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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****Thirty-seventh session**

Geneva, 21–30 June 2010

Item 3 of the provisional agenda

**Listing, classification and packing****Mercury (UN 2809): Subsidiary risk 6.1****Transmitted by the expert from Germany<sup>1</sup>****Introduction**

1. Mercury is a metallic element released into the air as a vapour by natural processes and anthropogenic activities. International programmes aiming at increased common safety standards associated with the handling of mercury were initiated after a global assessment report substantiated its various negative impacts on human health and the environment.
2. In humans, neurological and behavioural disorders have been observed following inhalation of elemental mercury vapour. Similar effects are seen following all durations of exposure. The severity increases as exposure duration and/or concentration increase. Although improvement in most neurological dysfunctions has been observed upon removal of persons from the source of exposure, some changes may be irreversible.
3. According to available experimental data, mercury fulfils the criteria for classification under Division 6.1 of the UN Model Regulations for the Transport of Dangerous Goods: In an acute inhalation toxicity study<sup>2</sup>, 20 out of 32 rats died following 2 h exposure to mercury vapour in a concentration of 27 mg/m<sup>3</sup> (3.1 ml/m<sup>3</sup>). Taking into account paragraph 2.6.2.2.4.5 of the UN Model Regulations, the LC<sub>50</sub> value after 1 h exposure can be estimated as < 54 mg/m<sup>3</sup> (< 6.2 ml/m<sup>3</sup>). Based on a reported vapour

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<sup>1</sup> In accordance with the programme of work of the Sub-Committee for 2009-2010 approved by the Committee at its fourth session (refer to ST/SG/AC.10/C.3/68 para. 118(b) and ST/SG/AC.10/36, para. 14).

<sup>2</sup> *F Livardjani et al., Toxicology 66 (1991) 289-295.*

pressure at 20 °C of 0.00182 mm Hg<sup>3</sup> ( $2.42 \times 10^{-4}$  Pa), the saturated vapour concentration of elemental mercury at 20 °C and standard atmospheric pressure is calculated as 20 mg/m<sup>3</sup> (2.4 ml/m<sup>3</sup>). Thus, the criteria for classification under Division 6.1, packing group III are met:  $V \geq 1/5 LC_{50}$  and  $LC_{50} \leq 5,000$  ml/m<sup>3</sup>.

4. In the Dangerous Goods list, mercury is currently listed under entry UN 2809, Class 8, packing group III. Taking into account its toxic by inhalation properties as outlined above, and following paragraph 2.0.3 of the UN Model Regulations (Precedence of hazard characteristics), mercury would remain to be classified under Class 8, with the addition of subsidiary risk 6.1. Accordingly, entry UN 2809 would need to be amended as outlined below.

5. The updated data sheet for mercury is contained in the Annex to this document.

## Proposal

6. Amend entry 2809 in the Dangerous Goods List to read as follows:

UN No.	Name and description	Class or division	Subsidiary risk	UN packing group	Special provisions	Limited and excepted quantities		Packagings and IBCs		Portable tanks and bulk containers	
						(7a)	(7b)	Packing instruction	Special provisions	Instruction	Special provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
2809	MERCURY	8	6.1	III		5 kg	E0	P800			

<sup>3</sup> *CF Hill, Phys Rev 20 (1922) 259-266.*

**Annex**

[English only]

**DATA SHEET TO BE SUBMITTED TO THE UNITED NATIONS  
FOR NEW OR AMENDED CLASSIFICATION OF SUBSTANCES**

Submitted by.....GERMANY Date

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 **Mercury**
- 1.2 Chemical formula **Hg**
- 1.3 Other names/synonyms -
- 1.4.1 UN number **2809**..... 1.4.2..... CAS number 7439-97-6
- 1.5 Proposed classification for the Recommendations
- 1.5.1 Proper shipping name (3.1.2<sup>1</sup>) **MERCURY**.....
- 1.5.2 Class/division **8**..... subsidiary risk(s) **6.1** .....  
packing group **III**.....
- 1.5.3 Proposed special provisions, if any .....
- 1.5.4 Proposed packing instruction(s).. **P800** .....

**Section 2. PHYSICAL PROPERTIES**

- 2.1 Melting point or range .....**-38.9 °C**
- 2.2 Boiling point or range .....**356.7 °C**
- 2.3 Relative density at :
- 2.3.1.....15 °C
- 2.3.2.....20 °C 25 °C: **13.53**
- 2.3.3.....50 °C
- 2.4 Vapour pressure at :
- 2.4.1.....50 °C **1.7 10<sup>-3</sup> kPa**
- 2.4.2.....65 °C kPa
- 20 °C 2.42 10<sup>-4</sup> kPa**
- 2.5 Viscosity at 20 °C<sup>2</sup> .....**1.55 mPa x sec**

<sup>1</sup> This and similar references are to chapters and paragraphs in the Model Regulations on the Transport of Dangerous Goods



- 4.4.3 Proposed emergency temperature for a 50 kg package ..... °C
- 4.5 Is the substance pyrophoric? (2.4.3<sup>1</sup>) **no**
- 4.5.1 If yes, give details .....
- 4.6 Is the substance liable to self-heating? (2.4.3<sup>1</sup>) **no**
- 4.6.1 If yes, give details .....
- 4.7 Is the substance an organic peroxide (2.5.1) **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>) **no**
- 4.8.1 If yes, give details .....
- 4.9 Does the substance have oxidizing properties (2.5.1<sup>1</sup>) **no**
- 4.9.1 If yes, give details .....
- 4.10 Corrosivity (2.8<sup>1</sup>) to:
- 4.10.1 .....mild steel **0.025 mm/year** at **600°C**
- 4.10.2 .....aluminium mm/year at °C
- Heavy, rapid corrosion and alloy formation leading to pitting and cracking, increased by humidity**
- 4.10.3 .....other packaging materials (specify)
- mm/year at °C
- mm/year at °C
- 4.11 Other relevant chemical properties  
**Forms alloys (amalga) with many metals**
- Section 5. HARMFUL BIOLOGICAL EFFECTS**
- 5.1 LD<sub>50</sub>, oral (2.6.2.1.1<sup>1</sup>) **no data**
- 5.2 LD<sub>50</sub>, dermal (2.6.2.1.2<sup>1</sup>) **no data**
- 5.3 LC<sub>50</sub>, inhalation (2.6.2.1.3<sup>1</sup>)...<**0.027** mg/l.....Exposure time **2 hours**  
or.....<**3.26** ml/m<sup>3</sup> Animal species **rat**.....
- 5.4 Saturated vapour concentration at 20 °C (2.6.2.2.4.3<sup>1</sup>) **19.9 mg/m<sup>3</sup> (2.39 ppm)**

<sup>1</sup> This and similar references are to chapters and paragraphs in the Model Regulations on the Transport of Dangerous Goods.

- 5.5 Skin exposure (2.81) results **no data ..**
- 5.6 Other data
- 5.7 Human experience

**Elemental mercury is easily absorbed via the lungs. Acute poisonings after inhalation of elemental mercury vapour have been reported frequently, including deaths from cerebral oedema, cardiac arrest or respiratory failure. The most sensitive target is the central nervous system. Prominent symptoms include tremors, emotional lability, insomnia, memory loss, neuromuscular changes, headaches, polyneuropathy, and deficits in cognitive or motor function performance. Similar effects are seen following all durations of exposure. The severity increases as exposure duration and/or concentration increase.**

## Section 6. SUPPLEMENTARY INFORMATION

- 6.1 Recommended emergency action
- 6.1.1 Fire (include suitable and unsuitable extinguishing agents)

**Fire will produce toxic gases. Wear full protective clothing and self-contained breathing apparatus with full face piece operated in the pressure demand or other positive pressure mode. Use extinguishing agent suitable for type of surrounding fire. Do not direct water at the heated metal. Run-off may pollute waterways.**

- 6.1.2 Spillage

**Isolate hazard area for at least 50 meters in all directions. Do not touch or walk through spilled material. Prevent entry into waterways, sewers, basements or confined areas. Do not use steel or aluminium tools or equipment. Cover with earth, sand or other non-combustible material. Use mercury spill kit. Mercury spill areas may be subsequently treated with calcium sulphide or with sodium thiosulphate wash.**

- 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)

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<sup>1</sup> This and similar references are to chapters and paragraphs in the Model Regulations on the transport of Dangerous Goods.

**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 .....
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