



**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****Fifty-fourth session**

Geneva, 26 November-4 December 2018

Item 2 (e) of the provisional agenda

**Recommendations made by the Sub-Committee on its fifty-first,
fifty-second and fifty-third sessions and pending issues:
transport of gases****Update of LC₅₀ values in P200****Transmitted by the International Organisation for Standardisation
(ISO)*****Introduction**

1. At the fifty-third session of the Sub-Committee of Experts on the Transport of Dangerous Goods ISO submitted ST/SG/AC.10/C.3/2018/24. This document proposed amending the LC₅₀ values of eight toxic gases that showed different values in the twentieth revision of the Model Regulations to those in ISO 10298:2018 Gas cylinders - *Gases and gas mixtures - Determination of toxicity for the selection of cylinder valve outlets*.
2. During the discussion of ST/SG/AC.10/C.3/2018/24, the Sub-Committee requested the source of the data that had led to the changes in the 2018 edition of ISO 10298 and ISO undertook to come back to the Sub-Committee with the data sources.

Sources

3. The sources where the LC₅₀ values have been determined from are given in ISO 10298. The authors of ISO 10298 recognise that it is important to understand where the values

* In accordance with the programme of work of the Sub-Committee for 2017–2018 approved by the Committee at its eighth session (see ST/SG/AC.10/C.3/100, paragraph 98 and ST/SG/AC.10/44, para. 14).

of LC₅₀ have been derived from. For the gases where the proposed changes to the Model Regulations have been made, the source of the value is given below.

UN No.	Proper Shipping Name	LC ₅₀ in ml/m ³ in P200 (Rev.20)	LC ₅₀ in ml/m ³ in ISO 10298:2018	Source reference from ISO 10298:2018
1008	BORON TRIFLUORIDE	387	864	1
1859	SILICON TETRAFLUORIDE	450	922	2
2188	ARSINE	20	178	3
2196	TUNGSTEN HEXAFLUORIDE	160	218	4
2198	PHOSPHOROUS PENTAFLUORIDE	190	261	5
2202	HYDROGEN SELENIDE	2	51	6
2534	METHYLCHLOROSILANE	600	2 810	7
2676	STIBINE	20	178	8

- 1) Marhold, J.V. Sbomik Vysledku Toxiko logickeho Vysetheni Latek a Phipravku, 1972
- 2) Scheel L.D. et al. Toxicity of carbonyl fluoride, silicon tetrafluoride. Am. Ind. Hyg. Assoc. J. 1968, 29 pp. 41–48
- 3) International Research and Development Corp. Arsine * LC₅₀ acute inhalation toxicity evaluation in rats (60 min). 28 October 1985, Report no. 533-002, AT&T Bell laboratories
- 4) Derived from decomposition to HF, the source of which is “Acute Exposure Guideline Levels for Selected Airborne Chemicals, Volume 4. Subcommittee on Acute Exposure Guideline Levels, Committee on Toxicology Board on Environmental Studies and Toxicology, The National Academy Press, Washington DC, 2004” (see Hydrogen Fluoride in ISO 10298:2010)
- 5) As for 4), derived from the decomposition to HF.
- 6) Zwart A., Arts J.H.E., Ten Berge W.F., Appleman L.M. Alternative Acute Inhalation Toxicity Testing by Determination of the Concentration-Time-Mortality Relationship: Experimental Comparison with Standard LC₅₀ Testing. Regul. Toxicol. Pharmacol. 1992, 15 pp. 278–290
- 7) Acute Exposure Guideline Levels (AEGLS) for Methylchlorosilane. April 2009, US National Advisory Committee for AEGL
- 8) By analogy with arsine, the source of which is given in 3) above.

4. With the above explanation of the sources of the changed toxicity data, ISO proposes that the values of LC₅₀ in ml/m³ originally given in ST/SG/AC.10/C.3/2018/24 are adopted in Table 2 of packing instruction P200 in 4.1.1.4.

Proposal

5. In Table 2 of P200 in 4.1.1.4, for the UN numbers listed below, replace the values under the heading “LC₅₀ in ml/m³”, with those in ISO 10298:2018, as follows:

UN No.	Name and description	Current LC ₅₀ in ml/m ³ values in Rev.20	Replace with
1008	BORON TRIFLUORIDE	387	864
1859	SILICON TETRAFLUORIDE	450	922
2188	ARSINE	20	178
2196	TUNGSTEN HEXAFLUORIDE	160	218
2198	PHOSPHOROUS PENTAFLUORIDE	190	261
2202	HYDROGEN SELENIDE	2	51
2534	METHYLCHLOROSILANE	600	2 810
2676	STIBINE	20	178

Justification

6. ISO 10298:2018 and its previous 2010 edition were based on wide-ranging research into the latest toxicological data on these gases and the standard lists the references on which these LC₅₀ values were based. The 1995 edition has proved to be a sound basis for P200 and there are relatively few changes given the fact that scientific knowledge continues to advance.
