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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****Present and future products in the liquefied petroleum gas  
(LPG) industry – Proposal for a new UN number****Transmitted by the World Liquid Gas Association (WLGA - ex.  
WLPGA)\*****Executive summary:**

Conventional LPG is primarily propane, butane or mixtures thereof. To lower the carbon footprint of the product, it can be partly replaced in the future by mixtures of renewable/recycled LPG and renewable/recycled dimethyl ether (DME) at any ratio.

Current forecasts are that for example in Europe and North America, by 2030 renewable/recycled DME can constitute up to 25 % of the renewables offerings of the LPG industry and possibly up to 40 % by 2040, rising to 50 % by 2050. Assuming that the requested new special provision to allow LPG with up to 12 % by mass of DME to be assigned to UN 1075 or UN 1965 is approved, it is believed that in the future, up to 30 % of the DME/LPG mixtures may have a DME content higher than 12 % (by mass), thus falling in the category of the requested new UN number, and represent around 10 % of the total market. These significant mixture volumes, according to the current regulations, would need to be assigned to UN 3161 Liquefied Gas, Flammable, N.O.S. However, to ease identification of the product by the emergency services, it is proposed that a new UN number is created for “Hydrocarbon and dimethyl ether gas mixtures, liquefied”.

This proposal is separate from and not linked to the proposal to introduce a new special provision to allow up to 12 % by mass of DME in LPG assigned to UN 1075 or UN 1965 (ST/SG/AC.10/C.3/2024/48).

**Action to be taken**

Create a new UN number for hydrocarbon and DME mixtures as “Hydrocarbon gases, UN Nos. 1075, 1965, 1011, 1012, 1055, 1969, or 1978 and dimethyl ether UN 1033, mixtures, liquefied”.

**Related documents:**

Document ST/SG/AC.10/C.3/2023/32 from the sixty-third session.

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



## I. Background

1. Document ST/SG/AC.10/C.3/2023/32 of the sixty-third session contained the background information on the way that the LPG industry is changing and adapting to meet its renewable and sustainability goals, and addressed the issues raised during the sixty-second session.
2. During the debate held in the sixty-third session, it was felt that product identification was not sufficient grounds to justify a new UN number, unless large quantities of such DME/LPG mixtures will enter the transport train. This document includes some projections/forecasts on the significant expected quantities concerned.
3. Such mixtures of renewable/recycled DME (rDME) with LPG will assist in the decarbonisation of the fuel supplied by the Liquid Gas, LPG industry, and thus contribute towards the United Nations, Sustainable Development Goal 7 (affordable and clean energy). Current forecasts are that for Europe and North America, by 2030 rDME can constitute up to 25 % of the renewables offerings of the LPG industry and possibly up to 40 % by 2040, rising to 50 % by 2050. Assuming that the requested new special provision to allow LPG with up to 12 % by mass of DME to be assigned to UN 1075 or UN 1965 is approved, it is believed that in the future, up to 30 % of the DME/LPG mixtures may have a DME content higher than 12 % (by mass), thus falling in the category of the requested new UN number, and represent around 10 % of the total market.
4. During the debate held at the sixty-third session, views were expressed that a new UN number was not necessary, as there was no need to specifically identify this mixture in an emergency, thus duplicating unnecessarily the existing UN number (UN 3161). However, there are already similar duplications in UN numbers, and we believe these were introduced for the sake of similar clarity as the one we are requesting here.
5. An example is with refrigerant gases. There are 25 separate UN numbers for gases classified as 2A with a 20 hazard identification number<sup>1</sup> (HIN) (UN Nos. 1009, 1018, 1020, 1021, 1022, 1028, 1029, 1958, 1973, 1974, 1976, 1982, 1983, 1984, 2422, 2424, 2599, 2602, 3159, 3220, 3296, 3337, 3338, 3339 and 3340) and 7 UN numbers classified as 2F with a 23 HIN (UN Nos. 1030, 1063, 2035, 2453, 2454, 2517 and 3252). The 2A gases could have been assigned to UN 1078 Refrigerant gases, N.O.S. or UN 3163 (liquefied gases N.O.S.) and the 2F gases to UN 3161. However, they have all been assigned to separate UN numbers to avoid confusion and aid identification. By 2030 the volume of DME/LPG mixtures transported will by far exceed the total volume of refrigerant gases transported.
6. UN Nos. 1033, 1075 and 1065 all have the same HIN (23). However, some flammable liquefied gases that could be mixed and then classified as UN 3161 have different HINs. For example, UN 1041 has a 239 HIN (risk of spontaneous violent reaction), but if that is mixed with another flammable gas it is assigned to UN 3161 with a 23 HIN. The same applies with UN Nos. 1060, 1081, 1085, 1086, 1087, 1959 and 2452. UN 2191 has a 26 HIN, again that can be mixed with another liquefied gas and then assigned to UN 3161.
7. During an emergency, documentation detailing the actual mixture transported may not be readily available, and if the product were to be transferred into an alternative container not having suitable elastomeric seals, unacceptable swelling may occur. Swelling occurs in the first 48 hours of exposure and dimethyl ether/LPG mixtures with a higher than 40 % DME will cause unacceptable swelling in many elastomers used in the LPG industry.
8. Mixtures of rDME and LPG (hydrocarbons to UN Nos. 1075, 1965, 1011, 1012, 1055, 1969, 1978) will become very common in the transport chain in the future, as conventional fossil fuels are gradually replaced. Having a dedicated UN number for these mixtures will enable rapid identification of the actual product transported, which can only help in the case of an emergency and will improve safety.

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<sup>1</sup> See Column (20) of Table A of Chapter 3.2 of the *Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)*.

## II. Proposal

9. Add a new entry to the Dangerous Goods List in 3.2.2 as follows:

(1)	(2)	(3)	(4)	(5)	(6)	(7a)	(7b)	(8)	(9)	(10)	(11)
XXXX	HYDROCARBON GASES, UN Nos. 1075, 1965, 1011, 1012, 1055, 1969, OR 1978, AND DIMETHYL ETHER UN 1033, MIXTURES, LIQUEFIED	2.1			274 392	0	E0	P200		T50	

10. In 4.1.4.1 packing instruction P200, Table 2, add new entry as follows:

UN No.	Name and description	Class or Division	Subsidiary Hazard	L <sub>C50</sub> (ml/m <sup>3</sup> )	Cylinders	Tubes	Pressure Drums	Bundles of cylinders	MEGCs	Test period (years)	Test pressure (bar)	Filling ratio	Special packing provisions
XXXX	HYDROCARBON GASES, UN Nos. 1075 1965, 1011, 1012, 1055, 1969, OR 1978, AND DIMETHYL ETHER UN 1033, MIXTURES, LIQUEFIED	2.1			X	X	X			10			z

11. In 4.2.5.2.6 portable tank instruction T50, add a new entry as follows:

UN No.	Non-refrigerated liquefied gases	Max. allowable working pressure (bar) Small: Bare; Sunshield; Insulated: respectively <sup>a</sup>	Openings below liquid level	Pressure-relief requirements <sup>b</sup> (see 6.7.3.7)	Maximum filling ratio
XXXX	Hydrocarbon gases, UN Nos. 1075 1965, 1011, 1012, 1055, 1969, or 1978, and dimethyl ether UN 1033, mixtures, liquefied	See MAWP definition in 6.7.3.1	Allowed	Normal	See 4.2.2.7

## III. Safety implications

12. No negative safety implications are foreseen from the proposal. Having a dedicated UN number for this product, will enable easy identification by the emergency services without the need of checking the transport documentation and this can only have a positive impact on safety.