and materials*

13.6.2.2.1 The following apparatus is required:

- (a) Glass sample tubes of 13 x 100 mm inside a larger tube of 25 x 100 mm. Each 13 x 100 mm tube is surrounded by insulation and placed into the larger tube. Each larger glass tube has insulation surrounding it further isolating it thermally from the metal oven block. The glass sample tube can be sealed to prevent the escape of gases.
- (b) A well-insulated multiport metal block that can be heated with resistance heaters to a temperature of at least 260 °C. The heating of the block must be automated or reliably controlled so that the desired temperature can be maintained within ± 0.5 °C. The heated block should have independent protection against excessively heating the block in the event of a primary control system failure. Each port in the metal block should have a diameter of 5 cm and a depth of 10 cm.
- (c) The temperature decay time constant, τ , for the configuration outlined in (a) and (b) should be at least 10 minutes. The decay constant, τ , is found by heating 5 grams of an inert material (e.g. dried silica, alumina, or

silicone) in the sample tube (13 x 100 mm test tube) to a temperature 50 °C or more higher than the constant temperature of the SBAT. The heated sample tube is placed into the SBAT apparatus (into the larger glass tube with internal and external insulation as previously described). The sample will cool to the constant temperature of the oven. While cooling, the sample temperature is recorded. The decaying temperature will be exponential in shape and is fit to the following equation:

$$(T - T_a)/(T_i - T_a) = \exp(-t/\tau)$$

where T is the inert reference temperature that varies with time, T_a is the constant oven temperature, T_i is the initial reference temperature, t is time and τ is the temperature decay time constant.

- (d) An inert material (e.g. dried silica, alumina or silicone) to be used as a reference which is also placed into insulated glass tubes (13 x 100 mm inside the larger 25 x 100 mm tube) with the same insulation configuration as the sample.
- (e) Thermocouples with a data recording system to record the temperature of the reference and sample(s) as well as thermocouple(s) to measure and control the oven temperature.

13.6.2.3 *Procedure*

13.6.2.3.1 Five grams of the sample or an amount that fills the tube to 75 mm height, whichever is less, is placed inside one of the sample tubes. A second sample tube is filled with the same amount of sample. One of the filled sample tubes is not sealed whereas the second filled sample tube is sealed with a screw cap or other method. For the sample tube that is sealed, the thermocouple is attached to the sidewall of the sample tube. For the open sample tube, the thermocouple can be attached to the side of the tube or inserted into the sample.

13.6.2.3.2 Each sample tube is then surrounded with insulation and placed into the larger 25 x 100 mm tube which is also insulated from the side walls of the SBAT oven ports. The approximately 5 gram reference sample must also be present in one of the SBAT ports with the same insulation configuration as the sample. The samples are heated to 75 – 77 °C and maintained at that temperature for 48 hours. Sample and reference temperatures are recorded throughout the test.

13.6.2.3.3 Once the test has been completed, additional test data may be obtained by linearly increasing the temperature of the apparatus to determine the thermal profile of the sample (measuring endotherms and exotherms, as evidenced by departures of the sample from the temperature of the inert reference).

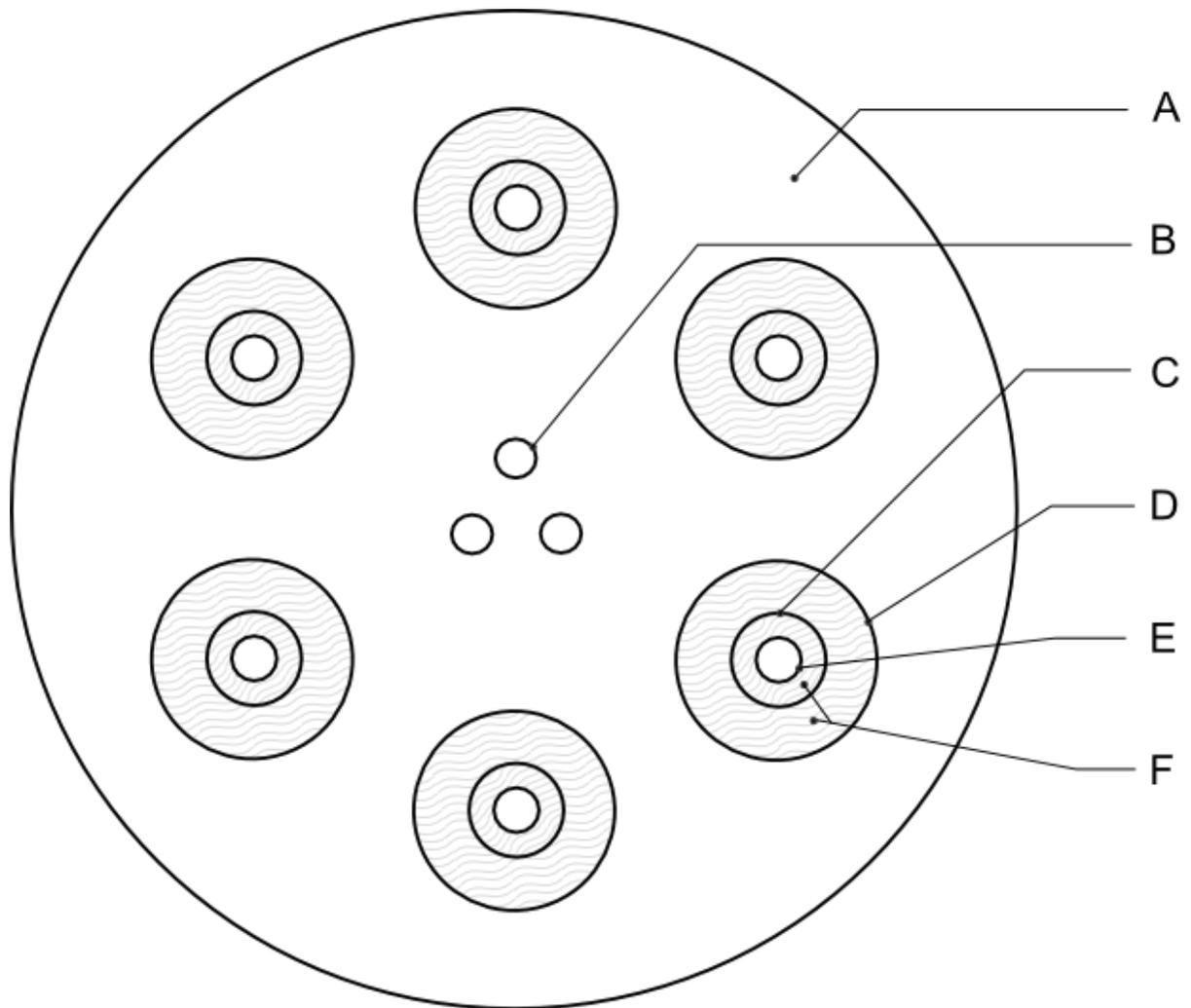
13.6.2.4 *Test criteria and method of assessing results*

13.6.2.4.1 The result from a test is considered “+” if either the sealed or unsealed sample shows more than a 1.5 °C temperature rise during the 48 hour test period indicating self-heating.

13.6.2.4.2 If the test result is “+”, the substance should be considered too thermally unstable for transport.

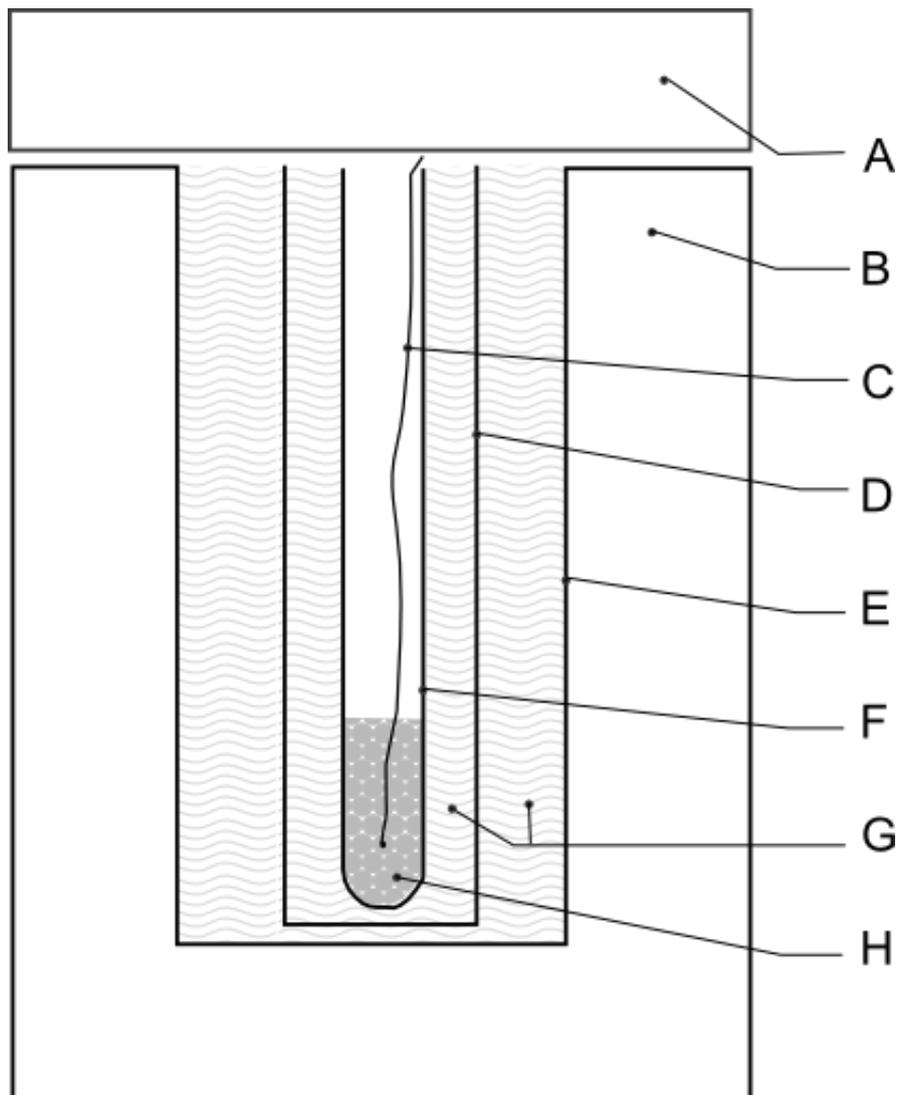
13.6.2.5 *Examples of results*

Substances	Temperature Rise	Result
PETN	Less than 1.5 °C	–
RDX	Less than 1.5 °C	–
TNT	Less than 1.5 °C	–
Composition B, reclaimed	Less than 1.5 °C	–
Double base smokeless powder, 40% NG	Less than 1.5 °C	–
Black powder	Less than 1.5 °C	–
Barium styphnate	Less than 1.5 °C	–
Rocket motor propellant (60-70% AP, 5-16% Al, 12-30% binder)	Less than 1.5 °C	–
Catalyst containing copper acetylide	Greater than 1.5 °C	+



- | | | | |
|-----|------------------------|-----|-------------------|
| (A) | Metal block | (B) | Cartridge heaters |
| (C) | Glassware | (D) | Sample port |
| (E) | Glass sample container | (F) | Insulation |

Figure 13.6.2.1: SBAT Heating Block



-
- | | | | |
|-----|---------------------------|-----|------------------------|
| (A) | Insulative cap or blanket | (B) | Metal block |
| (C) | Thermocouple | (D) | Glassware |
| (E) | Sample port | (F) | Glass sample container |
| (G) | Insulation | (H) | Sample |
-

Figure 13.6.2.1: SBAT Port²⁷

(Reference documents: ST/SG/AC.10/C.3/2014/52 and informal document INF.61/Add.2 of the forty-fifth session)

Section 16

16.2.2 Amend as follows:

In the first sentence, insert “normally” after “and 6 (d) are”. In the second sentence, insert “follow this order or to” after “necessary to”.

Third and fourth sentences become new sub-paragraphs (a) and (b) respectively. At the end of both add the following phrase: “, (see also section 16.2.2 (d))”.

Former sub-paragraphs (a) and (b) become indents (i) and (ii) under new sub-paragraph (b).

Next two sentences after (i) and (ii), former sub-paragraphs (a) and (b), become sub-paragraphs (c) and (d) respectively. At the end of (d) insert a new sentence to read as follows: “When testing articles to which special provision 347 applies, test type 6(d) may be performed first. If the results of test type 6(d) indicate that a 1.4S classification is appropriate, then test types 6(a) and 6(b) may be waived.”.

Delete the last sentence, starting with “The results of test series 6 (c)...”.

(Reference documents: ST/SG/AC.10/C.3/2014/4 as amended and informal document INF.61/Add.2 of the forty-fifth session)

16.4.1.2 Amend as follows:

Group sub-paragraphs (a) and (b) and amend to read as follows:

(a) “A detonator to initiate the substance or article or an igniter just sufficient to ensure ignition of the substance or article (see 16.4.1.3.2 and 16.4.1.3.3);”.

Re-number sub-paragraphs (c) and (d) as (b) and (c) respectively.

In sub-paragraph (b), former (c), insert “(see 16.4.1.3.4)” after “materials”.

In sub-paragraph (c), former (d), replace “3.0” by “3”.

(Reference documents: ST/SG/AC.10/C.3/2014/4 as amended and informal document INF.61/Add.2 of the forty-fifth session)

16.5.1.2 Amend as follows:

Group sub-paragraphs (a) and (b) and amend to read as follows:

(a) “A detonator to initiate the substance or article or an igniter just sufficient to ensure ignition of the substance or article (see 16.5.1.4 and 16.5.1.5);”.

Re-number sub-paragraphs (c) and (d) as (b) and (c) respectively.

In sub-paragraph (b), former (c), insert “(see 16.5.1.3)” after “materials”.

In sub-paragraph (c), former (d), replace “3.0” by “3”.

(Reference documents: ST/SG/AC.10/C.3/2014/4 as amended and informal document INF.61/Add.2 of the forty-fifth session)

16.6.1.1 At the end of the sentence, delete “or any other dangerous effect”.

(Reference documents: ST/SG/AC.10/C.3/2014/4 as amended and informal document INF.61/Add.2 of the forty-fifth session)

16.6.1.2 In sub-paragraph (c), replace “ground” by “fuel surface at the onset of the test”. After sub-paragraph (h), in the last paragraph, add a last sentence to read as follows: “Further equipment may be needed when following the procedure in 16.6.1.3.9.”.

(Reference documents: ST/SG/AC.10/C.3/2014/4 as amended and informal document INF.61/Add.2 of the forty-fifth session)

16.6.1.2 (h) Amend to read as follows:

“(h) Video equipment capable of recording the events necessary for classification. The type, number and placement of the camera(s) shall be sufficient to record all events to be assessed.”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

16.6.1.3.1 Amend to read as follows:

“16.6.1.3.1 The required number of packages or unpackaged articles, in the condition and form in which they are offered for transport, are arranged as close as possible to one another on the metal grid. If directional effects are anticipated, packages or unpackaged articles should be oriented in such a way to maximize probability for projections to hit witness screens and for discrete flame jets to be pointed horizontally. If necessary, the packages or unpackaged articles may be encircled with a steel strip to support them during the test. Fuel is placed beneath the grid so that the fire will engulf the packages or unpackaged articles. Suitable methods of heating include a wood, liquid or gas fuel fire or a combination thereof, which achieves a temperature of 800 °C. Fluctuations of temperature below 800 °C are normal and should not render the test invalid.”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

16.6.1.3.2 Amend to read as follows:

“16.6.1.3.2 A wood fire should burn the packages or unpackaged articles with sufficient intensity and duration to completely react the explosives (see 16.6.1.2(e)). Dried pallets, boards, laths, or other wood alone or in combination may be stacked to form a lattice beneath the grid 1 m off the ground, and up to the base of the grid supporting the packages or unpackaged articles. The wood should extend at least 1 m beyond the packages or unpackaged articles to ensure that the fire engulfs the product.”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

16.6.1.3.5 Amend the first three sentences to read as follows:

“The witness screens are erected vertically in each of three quadrants at a distance of 4 m from the edge of the packages or unpackaged articles. The sheets should be placed so that the centres are approximately level with the centre of the packages or unpackaged articles or, if this is less than 1.0 m above the ground, in contact with the ground.”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

16.6.1.3.6 Amend the last sentence to read as follows:

“A safe waiting period, prescribed by the test agency, should be observed before approaching the test area.”.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)

16.7.1.2 Amend as follows:

Group sub-paragraphs (a) and (b) and amend to read as follows:

(a) “A detonator to initiate the substance or article or an igniter just sufficient to ensure ignition of the substance or article (see 16.7.1.3.2); and”.

Renumber sub-paragraph (c) as (b).

In sub-paragraph (b), former (c), replace “3.0” by “3”.

(Reference documents: ST/SG/AC.10/C.3/2014/4 as amended and informal document INF.61/Add.2 of the forty-fifth session)

16.7.1.4 In sub-paragraph (b), replace “capable of igniting” by “that ignites”.

(Reference documents: ST/SG/AC.10/C.3/2014/4 and informal document INF.61/Add.2 of the forty-fifth session)

Section 18

(Reference documents: ST/SG/AC.10/C.3/2014/11 and informal document INF.61/Add.4 of the forty-fifth session)

18.1 In the last paragraph, insert “of ANEs” after “the suitability” and “portable” before “tanks”.

18.2, Table note b Insert “of ANEs” after “the suitability” and “portable” before “tanks”.

18.3.1 Amend to read as follows:

“18.3.1 Unless otherwise specified in these tests, the substance should be tested as offered for transport, at the maximum temperature which may occur during transport (see 1.5.4 of this Manual).”.

18.4.1.1 Group 18.4.1.1.1 and 18.4.1.1.2 and amend to read as follows:

“18.4.1.1.1 This test is used to determine whether a candidate for "ammonium nitrate emulsion, suspension or gel, intermediate for blasting explosives" is thermally stable at temperatures encountered during transport. In the way this type of test is normally carried out (see 28.4.4), the 500 ml insulated test vessel is only representative for packagings, IBCs and small tanks. For the transport of ammonium nitrate emulsions, suspensions or gels the test is used to measure their thermal stability during tank transport if the test is carried out on candidate products which are at a temperature 20 °C higher than the maximum temperature which may occur during transport, or if higher, at the temperature at the time of loading.”.

18.4.1.2.1 After “of a suitable” insert “thermostatically controlled” and after “test chamber” insert “(which may be fan assisted)”. Replace “Dewar” by “insulated test” and “measuring equipment” by “recording equipment”.

18.4.1.2.2 Amend to read as follows (the last sentence is unchanged):

“18.4.1.2.2 The test should be performed following a risk assessment, taking account of the potential for fire and/or explosion in the test chamber, and the application of appropriate control measures for the protection of persons and property. A number of tests may be run concurrently. The recording system should be housed in a separate observation area.”.

18.4.1.2.3 Amend as follows:

In the first sentence, replace “A thermostatically controlled drying oven (which may be fan-assisted)” by “The test chamber must be” and “Dewar vessel may be used” by “insulated test vessels.”.

In the second sentence, replace “oven” by “test chamber”, “Dewar” by “insulated test” and “± 1 °C” by “± 2 °C”.

In the third sentence, replace “oven” by “test chamber”.

Delete the 2 last sentences.

18.4.1.2.4 In the first sentence, replace “Dewar” by “Insulated test” and insert “approximately” before “500 ml”. In the second sentence, replace “Dewar” by “test”. Delete the last sentence.

18.4.1.2.5 Replace “Dewar” by “insulated test” and “should” by “must”. In the third sentence, replace “can be” by “are” and amend the end to read as follows: “filled with a known inert liquid substance e.g. distilled water.” In the last sentence, replace “can be” by “is”.

18.4.1.2.6 Replace “Dewar” by “Insulated test”.

18.4.1.2.7 Delete.

18.4.1.3.1 Insert “at” before “the temperature”. Amend the second and third sentences to read as follows: “Fill the test vessel with the substance under test to about 80% of the capacity of the test vessel, or approximately 400 ml.” Amend the beginning of the last sentence to read as follows: “Seal the lid of the test vessel and place it in the test chamber,...”, remainder unchanged.

18.4.1.3.2 Amend the first sentence to read as follows: “The temperature of the sample and of the test chamber are continuously monitored.”. Delete the last sentence.

18.4.1.3.3 Amend to read as follows:

“18.4.1.3.3 At the end of the test, allow the sample to cool, remove it from the test chamber and carefully dispose of it as soon as possible.”.

18.4.1.4.1 Insert “within the seven day period” after “6 °C or more”.

Figure 18.4.1.1 Delete.

18.5.1.1 Replace “donor” by “booster”.

18.5.1.2.1 Replace “(donor)” by “(booster charge)”, “test charge” by “sample substance” and insert “charge” after “acceptor”.

18.5.1.2.1 (a) Amend to read as follows:

“(a) Detonators of sufficient strength to effectively initiate the booster charge;”.

18.5.1.2.1 (b) Amend to read as follows:

“(b) Booster charges consisting of 95 mm diameter by 95 mm long pellet with a density of $1\ 600\ \text{kg/m}^3 \pm 50\ \text{kg/m}^3$ of either Pentolite (PETN/TNT with a minimum 50% PETN), Composition B (RDX/TNT with a minimum 50% RDX) or RDX/WAX (with a minimum 95% RDX);”.

18.5.1.2.1 (c) Delete “seamless,”

18.5.1.2.1 (d) Amend to read as follows:

“(d) Sample substances (acceptor charges);”.

18.5.1.2.1 (e) Delete the last sentence.

18.5.1.2.1 (f) Insert “approximately” before “200 mm”.

18.5.1.2.1 (g) Insert “approximately” before “25 mm”, at the end add: “in place against the booster charge;”.

18.5.1.2.1 Add a new sub-paragraph (h) to read as follows:

“(h) Wood blocks or similar to stand the assembly at least 100 mm off the ground.”.

18.5.1.3.1 Amend to read as follows:

“18.5.1.3.1 As shown in Figure 18.5.1.1, the detonator, booster charge, PMMA gap and acceptor charge are coaxially aligned above the centre of the witness plate. The bottom end of the tube is sealed with a single layer of cloth adhesive tape, or equivalent, to contain the sample substance which is carefully loaded so as to avoid the formation of voids within the sample or between the sample and the tube walls. The surface of the sample should be level with the rim of the tube. Care should be taken to ensure good contact between the detonator, the booster charge, the PMMA cylinder and the acceptor charge. The sample substance should be at ambient temperature. The wood block holding the detonator, the booster charge, the PMMA cylinder and the steel tube should be held firmly in alignment (e.g. by using a band of adhesive tape at each intersection).”

18.5.1.3.2 Amend to read as follows:

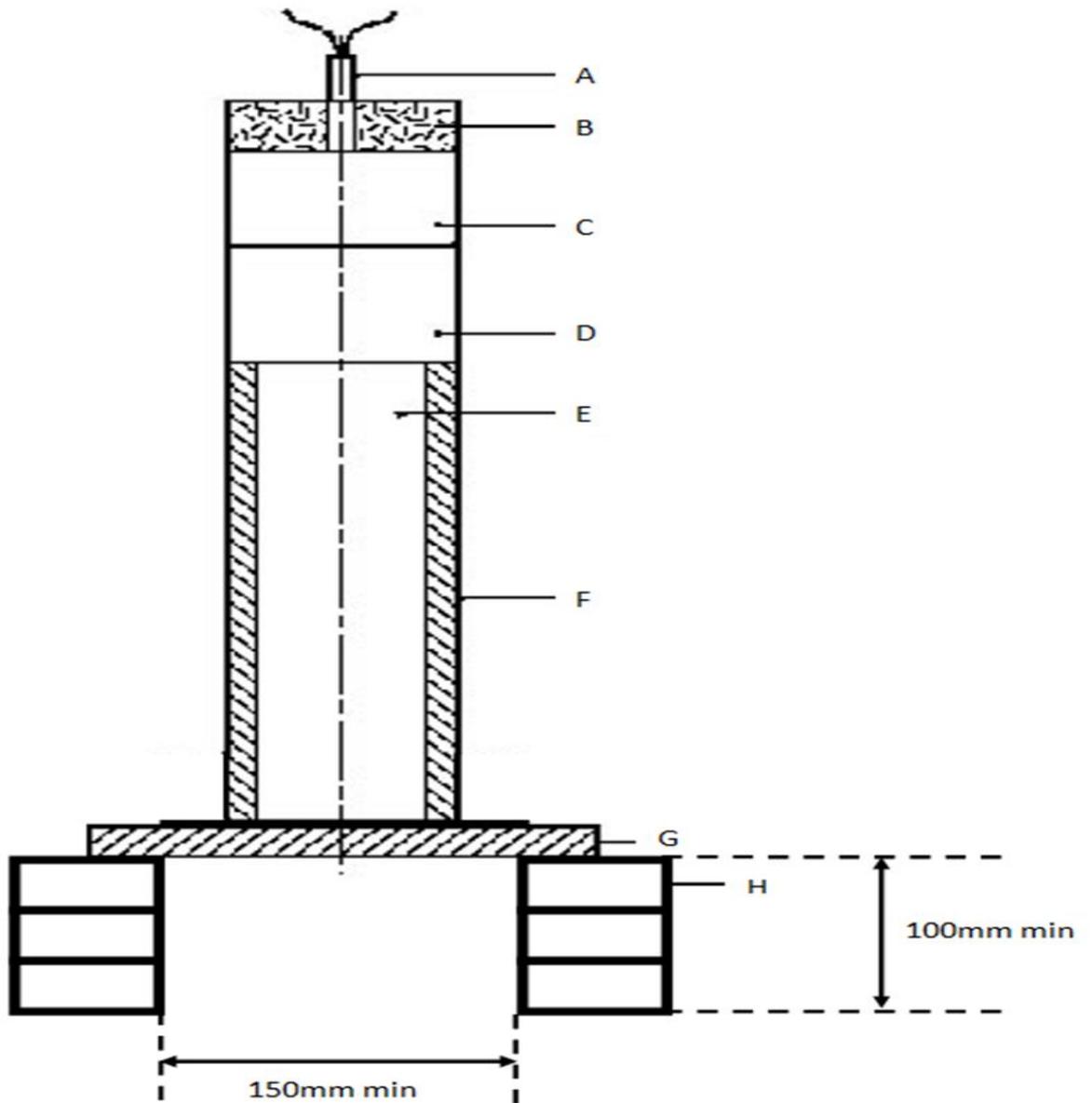
“18.5.1.3.2 The whole assembly, including the witness plate, is raised above the ground, with at least a 100 mm air gap between the ground and the bottom surface of the witness plate which is supported along two edges only with wooden blocks, or similar, as shown in Figure 18.5.1.1. The location of the blocks must ensure there is a clear space under where the tube is standing on the witness plate. To assist in collecting the remains of the witness plate, the whole assembly should be vertical (e.g. checked with a spirit level).”

18.5.1.3.3 Delete the first sentence.

18.5.1.4 Insert “and propagated” after “a detonation was initiated”. Amend the middle of the second sentence to read: “...which detonates and punches a hole in the witness plate in any trial is not to be classified...”.

18.5, Figure 18.5.1.1 Replace Figure 18.5.1.1 and caption by the following ones (*the heading of the figure remains unchanged*):

“



(A) Detonator	(B) Wooden detonator holder	(C) Booster charge
(D) PMMA gap	(E) Substance under test	(F) Steel Tube
(G) Witness plate	(H) Wooden blocks	

”

Table 18.5.1.1 and Figure 18.5.1.2 Delete.

18.6.1.2.1 Amend the end of the first paragraph to read as follows:

“...and is available with numerous sized orifices. For this test the following diameter holes are used:

- 1.5 mm for the closing plate used in the heating calibration procedure; and
- 2.0 mm for the closing plate used in the test.

The dimensions of the threaded collar and the nut (closing device) are given in Figure 18.6.1.1.”

18.6.1.2.1 (a) Delete the remainder of the sentence after “ 26.5 ± 1.5 g”.

18.6.1.2.2 Replace “propane” by “a gaseous fuel (e.g. propane)”. Delete the second sentence. Insert “or equivalent” after “dibutyl phthalate” and insert “and inserted through the orifice plate” after “rim of the tube”.

18.6.1.2.3 In the first sentence, insert a full stop after “welded box” and replace the remainder of the sentence by “A suitable arrangement of the construction and dimensions of the box is given in Figure 18.6.1.2.”. In the fourth sentence, replace “The arrangement” by “A suitable arrangement”.

18.6 Insert a new paragraph 18.6.1.2.4 to read as follows:

“18.6.1.2.4 A video camera should be provided to record the test and to ensure all burners are functional during the test. The camera may also provide evidence of blockages of the orifice by solids within the sample.”.

18.6.1.3.1 Replace “appropriate” by “2 mm” and “molybdenum disulphide based lubricant” by “high temperature anti-seize compound (e.g. molybdenum disulphide based lubricant)”.

18.6.1.3.2 Delete the first sentence.

18.6.1.3.3 At the end, add “to ensure all pieces have been recovered”.

18.6.1.3.4 Replace ““no explosion”” by ““no explosion (negative (-))”” and ““explosion”” by ““explosion (positive (+))””.

18.6.1.3.5 Amend to read as follows:

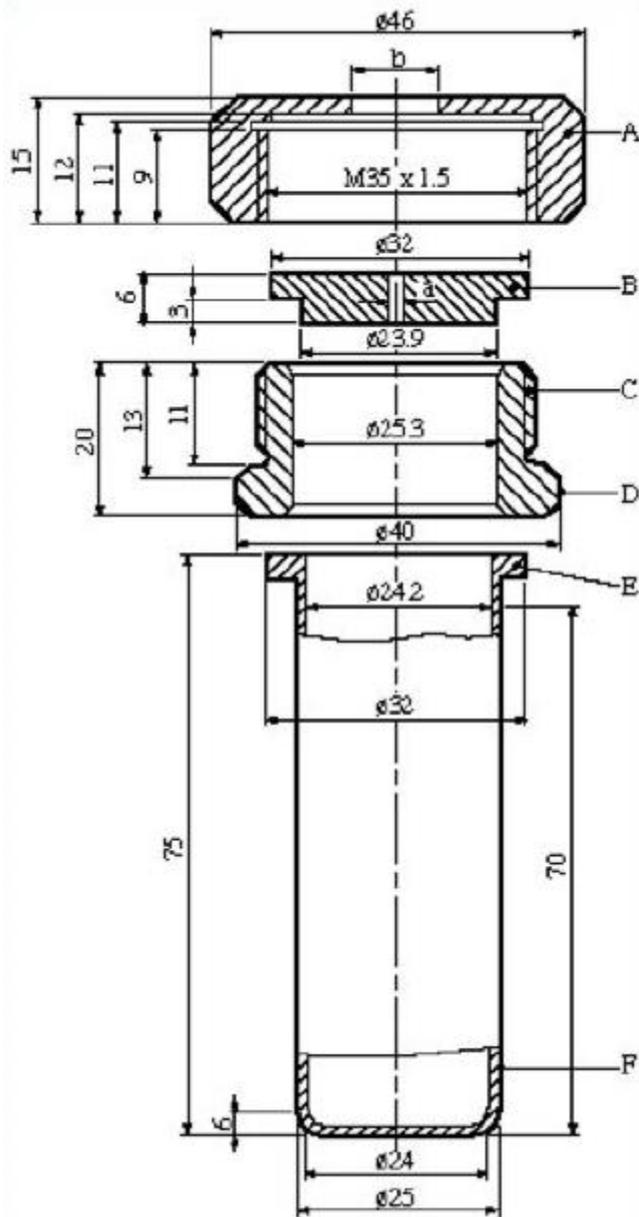
“18.6.1.3.5 The test is performed to achieve negative (-) results in three tests.

Given the nature of ammonium nitrate emulsions, suspensions or gels and the possibility of varying percentages of solids present, blockages of the orifices may occur during testing potentially leading to a false “+” result. Where this is observed the test may be repeated (maximum twice).”.

18.6.1.4 Amend the end of the paragraph to read as follows: “...Division 5.1 if three negative (-) results cannot be achieved within a maximum of five tests.”.

Figures 18.6.1.1, 18.6.1.2 and 18.6.1.3 Replace by the following figures and pictures:

“



- | | |
|---|--|
| (A) Nut ($b = 10$ mm) with flats for size 41 spanner | (B) Orifice plate ($a = 1.5$ or 2.0 mm) |
| (C) Threaded collar | (D) Flats for size 36 spanner |
| (E) Flange | (F) Tube |

Figure 18.6.1.1: TEST TUBE ASSEMBLY

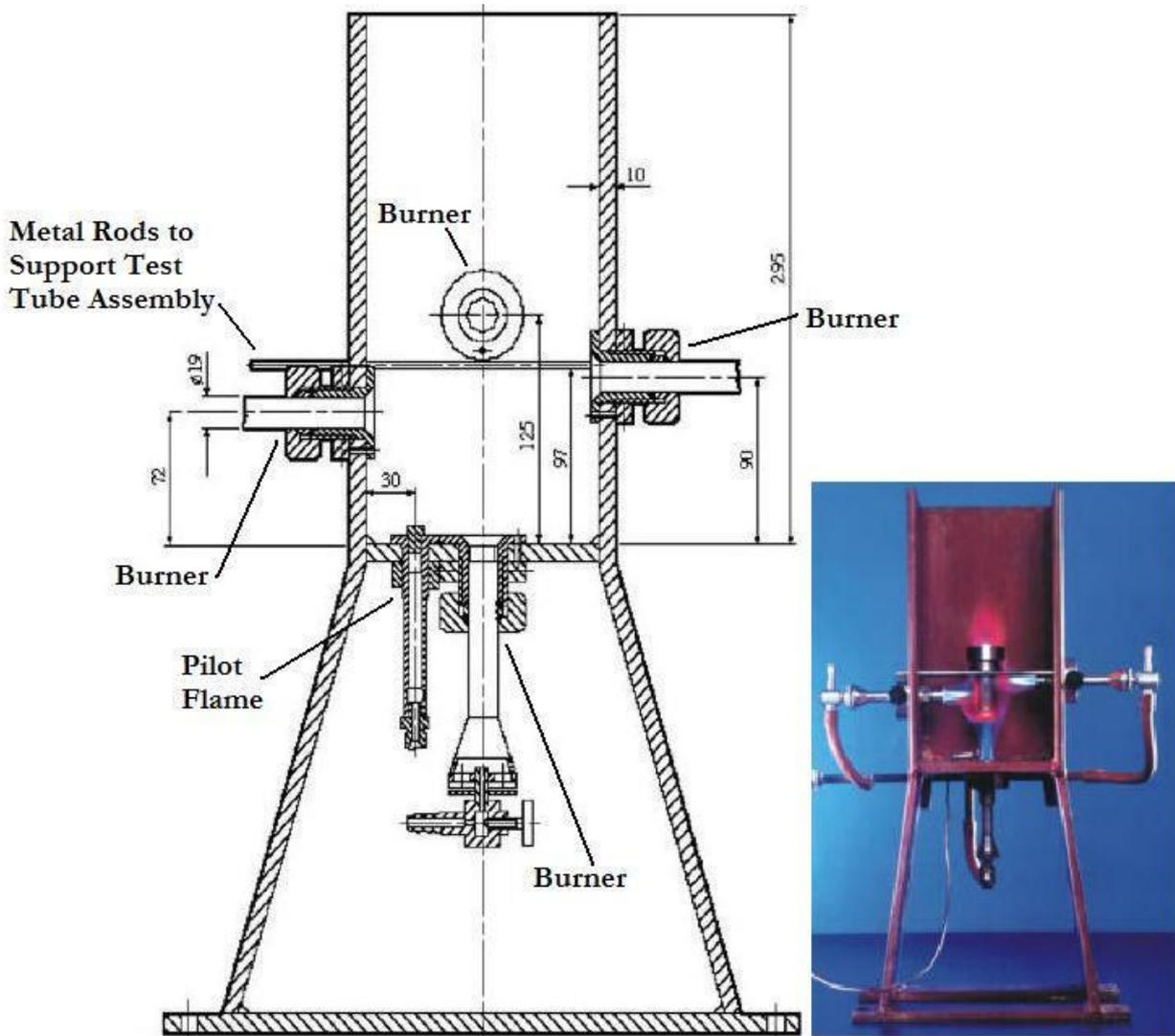


Figure 18.6.1.2 HEATING DEVICE

Examples of Koenen test results

“O”: Tube unchanged



“A”: Bottom of the tube bulged out



“B”: Bottom and wall of the tube bulged out



Classification “C”: Bottom of tube split (*MISSING PICTURE MUST BE PROVIDED TO THE SECRETARIAT BEFORE THE SESSION*)

“D”: Wall of tube split



“E”: Tube split into two fragments



“F”: Tube fragmented into three or more mainly large pieces which in some cases may be connected with each other by a narrow strip;



“G”: Tube fragmented into many mainly smaller pieces, closing device undamaged



18.7.1.2 (a) Add the following sentences at the end to read as follows: “All welding should be to a relevant ISO standard or equivalent. All steel components are to be Schedule 40 carbon steel (A53 Grade B) or equivalent;”.

18.7.1.2 (b) Replace “fuel” by “fire”. Insert “approximately” before “1.0 m”. Amend the end of the paragraph to read as follows: “...the grid should be approximately 0.5 m above the fuel surface at the onset of the test”.

18.7.1.2 (c) Amend the beginning to read as follows: “Enough fuel to produce a fire reaching 800 °C (measured at the external base of the pipe) and to keep burning ...”. At the end, add: “, evidenced by ejection of material, smoke, fumes, flames, etc., from the top of

the pipe. Temporary variation of temperature below 800 °C is normal and should not render the test invalid”.

18.7.1.2 (d) Amend the end of the paragraph to read as follows: “...soak the wood and igniters;”.

18.7.1.2 (e) Amend to read as follows:

“(e) Video cameras to record events in colour;”.

18.7.1.2 (f) Amend to read as follows:

“(f) Means of measuring and recording temperature, up to and above 800 °C, with a thermocouple located at the external base of the pipe;”.

18.7.1.2 Add a new sub-paragraph (g) to read as follows:

“(g) A means of measuring wind speed, such as an anemometer.”.

18.7.1.3.1 In the fourth sentence, insert “, extending in every direction beyond the pipe” before “beneath the grid” and “fully” before “engulf”. In the last sentence, delete “using a lattice of wooden laths”.

18.7.1.3.2 and 18.7.1.3.3 Amend to read as follows:

“18.7.1.3.2 The test should not be performed under conditions where the wind speed consistently exceeds 6 m/s.

18.7.1.3.3 Observations are made on the following:

- (a) Wind speed at commencement of the test as per Section 18.7.1.3.2;
- (b) Fire duration of at least 30 minutes or until the substance has clearly had enough time to react to the fire, with 800 °C reached at the external base of the pipe;
- (c) Temperature at the external base of pipe;
- (d) Substance reacting to the fire as described in 18.7.1.2(c);
- (e) Evidence of explosion (e.g. fragmentation of the pipe into two or more pieces);
- (f) Projection of fragments of the pipe section from the fire area;
- (g) Evidence of a rupture (e.g. a split of the pipe or separation of the pipe from the base plate at the weld).”.

18.7.1.4 Amend to read as follows:

“18.7.1.4 *Test criteria and method of assessing results*

A test is considered valid if observation criteria outlined in Section 18.7.1.3.3 (a) to (d) have been met.

The test result is considered “+” and the substance should not be transported in portable tanks as a dangerous good of Division 5.1 if an explosion and/or fragmentation of the pipe, as specified in Section 18.7.1.3.3 (e) and (f) is observed.

The test result is considered “-” if no explosion and/or fragmentation of the pipe is observed. Splitting of the pipe or its separation from the end plates, as specified in Section 18.7.1.3.3 (g) is evidence of a “-” result.”.

18.7.2.1 Amend the end of the first paragraph to read as follows: "...the suitability of a candidate for "ammonium nitrate emulsion or suspension or gel, intermediate for blasting explosives", to be transported in portable tanks as a dangerous substance of Division 5.1."

18.7.2.2 (a) Insert a new fourth sentence to read as follows: "All welding should be to a relevant ISO standard or equivalent." In the last sentence, move "neatly" to before "accommodate".

18.7.2.2 (b) Insert ", or similar solid base," before "about 400 mm".

18.7.2.2 (c) Insert "approximately" before "150 mm". At the end add: "or similar solid base".

18.7.2.2 (d) In the first sentence, replace "propane" by "fuel gas (e.g. propane)". In the second sentence, insert ", or similar solid base," after "concrete block".

18.7.2.2 Add a new sub-paragraph (e) to read as follows:

"(e) Enough fuel to produce a fire reaching 800 °C (measured at the external base of the pipe) and to keep burning for at least 60 minutes or, if necessary, until the substance has clearly had enough time to react to the fire, evidenced by ejection of material, smoke, fumes, flames, etc., from the top of the pipe. Temporary variation of temperature below 800 °C is normal and should not render the test invalid;"

Renumber sub-paragraphs (e) to (k) accordingly.

18.7.2.2 (f) former (e) In the first sentence, replace "propane" by "fuel gas". In the third sentence, insert "about" before "600 mm" and replace "the height is" by "the height should be about". In the fourth sentence insert "approximately" before "150 mm".

18.7.2.2 (g) former (f) In the first sentence, replace "Propane" by "Fuel gas". Delete the second sentence and replace "propane" by "fuel gas" everywhere else in the paragraph (three times). Replace "measuring up to 60 g/min of propane" by "measuring up to 60 g/min".

18.7.2.2 (h) former (i) Insert "approximately" before "500 (2)".

18.7.2.2 (l) former (k) Amend to read as follows:

"(l) The candidate ammonium nitrate emulsion or suspension or gel, intermediate for blasting explosives ANE to be tested;"

18.7.2.2 Add a new sub-paragraph (m) to read as follows:

"(m) A means of measuring wind speed at the commencement of the test, such as an anemometer;"

18.7.2.2 Number the last sentence as sub-paragraph (n).

18.7.2.3.1 In the first sentence, insert "about" before "435 mm)".

18.7.2.3.3 In the first sentence, replace "ANE" by "test".

18.7.2.4.1 In the first sentence, insert ", or similar solid base," after "concrete block". In the second sentence, replace "propane" by "fuel gas" and "concrete block" by "solid base".

18.7.2.4.2 In the second sentence, insert "approximately" before "435 mm" and replace "ANE" by "substance" twice. In the last sentence, replace "propane" by "gas".

18.7.2.4.3 (c) Insert "about" before "20 mm".

18.7.2.4.3 The amendment to the last paragraph does not apply to the English text.

18.7.2.4.4 In the first sentence, replace “Propane” by “Fuel gas”. Amend the end of the paragraph to read as follows: “...exceeds 6 m/s, unless additional precautions against side winds are taken to avoid dissipation of the heat.”.

18.7.2.4.5 In the first sentence, replace “propane” by “fuel gas”.

18.7.2.4.7 Amend to read as follows:

“18.7.2.4.7 Observations are made on the following:

- (a) Wind speed at commencement of the test as per Section 18.7.2.4.4;
- (b) Fire duration of at least 60 minutes or until the substance has clearly had enough time to react to the fire, with 800 °C reached at the external base of the pipe;
- (c) Temperature at the external base of pipe;
- (d) Substance reacting to the fire as described in 18.7.2.2(e);
- (e) Evidence of explosion (e.g. fragmentation of the pipe into two or more pieces);
- (f) Projection of fragments of the pipe section from the fire area;
- (g) Evidence of a rupture (e.g. a split of the pipe or separation of the pipe from the base plate at the weld).”.

18.7.2.4.8 Amend to read as follows:

“18.7.2.4.8 Test criteria and method of assessing results

A test is considered valid if observation criteria outlined in Section 18.7.2.4.7 (a) to (d) have been met.

The test result is considered “+” and the substance should not be transported in portable tanks as a dangerous good of Division 5.1 if an explosion and/or fragmentation of the pipe, as specified in Section 18.7.2.4.7 (e) and (f) is observed

The test result is considered “-” if no explosion and/or fragmentation of the pipe is observed. Splitting of the pipe or its separation from the end plates, as specified in Section 18.7.2.4.7 (g) is evidence of a “-” result.”.

18.7.2.5 Delete.

18.7.2.6 Renumber as 18.7.2.5.

Section 21

21.1.2 At the end, replace “Series A test may be used” by “Series A test should be performed”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

21.1, Table 21.1 Delete the entry for “A2”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

21.3.2 At the end insert “, if known”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

21.4.3.2 Amend as follows:

In the second sentence, replace “cold-drawn” by “an annealed” and “ 4.0 ± 0.1 ” by “4”.

In the fourth sentence, replace “two layers of 0.08 mm thick polythene” by “a plastics”, insert “tightly” before “in place” and delete the remainder of the sentence after “in place”.

Amend the fifth and sixth sentences to read as follows: “The plastics sheet shall be compatible with the substance under test. The booster charge consists of 160 g RDX/wax (95/5) or PETN/TNT that has a minimum of 50% PETN in the mixture, 50 ± 1 mm in diameter with a density of $1\,600 \pm 50$ kg/m³.”.

In the seventh sentence, replace “RDX/wax charge” by “charges”.

In the eighth sentence, replace “ 3.2 ± 0.2 ” by “3” and “is mounted” by “may be mounted”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

21.4.3.3.1 Delete the last sentence.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

21.4.4.2 Amend as follows:

In the second sentence, replace “cold-drawn” by “an annealed”.

In the fourth sentence, replace “two layers of 0.08 mm thick polythene” by “a plastics”, insert “tightly” before “in place” and delete the remainder of the sentence after “in place”.

Amend the fifth and sixth sentences to read as follows: “The plastics sheet shall be compatible with the substance under test. The booster charge is a 200 g RDX/wax (95/5) or PETN/TNT that has a minimum of 50% PETN in the mixture, 60 ± 1 mm in diameter with a density of $1\,600 \pm 50$ kg/m³.”.

In the seventh sentence, replace “RDX/wax charge” by “charges”.

In the last sentence, replace “3.2” by “3” and “is mounted” by “may be mounted”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

21.4.4.3 Delete the third sentence.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

Section 23

23.2.1 Replace “Does it propagate” by “Can it propagate”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

23.1, Table 23.1 In the entry for “C.2”, under “Section”, replace “23.4.3” by “23.4.2”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

23.4.1.2.1 In the seventh sentence, replace “55 mm” by “59 mm”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

23.4.1.2.2 Amend the beginning of the third sentence to read as follows: “A suitable deformable washer or rubber ring is used...”, remainder unchanged.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

23.4.1.2.6 Amend the beginning of the fourth sentence to read as follows: “An approximately 13 mm...”, remainder unchanged.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

23.4.1.2.7 Amend to read as follows:

“23.4.1.2.7 For liquids samples, a single piece of thin PVC sheathing, or equivalent, is used to cover the primed cambric in such a way that the primed cambric is not in contact with the liquid sample. The leads of the resistance wire are then fixed onto the terminals of the firing plug such that the tip of the primed cambric is above the surface of the firing plug.”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

23.4.1.3.1 Amend as follows:

In the fifth sentence, replace “lead washer” by “washer or rubber ring”.

In the seventh sentence, replace “An exploder dynamo” by “A power source”.

In the last sentence, insert “data acquisition” after “suitable” and delete the last phrase in brackets.

In footnote 3, delete the square brackets around “burning”.

The consequential amendment does not apply to the English text.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

23.4, Figure 23.4.1.1 In the caption, amend the entry for “(L)” to read “Insulation” and the entry for “(D)” to read “Deformable washer”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

23.4.2.2.1 Add a new second sentence to read as follows: “The windows are not necessary when using thermocouples to measure the deflagration rate.”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

23.4.2.2.2 Amend the end of the second sentence to read as follows: “...cooling with water or other suitable material filled to a height of 20 mm below the rim (i.e. 265 cm³) of Dewar vessel, closed by a tight fitting cork, should be longer than 5 hours.”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

23.4.2.3.2 Amend the end of the third sentence to read as follows: “...is filled to a height of 20 mm below the rim with the substance.”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

23.4.2.3.3 In the second sentence, replace “should” by “shall”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

23.4.2.5 In the entry for “Dicetyl peroxydicarbonate”, under “Result”, amend to read “No”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

Section 25

25.4.1.2.1 In the fifth sentence, insert a full stop after “chrome steel”. Amend the rest of the text before the last sentence to read as follows: “For classification the following diameter holes shall be used: 1.0 - 1.5 - 2.0 - 2.5 - 3.0 - 5.0 - 8.0 - 12.0 - 20.0 mm. In addition, other diameters can be used for hazard assessment.”. Remainder unchanged.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

25.4.1.2.2 In the penultimate sentence, at the end insert “or equivalent”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

25.4.1.3.1 Amend to read as follows:

“25.4.1.3.1 The tube is filled to a height of 60 mm from the bottom of the tube. Cast solids should be cast to the internal dimensions of the steel tube with a height of 60 mm and then placed inside the tube. Powders are filled in approximately three equal increments with tamping¹ to 80 N force between each increment. Liquids and gels are loaded into the tube to a height of 60 mm taking particular care with gels to prevent the formation of voids. Determine the total mass used to fill the tube to this level and use this amount of solid for each trial filling being performed. The threaded collar is slipped onto the tube from below, the appropriate orifice plate is inserted and the nut tightened by hand after applying some molybdenum disulphide based lubricant. It is essential to check that none of the substance is trapped between the flange and the plate, or in the threads.”

Footnote 1 unchanged.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

25.4.1.3.5 Amend as follows:

In the first sentence, replace “trails” by “trials” and “of 20.0 mm” by “with a certain diameter”.

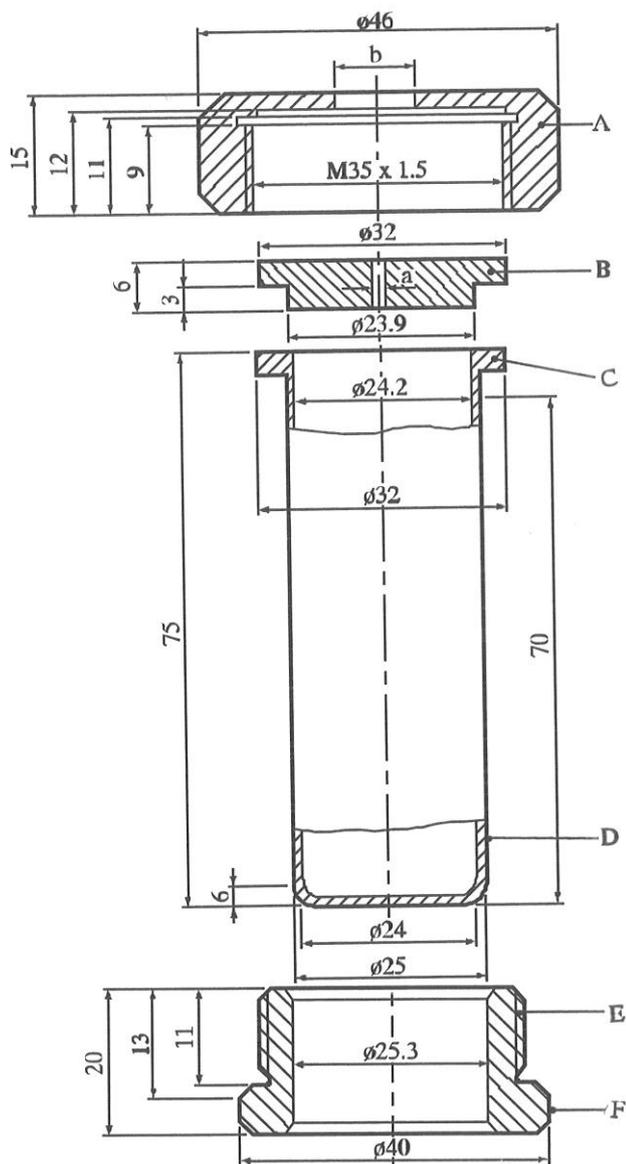
Amend the end of the second sentence to read as follows: “...series is continued with single trials at increasing diameters until only negative results in three tests are obtained at the same level.”

In the third sentence, replace “at 20.0 mm” by “in the first trial” and “following orifices 12.0 - 8.0 - 5.0 - 3.0 - 2.0 - 1.5” by “decreasing diameters”.

In the fourth sentence, delete “according to the sequence given in 25.4.1.2.1,” and replace “level” by “diameter”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

25.4.1.1 Replace Figure 25.4.1.1 and caption with the following ones:



- (A) Nut ($b = 10.0$ or 20.0 mm) with flats for size 41 spanner
- (B) Orifice plate ($a = 1.0$ to 20.0 mm diameter)
- (C) Flange
- (D) Tube
- (E) Threaded collar
- (F) Flats for size 36 spanner

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

25.4.2.2.1 Insert a new third sentence to read as follows: “In addition other diameters may be used for hazard assessment.”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

25.4.2.2.2 In the fourth sentence, insert “or equivalent” after “dibutyl phthalate”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

25.4.2.3.3 Amend the first sentence to read as follows: “The series of trials is started with a single trial using an orifice plate with a certain diameter. If there is no rupture of the disc with this orifice, experiments are performed with single trial using plates with decreasing diameters until rupture of the disc occurs.”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

25.4.2.4.2 In the description of “Medium”, replace “6.0 mm” by “larger but smaller than 9.0 mm”. In the description of “Low”, replace “2.0 mm” by “larger but smaller than 3.5 mm”.

(Reference document: informal document INF.61/Add.2 of the forty-fifth session)

Section 38

38.3.2.1 Amend the last sentence to read as follows:

“A component cell that is transported separately from the battery shall be subjected to tests T.1 to T.6 and T.8.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

[38.3.2.3 Amend the definitions hereafter to read as follows:

“*Cell* means a single encased electrochemical unit (one positive and one negative electrode) which exhibits a voltage differential across its two terminals, and may contain protective devices. See definitions for battery and single cell battery.”.

“*Component cell* means a cell contained in a battery. A component cell is not to be considered a single cell battery.”.

“*Battery* means two or more cells or batteries which are electrically connected together and fitted with devices necessary for use, for example, case, terminals, marking or protective devices. Units which have two or more cells that are commonly referred to as “battery packs”, “modules” or “battery assemblies” having the primary function of providing a source of power to another piece of equipment are for the purposes of the Model Regulations and this Manual treated as batteries. See definitions for cell and single cell battery.”.

“*Single cell battery* means a cell [externally] fitted with devices necessary for use in equipment or another battery which it is designed to power, for example protective devices. See definitions for cell and battery.

NOTE: *A single cell battery is considered a “cell” and shall be tested according to the testing requirements for “cells” for the purposes of the Model Regulations and this Manual.”.]*

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

38.3.3 (d) Amend the last paragraph to read as follows:

“Batteries or single cell batteries not equipped with battery overcharge protection that are designed for use only as a component in another battery or in equipment, which affords such protection, are not subject to the requirements of this test.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

38.3.3 (f) Amend to read as follows:

“(f) When testing a battery in which the aggregate lithium content of all anodes, when fully charged, is not more than 500 g, or in the case of a lithium ion battery, with a Watt-hour rating of not more than 6 200 Wh, that is assembled from batteries or single cell batteries that have passed all applicable tests, one assembled battery in a fully charged state shall be tested under tests T.3, T.4 and T.5, and, in addition, test T.7 in the case of a rechargeable battery. A rechargeable battery shall have been cycled at least 25 cycles.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

38.3.3 Last paragraph, after sub-paragraph (f), becomes new sub-paragraph (g) and is amended to read as follows:

“(g) When batteries or single cell batteries that have passed all applicable tests are electrically connected to form a battery in which the aggregate lithium content of all anodes, when fully charged, is more than 500 g, or in the case of a lithium ion battery, with a Watt-hour rating of more than 6 200 Wh, the assembled battery does not need to be tested if:

- (i) It is designed with a battery management system that has been demonstrated to ensure that the battery will never be subject to overcharge; and
- (ii) The assembled battery is equipped with a system capable of preventing short circuits or over discharge between the batteries.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

38.3.4.7.1 Amend to read as follows:

“This test evaluates the ability of a rechargeable battery or a single cell rechargeable battery to withstand an overcharge condition.”.

(Reference document: ST/SG/AC.10/C.3/90/Add.1)

Appendix 6

3.3 (c) Amend to read as follows:

“(c) For the organic substance or a homogenous mixture of organic substances containing chemical group (or groups) associated with explosive properties:

- when the exothermic decomposition energy is less than 500 J/g, or
- when the onset of exothermic decomposition is 500 °C or above

as indicated by Table A6.2.

Table A6.2 DECISION TO APPLY THE ACCEPTANCE PROCEDURE FOR CLASS 1 FOR AN ORGANIC SUBSTANCE OR A HOMOGENOUS MIXTURE OF ORGANIC SUBSTANCES

Decomposition energy (J/g)	Decomposition onset temperature (°C)	Apply acceptance procedure for Class 1? (Yes/No)
< 500	< 500	No
< 500	≥ 500	No
≥ 500	< 500	Yes
≥ 500	≥ 500	No

The exothermic decomposition energy may be determined using a suitable calorimetric technique (see 20.3.3.3); or”.

5.1 (a) Amend the reference to Table A6.2 to read “Table A6.3”.

5.1, Table A6.2 Renumber as A6.3.

(Reference document: ST/SG/AC.10/C.3/86/Add.1)
