United Nations ST/SG/AC.10/C.3/106/Add.1

Secretariat

Distr.: General
30 July 2018

English
Original: English and French

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

Sub-Committee of Experts on the Transport of Dangerous Goods

Report of the Sub-Committee of Experts on the Transport of Dangerous Goods on its fifty-third session

held in Geneva from 25 June to 4 July 2018

Addendum

Table of contents

Annexes

GE.18-12507(E)

1812507

Annex I

Draft amendments to the twentieth revised edition of the Recommendations on the Transport of Dangerous Goods, Model Regulations (ST/SG/AC.10/1/Rev.20)

Chapter 1.4

1.4.1 table, Add the new entries "0512" and "0513" to read as follows:

"Class 1, Division 1.4 UN Nos. 0104, 0237, 0255, 0267, 0289, 0361, 0365, 0366, 0440, 0441, 0455, 0456, 0500, 0512 and 0513".

(Reference document: ST/SG/AC.10/C.3/2018/58 and informal document INF.67, annex 2, amendment 1)

1.4.3.2.3 In footnote 2, replace "INFCIRC/225/Rev.4 (corrected), IAEA Vienna (1999)" by "INFCIRC/225/Rev.5, IAEA, Vienna (2011)".

(Reference document: ST/SG/AC.10/C.3/2017/33/Rev.1)

Chapter 2.1

2.1.3.6.4 (b) In the Note, delete "such as described in ISO 12097-3" and add the following new sentence:

"One such method is described in ISO 14451-2 using a heating rate of 80 K/min."

(Reference document: ST/SG/AC.10/C.3/2018/6 and informal document INF.67, annex 2, amendment 6)

Chapter 2.2

2.2.2.1 (a) (ii) Replace "ISO 10156:2010" by "ISO 10156:2017".

(Reference document: ST/SG/AC.10/C.3/2018/2)

2.2.2.1 (b) (iii) In the Note, replace "ISO 10156:2010" by "ISO 10156:2017".

(Reference document: ST/SG/AC.10/C.3/2018/2)

2.2.3 (a) and (d) Replace "ISO 10156:2010" by "ISO 10156:2017".

(Reference document: ST/SG/AC.10/C.3/2018/2)

Chapter 2.4

2.4.3.2.3.1 In the Note, delete "except for type G".

(Reference document: ST/SG/AC.10/C.3/2018/1 and informal document INF.67, annex 2, amendment 8)

Chapter 2.5

2.5.3.2.4 In the table, for "DI-(4-tert-BUTYLCYCLOHEXYL) PEROXYDICARBONATE", for concentration "≤ 42 as a paste", in column "Packing Method", replace "OP7" by "OP8" and in column "Number (Generic entry)", replace "3116" by "3118".

(Reference document: ST/SG/AC.10/C.3/2018/29)

Chapter 2.6

2.6.1 (b) Delete ", rickettsiae".

(Reference document: ST/SG/AC.10/C.3/2018/26 and informal document INF.68)

2.6.3.1.1 Delete ", rickettsiae".

(Reference document: ST/SG/AC.10/C.3/2018/26 and informal document INF.68)

2.6.3.2.2.2, Note 3 Delete ", mycoplasmas, rickettsia".

(Reference document: ST/SG/AC.10/C.3/2018/26 and informal document INF.68)

Chapter 3.2, Dangerous Goods List

Add the following new entries:

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
0511	DETONATORS, ELECTRONIC programmable for blasting†	1.1B				0	E0	P131			
0512	DETONATORS, ELECTRONIC programmable for blasting†	1.4B				0	E0	P131			
0513	DETONATORS, ELECTRONIC programmable for blasting†	1.4S			347	0	E0	P131			

(Reference document: ST/SG/AC.10/C.3/2018/58 and informal document INF.67, annex 2, amendment 2)

Insert the following new entry:

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
[3549	MEDICAL WASTE, CATEGORY A, AFFECTING HUMANS, solid or MEDICAL WASTE, CATEGORY A, AFFECTING ANIMALS only, solid	6.2			395	0	E0	P622 LP622			]

(Reference document: ST/SG/AC.10/C.3/2018/20 and informal document INF.70, replaces the amendment in annex II of document ST/SG/AC.10/C.3/102/Add.1)

For UN Nos. 0340, 0341, 0342 and 0343, insert "393" in column (6).

(Reference document: ST/SG/AC.10/C.3/2018/9 and informal document INF.67, annex 2, amendment 5, as amended)

For UN Nos. 1092, 1098, 1143, 1163, 1238, 1239, 1244, 1595, 1695, 1752, 1809, 2334, 2337, 2646 and 3023, in column (11) delete "TP35".

(Reference document: ST/SG/AC.10/C.3/2018/31)

For UN Nos. 1135, 1182, 1251, 1541, 1580, 1605, 1670, 1810, 1834, 1838, 1892, 2232, 2382, 2474, 2477, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2521, 2605, 2606, 2644, 2668, 3079 and 3246, in column (11) delete "TP37".

(Reference document: ST/SG/AC.10/C.3/2018/31, as amended)

For UN Nos. 1372, 1387, 1856, 1857 and 3360, in column (6), delete "117" and insert "123".

(Reference document: ST/SG/AC.10/C.3/2018/28, as amended)

For UN 2381, in column (11) delete "TP39".

(Reference document: ST/SG/AC.10/C.3/2018/31)

For UN Nos. 2555, 2556, 2557 and 3380, insert "394" in column (6).

(Reference document: informal document INF.67, annex 2, amendment 5, as amended)

For UN Nos. 3091 and 3481, insert "390" in column (6).

(Reference document: ST/SG/AC.10/C.3/2018/37 and informal document INF.65/Rev.1)

For UN 3148, in column (11) delete "TP38".

(Reference document: ST/SG/AC.10/C.3/2018/31)

For UN 3529, in column (6), add "356".

(Reference document: informal document INF.61)

Chapter 3.3

Special provision 356 After "in vehicle, vessels" add ", machinery, engines" (twice). Replace "aircrafts" by "aircraft" (twice).

(Reference document: informal document INF.61)

Special provision 363 (j) In the last paragraph, delete "in accordance with 5.3.1.1.2" and add the following new sentence, at the end: "Placards shall correspond to the class indicated in Column 3 of the Dangerous Goods List of Chapter 3.2 and shall conform to the specifications given in 5.3.1.2.1;".

(Reference document: ST/SG/AC.10/C.3/2018/19)

Special provision 363 (k) In the last paragraph, delete "in accordance with 5.3.1.1.2"and add the following new sentence at the end: "Placards shall correspond to the class indicated in Column 3 of the Dangerous Goods List in Chapter 3.2 and shall conform to the specifications given in 5.3.1.2.1;".

(Reference document: ST/SG/AC.10/C.3/2018/19)

Special provision 376 Amend the Note to read as follows:

"***NOTE:*** *In assessing a cell or battery as damaged or defective, an assessment or evaluation should be performed based on safety criteria from the cell, battery or product*

manufacturer or by a technical expert with knowledge of the cell's or battery's safety features. An assessment or evaluation may include, but is not limited to, the following criteria:

- *Acute hazard, such as gas, fire, or electrolyte leaking;*
- *The use or misuse of the cell or battery;*
- *Signs of physical damage, such as deformation to cell or battery casing, or colours on the casing;*
- *External and internal short circuit protection, such as voltage or isolation measures;*
- *The condition of the cell or battery safety features; or*
- *Damage to any internal safety components, such as the battery management system.*".

(Reference document: ST/SG/AC.10/C.3/2018/51 and informal document INF.69/Rev.1)

Add the following new special provisions:

"390 When a package contains a combination of lithium batteries contained in equipment and lithium batteries packed with equipment, the following requirements apply for the purposes of package marking and documentation:

(a) the package shall be marked "UN 3091 Lithium metal batteries packed with equipment", or "UN 3481 Lithium ion batteries packed with equipment", as appropriate. If a package contains both lithium ion batteries and lithium metal batteries packed with and contained in equipment, the package shall be marked as required for both battery types. However, button cell batteries installed in equipment (including circuit boards) need not be considered.

(b) the transport document shall indicate "UN 3091 Lithium metal batteries packed with equipment" or "UN 3481 Lithium ion batteries packed with equipment", as appropriate. If a package contains both lithium metal batteries and lithium ion batteries packed with and contained in equipment, then the transport document shall indicate both "UN 3091 Lithium metal batteries packed with equipment" and "UN 3481 Lithium ion batteries packed with equipment.".

(Reference document: ST/SG/AC.10/C.3/2018/37 and informal document INF.65/Rev.1, as amended)

"393 The nitrocellulose shall meet the criteria of the Bergmann-Junk test or methyl violet paper test in the Manual of Tests and Criteria Appendix 10. Tests of type 3 (c) need not be applied."

(Reference document: ST/SG/AC.10/C.3/2018/9 and informal document INF.67, annex 2, amendment 5, as amended)

"394 The nitrocellulose shall meet the criteria of the Bergmann-Junk test or methyl violet paper test in the Manual of Tests and Criteria Appendix 10."

(Reference document: ST/SG/AC.10/C.3/2018/9 and informal document INF.67, annex 2, amendment 5, as amended)

"395 This entry shall only be used for solid medical waste of Category A transported for disposal.".

(Reference document: ST/SG/AC.10/C.3/2018/20 and informal document INF.70)

Appendix B

In the definition of “Detonators”, replace “DETONATORS for blasting, both ELECTRIC and NON-ELECTRIC” by “DETONATORS for blasting, ELECTRIC, NON-ELECTRIC, and ELECTRONIC programmable”.

(Reference document: ST/SG/AC.10/C.3/2018/58 and informal document INF.67/ annex 2, amendment 3)

Add the following new definition for “DETONATORS, ELECTRONIC programmable for blasting”:

“DETONATORS, ELECTRONIC programmable for blasting

Detonators with enhanced safety and security features, utilizing electronic components to transmit a firing signal with validated commands and secure communications. Detonators of this type cannot be initiated by other means.”

(Reference document: ST/SG/AC.10/C.3/2018/58 and informal document INF.67/ annex 2, amendment 4)

Chapter 4.1

4.1.1.3 Add a new 4.1.1.3.1 to read as follows:

“4.1.1.3.1 Packagings, including IBCs and large packagings, may conform to one or more than one successfully tested design type and may bear more than one mark”.

(Reference document: ST/SG/AC.10/C.3/2018/49 and informal document INF.53, as amended)

4.1.4.1 Amend packing instruction P801 to read as follows:

P801	**PACKING INSTRUCTION**	**P801**

This instruction applies to UN Nos. 2794, 2795 or 3028.

The following packagings are authorized, provided that the provisions of **4.1.1.1, 4.1.1.2, 4.1.1.6**, and **4.1.3** are met:

(1) Rigid outer packagings, wooden slatted crates or pallets.

Additionally, the following conditions shall be met:

(a) Batteries stacks shall be in tiers separated by a layer of electrically non-conductive material;

(b) Battery terminals shall not support the weight of other superimposed elements;

(c) Batteries shall be packaged or secured to prevent inadvertent movement;

(d) Batteries shall not leak under normal conditions of transport or appropriate measures shall be taken to prevent the release of electrolyte from the package (e.g. individually packaging batteries or other equally effective methods); and

(e) Batteries shall be protected against short circuits.

(2) Stainless steel or plastics bins may also be used to transport used batteries.

Additionally, the following conditions shall be met:

(a) The bins shall be resistant to the electrolyte that was contained in the batteries;

(b) The bins shall not be filled to a height greater than the height of their sides;

(c) The outside of the bins shall be free of residues of electrolyte contained in the batteries;

(d) Under normal conditions of transport, no electrolyte shall leak from the bins;

(e) Measures shall be taken to ensure that filled bins cannot lose their content; and

(f) Measures shall be taken to prevent short circuits (e.g. batteries are discharged, individual protection of the battery terminals, etc.).

(Reference document: ST/SG/AC.10/C.3/2018/21 and informal document INF.62)

[4.1.4.1 Add the following new packing instruction P622:

<table>
<tr><td colspan="3">P622 PACKING INSTRUCTION P622</td></tr>
<tr><td colspan="3">This instruction applies to UN 3549.</td></tr>
<tr><td colspan="3">The following packagings are authorized provided the general provisions of 4.1.1 and 4.1.3 are met:</td></tr>
<tr><td>Inner packagings</td><td>Intermediate packagings</td><td>Outer packagings</td></tr>
<tr><td>metal
plastics</td><td>metal
plastics</td><td>Boxes
steel (4A)
aluminium (4B)
plywood (4D)
fibreboard (4G)
other metal (4N)
plastics, solid (4H2)
Drums
steel (1A2)
aluminium (1B2)
plywood (1D)
fibre (1G)
other metal (1N2)
plastics (1H2)
Jerricans
steel (3A2)
aluminium (3B2)
plastics (3H2)</td></tr>
<tr><td colspan="3">The outer packaging shall conform to the packing group I performance level for solids.</td></tr>
<tr><td colspan="3">Additional requirements:</td></tr>
<tr><td colspan="3">1. Fragile articles shall be contained in either a rigid inner packaging or rigid intermediate packagings.
2. Inner packagings containing sharps objects such as broken glass and needles shall be rigid and resistant to puncture.
3. The inner packaging, the intermediate packaging, and the outer packaging shall be capable of retaining liquids. Outer packagings that are not capable of retaining liquids by design shall be fitted with a liner or suitable measure of retaining liquids.
4. The inner packaging and/or the intermediate packaging may be flexible. When flexible packagings are used, they shall be capable of passing the impact resistance test to at least 165 g according to ISO 7765-1:1988 “Plastics film and sheeting – Determination of impact resistance by the free-falling dart method – Part 1: Staircase methods” and the tear resistance test to at least 480 g in both parallel and perpendicular planes with respect to the length of the bag in accordance with ISO 6383-2:1983 “Plastics – Film and sheeting – Determination of tear resistance – Part 2: Elmendorf method”. The maximum net mass of each flexible inner packaging shall be 30kg.
5. Each flexible intermediate packaging shall contain only one inner packaging.
6. Inner packagings containing a small amount of free liquid may be included in intermediate packaging provided that there is sufficient absorbent or solidifying material in the inner or intermediate packaging to absorb or solidify all the liquid content present. Suitable absorbent material which may withstand the temperatures and vibrations liable to occur under normal conditions of transport shall be used.
7. Intermediate packagings shall be secured in outer packagings with suitable cushioning and/or absorbent material.</td></tr>
</table>

]

(Reference document: ST/SG/AC.10/C.3/2018/20 and informal document INF.70, replaces the amendment in annex II of document ST/SG/AC.10/C.3/102/Add.1)

4.1.4.1, packing instruction P907 (as corrected in ST/SG/AC.10/C.3/102/Add.1): Replace the introductory sentence by: "This packing instruction applies to articles, such as machinery, apparatus or devices of UN No. 3363.".

In the text after this introductory sentence: in the first sentence, replace "machinery or apparatus" by "article". In the second sentence replace "machinery or apparatus" by "an article". In the fifth sentence replace "machinery or apparatus" by "article". In the sixth sentence replace "machinery or apparatus" by "article".

(Reference document: ST/SG/AC.10/C.3/2018/7, replaces the amendment in ST/SG/AC.10/C.3/104/Add.1, annex II)

4.1.4.1, packing instruction P903 Add the following new paragraph (5):

"(5) For packaging containing both cells or batteries packed with equipment and contained in equipment:

(a) For cells and batteries, packagings that completely enclose the cells or batteries, then placed with equipment in a packaging conforming to the requirements in paragraph (1) of this packing instruction; or

(b) Packagings conforming to the requirements in paragraph (1) of this packing instruction, then placed with the equipment in a strong outer packaging constructed of suitable material, and of adequate strength and design in relation to the packaging capacity and its intended use. The outer packaging shall be constructed in such a manner as to prevent accidental operation during transport and need not meet the requirements of 4.1.1.3.

The equipment shall be secured against movement within the outer packaging.

Devices such as radio frequency identification (RFID) tags, watches and temperature loggers, which are not capable of generating a dangerous evolution of heat, may be transported when intentionally active in strong outer packagings. When active, these devices shall meet defined standards for electromagnetic radiation to ensure that the operation of the devices does not interfere with aircraft systems.".

(Reference document: ST/SG/AC.10/C.3/2018/37 and informal document INF.65/Rev.1, as amended)

4.1.4.2, Packing instruction IBC520 For UN No. 3119, insert the two following new entries:

UN No.	*Organic peroxide*	*Type of IBC*	*Maximum quantity (litres)*	*Control temperature*	*Emergency temperature*
3119	tert-Amyl peroxypivalate, not more than 42% as a stable dispersion in water	31HA1	1 000	0 ºC	+10 ºC
3119	tert-Butyl peroxypivalate, not more than 42% in a diluent type A	31HA1 31A	1 000 1 250	+10 ºC +10 ºC	+15 ºC +15 ºC

(Reference document: ST/SG/AC.10/C.3/2018/29)

[4.1.4.3 Add the following new packing instruction LP622:

LP622	**PACKING INSTRUCTION**	**LP 622**
This instruction applies to UN 3549.		
The following packagings are authorized provided the general provisions of **4.1.1** and **4.1.3** are met:		
Inner packagings	**Intermediate packagings**	**Outer packagings**
metal plastics	metal plastics	steel (50A) aluminium (50B) plywood (50D) fibreboard (50G) other metal (50N) plastics (50H)
The outer packaging shall conform to the packing group I performance level for solids.		
Additional requirement:		
1. Fragile articles shall be contained in either a rigid inner packaging or a rigid intermediate packagings. 2. Inner packagings containing sharps objects such as broken glass and needles shall be rigid and resistant to puncture. 3. The inner packaging, the intermediate packaging and the outer packaging shall be capable of retaining liquids. Outer packagings that are not capable of retaining liquids by design shall be fitted with a liner or suitable measure of retaining liquids. 4. The inner packaging and/or the intermediate packaging may be flexible. When flexible packagings are used, they shall be capable of passing the impact resistance test to at least 165g according to ISO 7765-1:1988 “Plastics film and sheeting – Determination of impact resistance by the free-falling dart method – Part 1: Staircase methods” and the tear resistance test to at least 480g in both parallel and perpendicular planes with respect to the length of the bag in accordance with ISO 6383-2:1983 “Plastics – Film and sheeting – Determination of tear resistance – Part 2: Elmendorf method”. The maximum net mass of each flexible inner packaging shall be 30kg. 5. Each flexible intermediate packaging shall contain only one inner packaging. 6. Inner packagings containing a small amount of free liquid may be included in intermediate packaging provided that there is sufficient absorbent or solidifying material in the inner or intermediate packaging to absorb or solidify all the liquid content present. Suitable absorbent material which may withstand the temperatures and vibrations liable to occur under normal conditions of transport shall be used. 7. Intermediate packagings shall be secured in outer packagings with suitable cushioning and/or absorbent material.		

]

(Reference document: ST/SG/AC.10/C.3/2018/20 and informal document INF.70, replaces the amendment in annex II of document ST/SG/AC.10/C.3/102/Add.1)

Chapter 4.2

Add the following new 4.2.3.7.3:

“4.2.3.7.3 The date at which the actual holding time ends shall be entered in the transport document (see 5.4.1.5.13).”

(Reference document: ST/SG/AC.10/C.3/2018/42)

4.2.5.2, special provision TP19 Amend to read as follows:

“TP19 At the time of construction, the calculated shell thickness shall be increased by 3 mm as a corrosion allowance. Shell thickness shall be verified ultrasonically at intervals midway between periodic hydraulic tests and shall never be lower than the calculated shell thickness.”.

(Reference document: ST/SG/AC.10/C.3/2018/43, option 2, as amended)

4.2.5.3 Delete portable tank instructions TP35, TP37, TP38 and TP39 and add "*Deleted*".

(Reference document: ST/SG/AC.10/C.3/2018/31)

Chapter 5.4

Add the following new 5.4.1.5.13:

"5.4.1.5.13 *Actual holding time*

In the case of portable tanks carrying refrigerated liquefied gases the consignor shall enter in the transport document the date at which the actual holding time ends, in the following format:

"END OF HOLDING TIME: …….. (DD/MM/YYYY)".

(Reference document: ST/SG/AC.10/C.3/2018/42)

Chapter 6.1

6.1.3.1 (e) In the text of the note explaining the asterisk, after the clock, replace the second sentence with the following:

"In such a case and when the clock is placed adjacent to the UN design type mark, the indication of the year in the mark may be waived. However, when the clock is not placed adjacent to the UN design type mark, the two digits of the year in the mark and in the clock shall be identical.".

(Reference document: ST/SG/AC.10/C.3/2018/46 and informal document INF.63, as amended)

Add the following new 6.1.3.13:

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

(Reference document: ST/SG/AC.10/C.3/2018/49 and Informal document INF.53, replaces the amendment in annex II of document ST/SG/AC.10/C.3/104/Add.1)

Add the following new 6.1.4.2.6:

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

Renumber the existing 6.1.4.2.6 and 6.1.4.2.7 as 6.1.4.2.7 and 6.1.4.2.8.

(Reference document: ST/SG/AC.10/C.3/2018/32)

Add the following new 6.1.4.3.6:

"6.1.4.3.6 If materials used for body, heads, closures and fittings are not in themselves compatible with the contents to be transported, suitable internal protective coatings or

treatments shall be applied. These coatings or treatments shall retain their protective properties under normal conditions of transport.".

Renumber the existing 6.1.4.3.6 and 6.1.4.3.7 as 6.1.4.3.7 and 6.1.4.3.8.

(Reference document: ST/SG/AC.10/C.3/2018/32, consequential amendment)

Chapter 6.2

[6.2.2.1.1 In the table, in the rows for "ISO 11119-3:2002" and "ISO 11119-3:2013" add the following new Note in the second column:

"***NOTE:*** This standard shall not be used for linerless cylinders manufactured from two parts joined together".]

(Reference document: informal document INF.10, as amended)

6.2.2.1.1 In the table, after "ISO 11119-3:2013", add the following new row:

ISO 11119-4: 2016	Gas cylinders – Refillable composite gas cylinders – Design, construction and testing – Part 4: Fully wrapped fibre reinforced composite gas cylinders up to 150 l with load-sharing welded metallic liners	Until further notice

(Reference document, ST/SG/AC.10/C.3/2018/23, proposal 2)

[6.2.2.1.2 In the table, in the row containing "ISO 11119-3:2013", add the following new Note in the central column:

"***NOTE:*** This standard shall not be used for linerless tubes manufactured from two parts joined together".]

(Reference document: informal document INF.10, as amended)

6.2.2.1.3 In the table, under "For the cylinder shell" add the following two new rows at the end:

ISO 4706:2008	Gas cylinders – Refillable welded steel cylinders – Test pressure 60 bar and below	Until further notice
ISO 7866:2012 + Cor 1:2014	Gas cylinders – Refillable seamless aluminum alloy gas cylinders – Design, construction and testing ***NOTE:*** *Aluminum alloy 6351A or equivalent shall not be used*	Until further notice

(Reference document: informal document INF.18)

6.2.2.1.3 Amend the headline of the second table to read as follows:

"For the acetylene cylinder including the porous material".

(Reference document: ST/SG/AC.10/C.3/2018/8 and informal document INF.36)

6.2.2.3 In the row for ISO 14246:2014 replace "Until further notice" with "Until 31 December 2024". Insert the following new row after ISO 14246:2014:

ISO 14246:2014 + Amd 1:2017	Gas cylinders – Cylinder valves – Manufacturing tests and examinations	Until further notice

(Reference document, ST/SG/AC.10/C.3/2018/23, proposal 3)

6.2.2.4 Add a new row at the end of the first table immediately after the row for ISO 22434:2006 as follows.

ISO 20475:2018	Gas cylinders – Cylinder bundles – Periodic inspection and testing	Until further notice

(Reference document, ST/SG/AC.10/C.3/2018/23, proposal 5)

6.2.2.4 Delete the row for ISO 10462:2005.

(Reference document, ST/SG/AC.10/C.3/2018/23, proposal 6)

6.2.2.7.2 (c) Add the following new Note:

"***NOTE:*** For the purpose of this mark the country of approval means the country of the competent authority that authorized the initial inspection and test of the individual receptacle at the time of manufacture.".

(Reference document: ST/SG/AC.10/C.3/2018/22 and informal document INF.57)

6.2.2.9.2 (c) Add the following new Note:

"***NOTE:*** For the purpose of this mark the country of approvalmeans the country of the competent authority that authorized the initial inspection and test of the individual system at the time of manufacture.".

(Reference document: ST/SG/AC.10/C.3/2018/22 and informal document INF.57, consequential amendment)

Chapter 6.3

6.3.5.2.2 In "*Explanation for use of the table"*, at the end of the first paragraph, delete "five times after conditioning".

(Reference document: ST/SG/AC.10/C.3/2018/25 and informal document INF.59)

6.3.5.3.1 Add the following new title to this paragraph: "Drop height and target".

(Reference document: ST/SG/AC.10/C.3/2018/25 and informal document INF.59)

6.3.5.3.2 Add the following new title to this paragraph: "Number of test samples and drop orientation". Renumber the text under this paragraph as "6.3.5.3.2.1".

(Reference document: ST/SG/AC.10/C.3/2018/25 and informal document INF.59, as amended)

6.3.5.3.3 Renumber as 6.3.5.3.2.2.

(Reference document: ST/SG/AC.10/C.3/2018/25 and informal document INF.59, as amended)

Renumber paragraphs 6.3.5.3.4, 6.3.5.3.5, 6.3.5.3.6, 6.3.5.3.6.1, 6.3.5.3.6.2 and 6.3.5.3.6.3 as 6.3.5.3.3, 6.3.5.3.4, 6.3.5.3.5, 6.3.5.3.5.1, 6.3.5.3.5.2 and 6.3.5.3.5.3, respectively. Adapt the cross references accordingly as follows:

In 6.3.5.2.2, in the table, under "Explanation for the use of the table", replace "6.3.5.3.6.1", "6.3.5.3.6.2" and "6.3.5.3.6.3" by "6.3.5.3.5.1", "6.3.5.3.5.2" and "6.3.5.3.5.3", respectively.

In 6.3.5.3.6.3, renumber 6.3.5.3.5.3, replace "6.3.5.3.6.1" and "6.3.5.3.6.2" by "6.3.5.3.5.1" and "6.3.5.3.5.2", respectively. At the end, replace "in 6.3.5.3.2" by "in 6.3.5.3.2.1 or in 6.3.5.3.2.2, as appropriate;".

(Reference document: ST/SG/AC.10/C.3/2018/25 and informal document INF.59 as amended and consequential amendments)

Chapter 6.5

Add the following new 6.5.2.1.3:

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

(Reference document: ST/SG/AC.10/C.3/2018/49 and informal document INF.53, replaces the amendment in annex II of document ST/SG/AC.10/C.3/104/Add.1)

6.5.2.2.2 In the first sentence, delete "when the IBC is in use".

(Reference document: ST/SG/AC.10/C.3/2018/27)

6.5.2.2.4 In the second paragraph, amend the second sentence to read as follows:

"In such a case, the date may be waived from the remainder of the marks.".

(Reference document: ST/SG/AC.10/C.3/2018/46 and informal document INF.63)

Chapter 6.6

6.6.3.3 In the first sentence, delete "when the large packaging is in use".

(Reference document: ST/SG/AC.10/C.3/2018/27, consequential amendment)

Add the following new 6.6.3.4:

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

(Reference document: ST/SG/AC.10/C.3/2018/49 and Informal document INF.53, replaces the amendment in annex II of document ST/SG/AC.10/C.3/104/Add.1)

Chapter 6.7

6.7.2.12.2.1 and 6.7.3.8.1.1 Amend the definition of factor "U" to read:

"U = heat transfer coefficient of the insulation, in $kW \cdot m^{-2} \cdot K^{-1}$, at 38 °C".

(Reference document: ST/SG/AC.10/C.3/2018/56)

Chapter 7.1

[7.1.5.4.5 (b) At the end, add "or a means of replenishment is assured;".]

(Reference document: ST/SG/AC.10/C.3/2018/39)

[7.1.5.4.5 (c) In the beginning, add “Thermal insulation and”. At the end, after “flammable vapours”, add “from the substances;”.]

(Reference document: ST/SG/AC.10/C.3/2018/39)

[7.1.5.4.5 (d) In the beginning, add “Thermal insulation and”.]

(Reference document: ST/SG/AC.10/C.3/2018/39)

[7.1.5.4.5 (e) In the beginning, add “Thermal insulation and”. At the end of paragraph (iii), after “flammable vapours”, add “from the substances.”.]

(Reference document: ST/SG/AC.10/C.3/2018/39)

Document ST/SG/AC.10/C.3/2018/54 adopted with the following modifications:

Delete the amendments to the definitions of “Freight container” and “IBC” and to paragraphs 1.5.2.5 and 1.5.2.6. In 2.7.2.3.3.8, replace “shall the” by “shall then”.

Annex II

Draft amendments to the sixth revised edition of the Recommendations on the Transport of Dangerous Goods, Manual of Tests and Criteria (ST/SG/AC.10/11/Rev.6) (as amended by ST/SG/AC.10/11/Rev.6/Amend.1)

Section 32

32.5.1.1 At the end, delete "with a flash point of less than 23 °C".

(Reference document: ST/SG/AC.10/C.3/2018/4)

Appendix 10

Insert a new appendix 10 to read as follows:

"APPENDIX 10

STABILITY TESTS FOR NITROCELLULOSE MIXTURES

1. Introduction

1.1 The Bergmann Junk test and the methyl violet paper test are used to determine whether nitrocellulose mixtures are considered to be stable for transport.

1.2 The methyl violet paper test is a qualitative test and determines the stability of a nitrocellulose mixture by examining the colour change of reagent paper over a period of time.

1.3 The Bergmann-Junk test is a quantitative stability test applicable to all types of nitrocellulose mixtures (NC). The test measures the quantity of NO gas per g NC given off by nitrocellulose heated for two hours at 132 °C determined by titration with alkali. The expression "NO gas" comprises all types of NO-gas formed during the heating for 2 hours at 132 °C. The Bergmann Junk test method allows a reliable and reproducible quantitative assessment of chemical stability. Thus this test is the preferred method.

2. Bergmann-Junk test

2.1 Introduction

The Bergmann-Junk test is a quantitative stability test applicable to all types of nitrocellulose (NC). The test measures the quantity of NO gas per g of NC given off by 1 (one) or 2 (two) gram(s) of nitrocellulose heated for two hours at 132 °C ± 1 °C *(Plasticised NC: 3 (three) grams are heated for 1 hour)* as determined by titration with alkali.

2.2 Apparatus and materials

2.2.1 Analytical balance, precision 10 mg or better.

2.2.2 Bergman-Junk tube made of clear glass, approximately 17.5 mm inner diameter, 19.5 mm, outer diameter, and 270 mm to 350 mm long fitted with a condensing chamber. Several different types of suitable condensing chambers are commercially available. (for examples see figures A10.1 and A10.2).

2.2.3 Stability bath: Oil or suitable fluid bath or metal block capable of maintaining the temperature of the stability tubes at 132 °C ± 1 °C or better. The temperature of the bath should be monitored with a calibrated thermometer or thermocouple (precision 0.1 °C) which is located in one of the test wells.

2.2.4 The following apparatus is required:

- 10 cm^3 semi-automatic pipette or equivalent.
- 250 cm^3 conical flash with wide neck.
- 50 cm^3 test tube.
- Titration burette 10 ml to 25 ml; or automated potentiometric titration apparatus with pH-electrode and calibrated class A burette

2.2.5 Sodium hydroxide (NaOH) solution 0.01 mol/l, specification 0.009998 to 0.01002 mol/l for manual titration with a standard burette, or 0.1 mol/l for the titration with an automated potentiometric titration apparatus with pH-electrode and calibrated class A burette, with factor determined to obtain the exact molarity of the sodium hydroxide solution.

2.2.6 Suitable pH indicator e.g. methyl orange, methyl red, methyl red/methylene blue or R8 B3 coloured indicating fluid (Tacchiro). Solution composed of 1 % alcohol mixed with 8 g of methyl red and 3 g of purple methyl (if manual titration is used).

2.2.7 Fully deionized or distilled water with a conductivity < 1 µS/cm (micro Siemens /cm).

2.3 Procedure

2.3.1 Weigh 1 (one) or 2 (two) gram(s) of dry NC to an accuracy of 0.01 g. *(Weigh 3 (three) grams of plasticised NC to an accuracy of 0.01 g)*. The moisture content of the sample must be below 1 % after the drying process and at the time, when it is introduced in the tube. (Drying conditions must be chosen, which avoid a decomposition of the NC, e.g. 50 °C in a vacuum oven) With the help of a funnel introduce this into the tube which must be dry and clean. Wipe the ground section thoroughly and adjust the condensing chamber making sure that the above is well greased with silicone grease; it may also not be greased.

2.3.2 Measure out 15 ml to 50 ml of distilled water, depending on the condenser type, in a test tube and pour into the bulbs of the condenser. Ensure that no water enters the stability tube.

2.3.3 Make sure that the stability bath has reached a temperature of 132 °C ± 1 °C and then insert each tube into one of the apertures in the bath. The depth of immersion of the tube will vary depending on the type of stability bath used but must be between 110 mm and 220 mm. Make a note of the time at which the experiment begins.

2.3.4 Maintain the tubes at a temperature of 132 °C ± 1 °C for two hours unless pronounced fuming is observed. If fuming occurs, the test shall be stopped immediately and the duration of the heating period noted.

2.3.5 After two hours at 132 °C *(1 hour for plasticised NC)* remove the tube from the bath, place it in its stand and allow to cool behind a safety screen. During this time some water may be drawn into the lower tube. After 30 min cooling transfer the contents of

the condensing chamber into the lower tube and rinse the condensing chamber with distilled water.

2.3.6 Transfer the contents of the lower tube into the conical flask and rinse with distilled water. The total amount of liquid should not be more than 175 ml.

2.3.7 Titrate with c_{NaOH} = 0.01 mol/l sodium hydroxide solution until the color of the indicator changes.

2.3.8 *Calculations*

$$\mathbf{2\ NaOH + 2\ NO + ½\ O_2 \rightarrow 2\ NaNO_2 + H_20}$$

$$V_{NO} = \frac{c_{NaOH} \times C_{NaOH} \times V_{NO,m}}{m_{NC}} = \frac{C_{NaOH} \times 0.224}{m_{NC}} = C_{NaOH} \times 0.224$$

where:

V_{NO} = volume of the evolved nitrogen oxide in cm^3/g nitrocellulose

c_{NaOH} = concentration of sodium hydroxide solution = 0.01 mol/l

C_{NaOH} = consumption of sodium hydroxide solution in ml.

$V_{NO,m}$ = molar volume of NO gas = 22.4 l/mol

m_{NC} = mass of nitrocellulose in g

If a sodium hydroxide solution with c_{NaOH} = concentration of sodium hydroxide solution = 0.1 mol/l is used, the formula is:

$$V_{NO} = C_{NaOH} \times 2.24$$

The formula is based on the assumption that nitrogen oxide evolves as NO and that NO is an ideal gas; according on the ideal gas law, 1 mol of gas occupies a volume of 22.4 *l*.

The total absence of acidity in the water is verified by a mock test; otherwise the value determined by the mock test is subtracted.

Also aliquot portions of the water containing the NO gas may be used, resulting in different factors in the formula.

2.4 Test criteria and method of assessing results

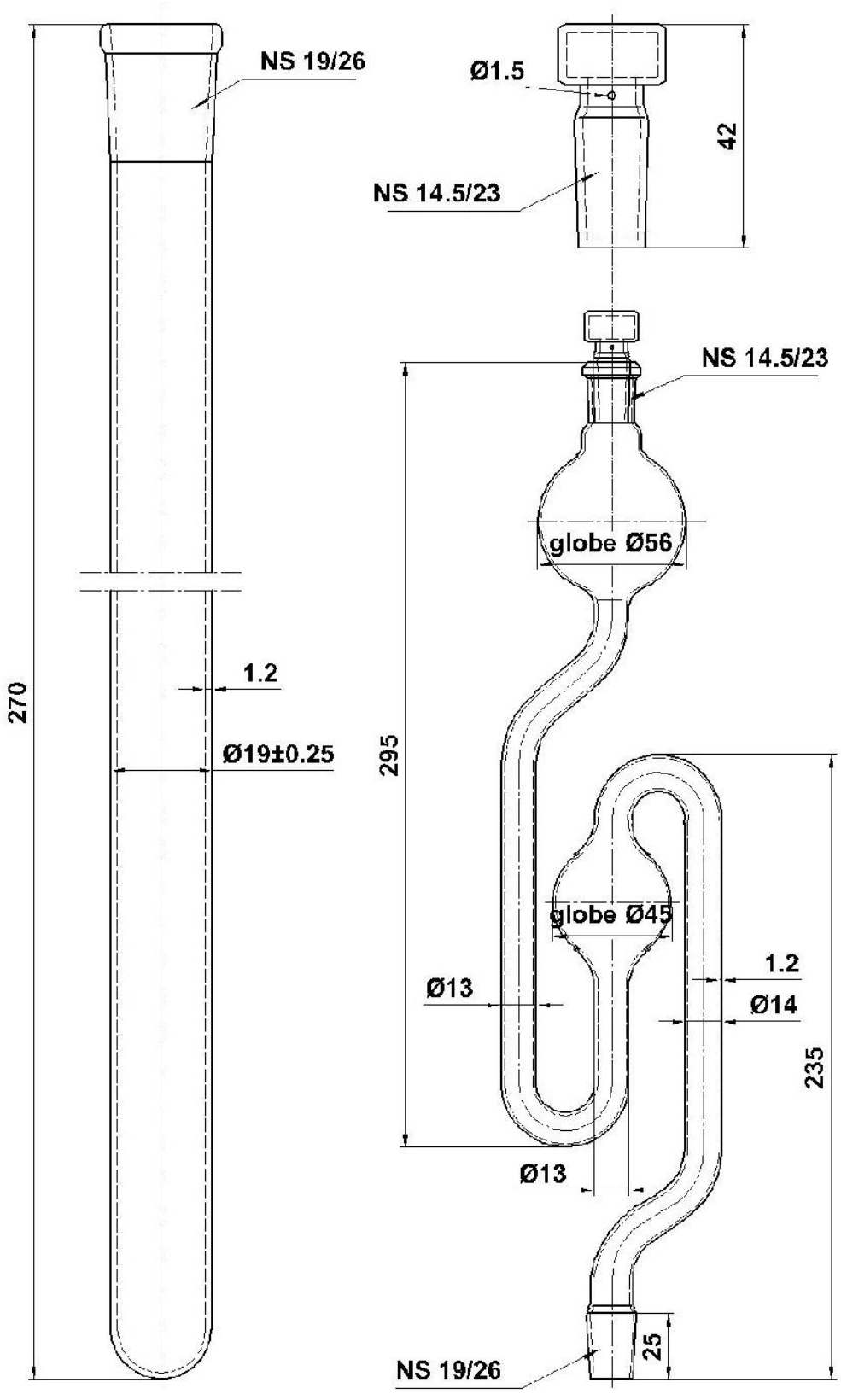
2.4.1 The test result is considered "+" and the substance is classified as unstable if the quantity of NO gas given off is more than 2.5 ml/g of NC. If the quantity of NO gas given off is less than or equal to 2.5 ml/g, of NC the result is "-" and the substance is classified as stable.

2.5 Examples of results

Quantity of NO gas/g of NC	Result
2.6 ml	+
2.5 ml	–

Figure A10.1: Condensing chamber for Bergmann Junk test example 1

Figure A10.2: Condensing chamber for Bergmann Junk test example 2



3. Methyl violet paper test (134.5° C heat test)

3.1 Introduction

The stability of nitrocellulose is tested by examining the colour change of reagent paper over a period of time.

3.2 Apparatus and materials

3.2.1 *Apparatus*

The following equipment shall be used in the apparatus for 134.5 °C heat test (methyl violet paper test):

(a) Analytical balance, precision 0.01 g or better.

(b) Stability bath: Water-ethylene glycol bath, oil bath, or metal block oven capable of maintaining the temperature of the stability tubes at 134.5 ± 0.5 °C. Temperature of bath has to be monitored with a calibrated thermometer or thermocouple (precision 0.1 °C) which is located in a test tube filled with inert material (e.g., sand); the test tube is placed in one of the thermowells. The inner diameter of each thermowell in the apparatus shall be 19 ± 0.5 mm. Depth of immersion of the stability test tubes shall be such that no more than 6 to 7 mm of the tubes project above the bath.

(c) Stability test tubes made of clear glass, approximately 15 mm inner diameter; 18 mm outer diameter; and 290 mm length.

(d) Powder funnel; metal or conductive plastic funnel with a long tube (to prevent electrostatic charging).

(e) Corks, each containing one breather hole 4 mm in diameter (or notch of equivalent area).

3.2.2 *Materials*

3.2.2.1 A sample of dry nitrocellulose weighing 2.50 ± 0.01 g. The moisture content of the sample must be below 1% after the drying process and at the time, when it is introduced in the tube. Drying conditions must be chosen, which avoid a decomposition of the NC, e.g. 50° C in a vacuum oven.

3.2.2.2 Standardized reagent methyl violet test papers approximately 70 ± 1.0 mm long and 20 ± 0.6 mm wide (see 6.16) or methyl violet test papers prepared and tested using the following method:

3.2.2.2.1 Preparation of the indicator solution

To prepare 100 ml of indicator solution (note: if different amount of solution is required, it can be prepared while maintaining these proportions): 0.250 g of basic rosaniline (equivalent to CAS number 632-99-5) is weighed into a porcelain dish, and about 10 ml of reagent grade acetic acid is added. The dish is heated on a water bath until all excess of acid is removed. In a 100 ml graduate cylinder, 0.168 g of crystal violet (equivalent to CAS number 548-62-9) is dissolved in 30 ml of high purity water and 5.0 g (4 ml) of reagent grade glycerine is added. The content of the porcelain dish is added to the cylinder using ethanol (minimum 95% v/v) and adjusted to produce 100 ml of solution. The solution is mixed thoroughly.

3.2.2.2.2 Preparation of the methyl violet paper

Sheets of paper are prepared by cutting filter papers (equivalent to Whatman 597, typically 580 mm × 580 mm with approximately 8.5 mg/cm^2) into square parts that will fit into a low edge dish large enough to fit the cut sheet (typically cut in 4 square parts about 290 mm × 290 mm). In a fume-hood, the methyl violet solution is poured into the low edge dish. Separately, each cut sheet of paper is dipped completely into the solution for about 30 seconds. The strip is removed from the solution and the wet sheet of paper rotated vertically until the solution stops dripping (excess alcohol will evaporate in about 1 minute). The strip is hung up overnight to dry in a room free from deleterious fumes. When dry, the strips are cut in the size of 70 ± 1.0 mm long and 20 ± 0.6 mm wide. Once certified, they are kept in tightly closed amber glass bottles or opaque plastic bottles with a maximum of 200 papers per bottle. The bottle shall be kept closed, stored at room temperature, and out of direct light at all times except to briefly extract indicator papers.

3.2.2.2.3 Certification of the methyl violet paper

A minimum of one paper from each 200 max bottle is tested for the content in water and shall be 7.5 to 15% water content by oven drying. If required, the paper may be rehydrated by keeping the paper in a controlled humidity chamber controlled at 60 to 80% relative humidity until the correct water content is obtained.

To confirm that the reactivity of the methyl violet paper is acceptable, a minimum of 1 paper from each 200 max bottle shall be tested using nitrogen dioxide gas of known concentration in air between 1500 and 2500 ppm (v/v). The gas may be obtained already diluted and certified or obtained by dilution using pure nitrogen dioxide. The gas concentration shall be known with an accuracy of ± 2.5%.

Based on the concentration of the nitrogen dioxide gas, the required flowrate for an end-point centered at 55 min is given by:

Flowrate (ml/min) = 83636 / Gas concentration in ppm (v/v) of nitrogen dioxide gas.

The flowrate shall be maintained within ± 1.5 ml/min of the calculated value during the certification of the paper. The paper is tested using the standard gas and a cylindrical flow cell of about 30 ml containing one paper (the flow cell diameter is similar to the methyl violet paper width). The end-point is obtained when the paper is completely salmon pink after 55 ± 7 min.

Only the batches that meet those 2 criteria (water content and reaction time) will be considered certified methyl violet paper. The paper shall be stored at room temperature and in the shade. The maximum shelf-life of the indicator papers in a sealed bottle is 5 years. Once the bottle is open, the shelf-life of the bottle's contents is reduced to 1 year. After 1 year, the water content of the paper shall be verified and adjusted, if necessary. The bottle containing the verified indicator papers shall be given another 1 year of shelf-life. Under no circumstances shall the indicator paper shelf-life be extended beyond 5 years after manufacture.

3.3 Procedure

3.3.1 Sample and interior of test tubes shall not be touched by bare hands. The test is to be performed in duplicate; with further repetition of test if the two results of the duplicate measurement differ by more than 5 min.

3.3.2 Two portions of 2.5 ± 0.01 g each of dry nitrocellulose sample are transferred into the stability test tubes, preferably by a powder funnel. Each tube is tapped gently in order to settle the material, and any material adhering to the sides of the tubes is brushed down. If the nitrocellulose occupies a greater length than 5 cm, it has to be compressed to

that length by means of a flat headed rod. Into each tube a piece of the test paper is placed vertically so that the lower end of the paper is 25 mm above the specimen. Then a cork is placed in each tube. The two tubes are placed in the bath and maintained at a temperature of 134.5 ± 0.5 °C.

3.4 Test criteria and method of assessing results

3.4.1 In order to determine the test time, the test papers are examined after the first 20 min in the bath, and thereafter at 5 min intervals. For each examination of test papers, the tubes are lifted half way out of the bath to monitor test paper colour change, and quickly replaced.

3.4.2 When the test paper in any tube has changed colour completely to salmon pink, the test is considered complete.

3.4.3 The test time is then recorded (for example, if the violet paper is not completely changed in 25 min, but is completely changed in 30 min, the time of the test is recorded as 30 min). The test is discontinued when the salmon pink end point is attained in any of the papers.

3.4.4 The test result is considered "+" and the substance is classified as unstable if the test paper completely changes colour in less than 30 min. If the colour change exceeds 30 min the result is "-" and the substance is classified as stable.

3.5 Examples of results

Time	Result
25 min	+
35 min	–

(Reference document: ST/SG/AC.10/C.3/2018/9 and informal document INF.67, annex 3, amendments 1, 2, 3 and 4)

Document ST/SG/AC.10/C.3/2018/1 adopted with the following modifications:

Section 1

1.1.1 At the end, replace “competent authorities and manufacturers and suppliers” with “classifiers”.

Add a new last sentence to read: “Although the term “classifier(s)” is used generically throughout the manual to indicate the entity providing the classification, in some sectors this may be limited specifically to a competent authority or designated testing authority, whereas in others it may allow for self-classification by manufacturers or suppliers. The sector for classification should be taken into account for each occurrence of this term to correctly identify the entity responsible for classification.”

(Reference document: informal document INF.67, annex 3, amendment 8)

1.1.9 In the first line, replace “manual” by “Manual”.

(Reference document: informal document INF.67, annex 3, amendment 9)

1.2.1.4.3 Amend to read as follows

“At the begining: replace “except for” by “Type A to “and replace the rest of the sentence by “should not be tested in the self-heating test N.4, as the test result will give a false positive result (i.e. temperature increase due to thermal decomposition rather than oxidative self-heating).”

In the second sentence: insert at the beginning “Self-reactive substances of type G and” and change the capital “O” to lower case in “Organic”.

(Reference document: informal document INF.67, annex 3, amendment 10)

Section 10

10.1.2 In the sixth sentence, replace “competent authorities” by “classifiers”.

(Reference document: informal document INF.6, annex 3, amendment 11)

10.2.2 Amend to read as follows:

“10.2.2 The classifier of a new product should document adequate information concerning the names and characteristics of all explosive substances in the product and all relevant tests which have been done. This information should be furnished to the competent authorities, if required.”.

(Reference document: UN/SCETDG/53/INF.7 – UNSCEGHS/35/INF.6 and informal document INF.67, annex 3, amendment 6)

Informal document INF.67, annex 3, amendments 5 and 6 adopted between square brackets as amended

Note by the secretariat: *Since these texts were adopted on the basis of informal documents available in English only, they are not included here. They will be reproduced in a working document for confirmation by the sub-committee at its fifty-fourth session.*

Annex III

Corrections to the twentieth revised edition of the Recommendations on the Transport of Dangerous Goods, Model Regulations (ST/SG/AC.10/1/Rev.20)

Chapter 1.2, 1.2.1 definitions

Not applicable to the English text.

(Reference document: ST/SG/AC.10/C.3/2018/55)

Chapter 2.0, 2.0.0.1

Not applicable to the English text.

(Reference document: ST/SG/AC.10/C.3/2018/55)

Chapter 2.3, 2.3.1.3

Not applicable to the English text.

(Reference document: ST/SG/AC.10/C.3/2018/38, paragraph 3)

Chapter 2.6, Note under 2.6.2.2.4.1

For 2.8.2.3 *read* 2.8.2.4

(Reference document: ST/SG/AC.10/C.3/2018/38, paragraph 5)

Chapter 3.2

For UN Nos. 3101 to 3120, *delete* "323" in column (6).

(Reference document: ST/SG/AC.10/C.3/2018/15, consequential amendment)

Chapter 3.3, special provision 251, second paragraph

Not applicable to the English text.

(Reference document: ST/SG/AC.10/C.3/2018/55)

Chapter 3.3, special provision 323

Delete and add Deleted.

(Reference document: ST/SG/AC.10/C.3/2018/15)

Chapter 3.3, special provision 341

Not applicable to the English text.

(Reference document: ST/SG/AC.10/C.3/2018/55)

Chapter 3.3, special provision 388, fourth paragraph

Not applicable to the English text.

(Reference document: ST/SG/AC.10/C.3/2018/55)

Chapter 4.1, packing instruction P006

Not applicable to the English text.

(Reference document: ST/SG/AC.10/C.3/2018/55)

Chapter 4.1, packing instruction LP03

Not applicable to the English text.

(Reference document: ST/SG/AC.10/C.3/2018/55)

Chapter 4.1, packing instruction LP905, introductory sentence

For “cells and batteries” *read* “cells or batteries” (twice).

(Reference document: ST/SG/AC.10/C.3/2018/15)

Chapter 5.3, 5.3.2.2, second paragraph, second sentence

Not applicable to the English text.

(Reference document: ST/SG/AC.10/C.3/2018/10)