



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

Sixtieth session

Geneva, 27 June–6 July 2022

Item 10 (c) of the provisional agenda

**Issues relating to the Globally Harmonized
System of Classification and Labelling
of Chemicals: miscellaneous**

Sub-Committee of Experts on the Globally Harmonized System of Classification and Labelling of Chemicals

Forty-second session

Geneva, 6–8 July 2022

Item 2 (f) of the provisional agenda

**Work on the Globally Harmonized System of
Classification and Labelling of Chemicals: practical
classification issues (proposed amendments to the Globally
Harmonized System of Classification and Labelling of
Chemicals)**

Proposal to address issues from the programme of work for the practical classification issues informal correspondence group

**Transmitted by the expert from the United States of America on behalf
of the practical classification issues informal correspondence group***

Purpose

1. This working document is the outcome of discussions on work item (c) from the practical classification issues (PCI) informal program of work (informal document INF.31 (39th session)), which addresses the need for additional guidance in Chapter 3.1 to convert acute inhalation toxicity values for exposure times other than 1 hour.

Background

2. GHS paragraph 3.1.2.6.1 provides guidance on how to convert experimental inhalation toxicity values for tests using a 1 hour exposure to a 4 hour equivalent for gases, vapours, dusts and mists. However, there is no guidance for tests using other exposure times, such as studies with 3 or 6 hours exposure times.

3. During the forty-first session, the PCI informal correspondence group submitted an informal document (informal document INF.15 (41st session)) to the GHS Sub-Committee, presenting editorial amendments to Chapter 3.1 to address the conversion of inhalation toxicity values for test data with exposure times other than 1 hour. The working group further discussed this issue via web conference on 22 February 2022 and has reached agreement on the final proposal as presented in the annex of this document.

* A/75/6 (Sect.20), para. 20.51

4. The proposed text provides editorial amendments to GHS Chapter 3.1 by including an additional sentence at the end of paragraph 3.1.2.6.1 to indicate that guidance on the conversion of experimental values for times other than a 1 hour exposure is provided in paragraph 3.1.5.3. The new guidance is provided in paragraph 3.1.5.3, following the decision logics.

Proposal

5. The PCI informal correspondence group invites the Sub-Committee to consider the recommended editorial amendments to the GHS as set forth in the annex of this document.

Annex

Work item (c) from the PCI Programme of work (informal document INF.31, 39th session)

GHS paragraph 3.1.2.6.1 provides guidance on how to convert experimental inhalation toxicity values for tests using a 1 hour exposure to a 4 hour equivalent for gases, vapours, dusts and mists. However, there is no guidance for tests using other exposure times (e.g. studies with 3 or 6 hour exposure times). Consider providing guidance to paragraph 3.1.2.6.1 to address the conversion of inhalation toxicity values for tests using exposure times other than 1 hour.

Proposal

Update to Chapter 3.1 (new text is underlined)

“3.1.2.6 *Specific considerations for inhalation toxicity*

3.1.2.6.1 Values for inhalation toxicity are based on 4 hours tests in laboratory animals. When experimental values are taken from tests using a 1 hour exposure, they can be converted to a 4 hour equivalent by dividing the 1 hour value by a factor of 2 for gases and vapours and 4 for dusts and mists. Guidance on the conversion of experimental values for times other than a 1 hour exposure is provided in 3.1.5.3.”

New guidance text to be placed after the decision logics

“3.1.5.3 *Guidance*

3.1.5.3.1 The ATE values used for inhalation toxicity classification in Table 3.1.1 are based on a 4 hour experimental exposure in laboratory animals (3.1.2.6.1). Existing inhalation LC₅₀ values obtained in studies using exposure times other than 1 hour (3.1.2.6.1) can be adjusted to a 4 hour exposure using the ten Berge equation ($C^n \times t = k$) for gases and vapours and Haber’s rule ($C \times t = k$) for dusts and mists, as follows:

Formula for gases and vapours

$$LC_{50}(4 \text{ hours}) = \left(\frac{C^n \times t}{4} \right)^{1/n}$$

where:

C = LC₅₀ concentration for exposure duration t
n = chemical-specific exponent
t = exposure duration for C

Formula for dusts and mists

$$LC_{50}(4 \text{ hours}) = \frac{C \times t}{4}$$

where:

C = LC₅₀ concentration for exposure duration t
t = exposure duration for C

3.1.5.3.2 A default value of 2 is used for n unless additional conclusive information is available to indicate that a different value is more appropriate. The accepted exposure times for conversion are from 30 minutes to 8 hour exposures. A competent authority may decide whether other exposure times are acceptable for conversion. Data from a long-term exposure should not be converted because this hazard class addresses Acute Toxicity. Guidance on the

duration of short-term (i.e., acute) inhalation toxicity exposures can be found in OECD Guidance Document 39 (section 4.1: Outline of the exposure methodology).”

Examples: classification using calculated 4-hour LC₅₀ values

Example 1

Substance (liquid)

1. For the purpose of this example the substance has an experimental 6 hour vapour LC₅₀ = 13.6 mg/l
2. No additional information on n is available so the default value (n = 2) will be used.

Criterion:

$$LC_{50}(4 \text{ hours}) = \left(\frac{C^n \times t}{4} \right)^{1/n}$$

Calculation

$$LC_{50}(4 \text{ hours}) = \left(\frac{C^n \times t}{4} \right)^{\frac{1}{n}} = \left(\frac{13.6^2 \times 6}{4} \right)^{\frac{1}{2}} = \mathbf{16.7}$$

3. Therefore, the substance is classified into Category 4 based on the vapours Category 4 criteria (10.0 < ATE ≤ 20.0) from Table 3.1.1.

Example 2

Substance (solid)

4. For this example the substance has an experimental 2-hour dust LC₅₀ = .26 mg/l

Criterion:

$$LC_{50}(4 \text{ hours}) = \frac{C \times t}{4}$$

Calculation

$$LC_{50}(4 \text{ hours}) = \frac{C \times t}{4} = \frac{.26 \times 2}{4} = 0.13$$

5. Therefore, the substance is classified into Category 2 based on the dusts and mists Category 2 criteria (0.05 < ATE ≤ 0.5) from Table 3.1.1.
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