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## 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

#### Sixty-fourth session

Geneva, 24 June-3 July 2024

Item 3 of the provisional agenda

**Listing, classification and packing**

## **Modification of the limited quantity for UN 2956 MUSK XYLENE**

**Transmitted by the expert from Germany\***

### **I. Introduction**

1. The thirty-eighth session of the Editorial and Technical Group (E&T) of the Sub-Committee on Carriage of Cargoes and Containers (CCC) met in March 2023 and detected a discrepancy between the International Maritime Dangerous Goods (IMDG) Code and the *Model Regulations* on the provision for limited quantities for UN 2956 *MUSK XYLENE* (document CCC 8/6/8 and paragraph 3.60 of the E&T report). The International Maritime Organization (IMO) informed the Sub-Committee of Experts on the Transport of Dangerous Goods (in informal document INF.17 of the sixty-second session) about the outcome.

### **II. Discussion**

2. In the Dangerous Goods List in Chapter 3.2 of the *Model Regulations*, UN 2956 *MUSK XYLENE* is assigned to Class 4.1. In addition, special provisions (SP) 132 and 133 are relevant for the Transport of UN 2956. Furthermore, the *Model Regulations* accept the transport of UN 2956 *MUSK XYLENE* in limited quantities, when the quantity in the inner packaging does not exceed 5 kg; however, transport in excepted quantities is not permitted.

3. Currently, SP 133 is exclusively assigned to UN 2956 *MUSK XYLENE* in the *Model Regulations* as this substance may exhibit explosive behavior if over-confined in packagings. In this context SP 133 references packing instruction P409 as those packagings authorized under P409 are intended to prevent over-confinement. However, packing instruction P409 is not applicable in the context of dangerous goods packed in limited quantities, since limited quantities generally provide relief from the performance packaging requirements and can be lower than those authorized by the *Model Regulations* (see Guiding Principles<sup>1</sup>, Chapter 3.4). Considering that the application of packing instruction P409 is necessary to ensure safe

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\* A/78/6 (Sect. 20), table 20.5.

<sup>1</sup> [Guiding Principles | UNECE](#).



transport of UN 2956 by preventing over-confinement as this substance may exhibit explosive behaviour, Germany argues that consequently the transport of UN 2956 in limited quantities should not be permitted.

4. According to the Guiding Principles, substances assigned to Class 1 as well as desensitized explosives are not permitted to be transported in limited or excepted quantities. Although musk xylene is only provisionally accepted into Class 1 according to Test Series 1 and 2, and later exempted from Class 1 according to Test Series 6 (2.4.2.4.2), it has some explosive properties. In addition, musk xylene – despite not being a desensitized explosive – is classified and assigned to Division 4.1 due to similar characteristics. Following these observations, musk xylene should not be transported in limited quantities.

5. In addition, it has already been indicated that the entry for UN 2956 *MUSK XYLENE* in the IMDG Code seems to take these considerations into account. The UN *Model Regulations* and the IMDG Code both do not permit the transport in excepted quantities. However, UN 2956 *MUSK XYLENE* can be transported in limited quantities according to the *Model Regulations*, as opposed to the IMDG Code. Permitting the transport in limited quantities while prohibiting transport under the more stringent requirements for excepted quantities is at least noteworthy as it is not consistent with the general application of limited and excepted quantities in the *Model Regulations*. Therefore, Germany suggests to delete the entry for limited quantities and to align the *Model Regulations* with the IMDG Code.

6. The following proposal supports Sustainable Development Goal 3: Good Health and Well-Being as part of the 2030 Agenda for Sustainable Development by promoting the safe transport of UN 2956 and Sustainable Development Goal 16: Peace, Justice and strong institutions by promoting consistent regulations for the safe transport of dangerous goods.

### III. Proposal

7. Amend UN 2956 *5-tert-BUTYL-2,4,6-TRINITRO-m-XYLENE (MUSK XYLENE)* in the Dangerous Goods List in Chapter 3.2 as follows (new text is underlined, deleted text is stricken through):

UN No.	Name and description	Class or division	Subsidiary hazard	UN packing group	Special provisions	Limited and excepted quantities		Packagings and IBCs		Portable tanks and bulk containers	
						(7a)	(7b)	Packing instruction	Special packing provisions	Instructions	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
2956	5-tert-BUTYL-2,4,6-TRINITRO-m-XYLENE (MUSK XYLENE)	4.1		III	132 133	<del>5 kg</del> <u>0</u>	E0	P409			

## Annex

### Data sheet to be submitted to the United Nations for new or amended classification of substances

Submitted by Germany

Date 20.03.2023

Supply all relevant information including sources of basic classification data. Data should relate to the product in the form to be transported. State test methods. Answer all questions - If necessary, state "not known" or "not applicable" - If data is not available in the form requested, provide what is available with details. Delete inappropriate words.

#### Section 1. SUBSTANCE IDENTITY

- 1.1 Chemical name: musk xylene
- 1.2 Chemical formula:  $C_{12}H_{15}N_3O_6$
- 1.3 Other names/synonyms: 1-tert-butyl-3,5-dimethyl-2,4,6-trinitrobenzene, 5-tert-butyl-2,4,6-trinitro-m-xylene, musk xylol
- 1.4.1 UN number: UN 2956
- 1.4.2 CAS number: 81-15-2
- 1.5 Proposed classification for the Recommendations:  
CLASS 4.1
- 1.5.1 Proper shipping name (3.1.2<sup>1</sup>)  
5-TERT-BUTYL-2,4,6-TRINITRO-M-XYLENE (MUSK XYLENE)
- 1.5.2 Class/division: 4.1 subsidiary hazard(s): -
- 1.5.3 Proposed special provisions, if any: 132, 133  
 Limited and excepted quantities: 0, E0  
 Special packing provisions: -  
 Portable tanks and bulk containers:  
 Instructions: -  
 Special provisions: -
- 1.5.4 proposed packing instruction(s): P409

#### Section 2. PHYSICAL PROPERTIES

- 2.1 Melting point or range: The substance has an unstable form melting at 105-106°C or 107°C, and a stable form melting at 112-114°C. When the unstable form is allowed to resolidify, it will convert to the stable form.
- 2.2 Boiling point or range: decomposition will start at 270 °C
- 2.3 Relative density at: 0.77 g/cm<sup>3</sup> at 20 °C
- 2.4 Vapour pressure at: 0.00003 Pa at 20 °C
- 2.5 Viscosity at 20 °C<sup>2</sup> \_\_\_ m<sup>2</sup>/s
- 2.6 Solubility in water at 20 °C: 0.15 mg/l
- 2.7 Physical state at 20°C (2.2.1.1<sup>1</sup>) solid/liquid/gas<sup>2</sup>
- 2.8 Appearance at normal transport temperatures, including colour and odour: white and pale yellow powder or needle-like crystals, natural musk aroma.
- 2.9 Other relevant physical properties: soluble in paraffin oil and slightly in ethyl alcohol, chloroform and ethyl acetate.

#### Section 3. FLAMMABILITY

- 3.1 Flammable vapour
  - 3.1.1 Flash point (2.3.3<sup>1</sup>) 168 °C oc/cc
  - 3.1.2 Is combustion sustained? (2.3.1.3<sup>1</sup>) yes/no
- 3.2 Autoignition temperature 305-341 °C
- 3.3 Flammability range (LEL/UEL) \_\_\_ %
- 3.4 Is the substance a flammable solid? (2.4.2<sup>1</sup>) yes/no
- 3.4.1 If yes, give details \_\_\_

## Section 4. CHEMICAL PROPERTIES

- 4.1 Does the substance require inhibition/stabilization or other treatment such as nitrogen blanket to prevent hazardous reactivity? yes/no  
If yes, state:
- 4.1.1 Inhibitor/stabilizer used \_\_\_\_
- 4.1.2 Alternative method \_\_\_\_
- 4.1.3 Time effective at 55 °C \_\_\_\_
- 4.1.4 Conditions rendering it ineffective \_\_\_\_
- 4.2 Is the substance an explosive according to paragraph 2.1.1.1? (2.1<sup>1</sup>) yes/no
- 4.2.1 If yes, give details \_\_\_\_
- 4.3 Is the substance a desensitized explosive? (2.4.2.4<sup>1</sup>) yes/no
- 4.3.1 If yes, give details \_\_\_\_
- 4.4 Is the substance a self-reactive substance? (2.4.1<sup>1</sup>) yes/no  
If yes, state:
- 4.4.1 exit box of flow chart \_\_\_\_  
What is the self-accelerating decomposition temperature (SADT) for a 50 kg package? °C  
Is the temperature control required? (2.4.2.3.4<sup>1</sup>) yes/no
- 4.4.2 proposed control temperature for a 50 kg package \_\_\_\_ °C
- 4.4.3 proposed emergency temperature for a 50 kg package \_\_\_\_ °C
- 4.5 Is the substance pyrophoric? (2.4.3<sup>1</sup>) yes/no
- 4.5.1 If yes, give details \_\_\_\_
- 4.6 Is the substance liable to self-heating? (2.4.3<sup>1</sup>) yes/no
- 4.6.1 If yes, give details \_\_\_\_
- 4.7 Is the substance an organic peroxide (2.5.1<sup>1</sup>) yes/no  
If yes state:
- 4.7.1 exit box of flow chart \_\_\_\_  
What is the self-accelerating decomposition temperature (SADT) for a 50 kg package? \_\_\_\_ °C  
Is temperature control required? (2.5.3.4.1<sup>1</sup>) yes/no
- 4.7.2 proposed control temperature for a 50 kg package \_\_\_\_ °C
- 4.7.3 proposed emergency temperature for a 50 kg package \_\_\_\_ °C
- 4.8 Does the substance in contact with water emit flammable gases? (2.4.4<sup>1</sup>) yes/no
- 4.8.1 If yes, give details \_\_\_\_
- 4.9 Does the substance have oxidizing properties (2.5.1<sup>1</sup>) yes/no
- 4.9.1 If yes, give details \_\_\_\_
- 4.10 Corrosivity (2.8<sup>1</sup>) to:
- 4.10.1 mild steel \_\_\_\_ mm/year at \_\_\_\_ °C
- 4.10.2 aluminium \_\_\_\_ mm/year at \_\_\_\_ °C
- 4.10.3 other packaging materials (specify)  
\_\_\_\_ mm/year at \_\_\_\_ °C  
\_\_\_\_ mm/year at \_\_\_\_ °C
- 4.11 Other relevant chemical properties \_\_\_\_

## Section 5. HARMFUL BIOLOGICAL EFFECTS

- 5.1 LD<sub>50</sub>, oral (2.6.2.1.1<sup>1</sup>) no signs of toxicity (rat, > 10000 mg/kg)
- 5.2 LD<sub>50</sub>, dermal (2.6.2.1.2<sup>1</sup>) no signs of toxicity (rabbit, > 15000 mg/kg)
- 5.3 LC<sub>50</sub>, inhalation (2.6.2.1.3<sup>1</sup>) no signs of toxicity
- 5.4 Saturated vapour concentration at 20 °C (2.6.2.2.4.3<sup>1</sup>) \_\_\_\_ ml/m<sup>3</sup>
- 5.5 Skin exposure (2.8<sup>1</sup>)
- 5.6 Other data \_\_\_\_
- 5.7 Human experience \_\_\_\_

## Section 6. SUPPLEMENTARY INFORMATION

- 6.1 Recommended emergency action
- 6.1.1 Fire (include suitable and unsuitable extinguishing agents) \_\_\_\_
- 6.1.2 Spillage \_\_\_\_

- 6.2 Is it proposed to transport the substance in:
- 6.2.1 Bulk Containers (6.8<sup>1</sup>)                      yes/no
- 6.2.2 Intermediate Bulk Containers (6.5<sup>1</sup>)?      yes/no
- 6.2.3 Portable tanks (6.7<sup>1</sup>)?                      yes/no
- If yes, give details in Sections 7, 8 and/or 9.

**Section 7. BULK CONTAINERS (only complete if yes in 6.2.1)**

- 7.1 Proposed type(s)

**Section 8. INTERMEDIATE BULK CONTAINERS (IBCs) (only complete if yes in 6.2.2)**

- 8.1 Proposed type(s)

**Section 9. MULTIMODAL TANK TRANSPORT (only complete if yes in 6.2.3)**

- 9.1 Description of proposed tank (including IMO tank type if known)
- 9.2 Minimum test pressure \_\_\_\_
- 9.3 Minimum shell thickness \_\_\_\_
- 9.4 Details of bottom openings, if any \_\_\_\_
- 9.5 Pressure relief arrangements \_\_\_\_
- 9.6 Degree of filling \_\_\_\_
- 9.7 Unsuitable construction materials \_\_\_\_
- \_\_\_\_\_