

U.S. Department of Transportation **Pipeline and Hazardous Materials Safety Administration**

August 5, 2022

Mr. Mike Stephens Manager Distribution Compliance Linde Gas & Equipment Inc. 217 Loren St Washington, IL 61571

Reference No. 22-0049

Dear Mr. Stephens:

This letter is in response to your April 14, 2022, email requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to the segregation of hazardous materials when transported by vessel. Specifically, you seek confirmation that your understanding of § 176.83(a)(8) is accurate in that a Division 2.3 (Gas poisonous by inhalation) hazardous material with subsidiary hazards of Division 2.1 (Flammable gas) and Class 8 (Corrosive) may—under certain conditions—be stowed in the same cargo transport unit on board a vessel as a Division 2.3 gas with a subsidiary hazard of Class 8.

Your understanding is correct. In accordance with § 176.83(a)(8) and notwithstanding the requirements of paragraphs (a)(6) and (a)(7) of § 176.83, hazardous materials of the same class may be stowed together without regard to segregation required by secondary hazards—subsidiary risk label(s)—provided the substances do not react dangerously with each other and cause: 1) combustion and/or evolution of considerable heat; 2) evolution of flammable, toxic, or asphyxiant gases; 3) the formation of corrosive substances; or 4) the formation of unstable substances.

I hope this information is helpful. Please contact us if we can be of further assistance.

Sincerely,

J. Alenn Foston

T. Glenn Foster Chief, Regulatory Review and Reinvention Branch Standards and Rulemaking Division

1200 New Jersey Avenue, SE Washington, DC 20590

Larson

From:	INFOCNTR (PHMSA)
To:	Dodd, Alice (PHMSA)
Subject:	FW: Request for Interpretation
Date:	Wednesday, May 18, 2022 2:06:50 PM
Attachments:	Germanium Tetrafluoride Hydrogen mix segregation.docx 120239 Segregation Interup letter only.pdf

22-0049

From: INFOCNTR (PHMSA)
Sent: Monday, May 2, 2022 12:21 PM
To: Hazmat Interps <hazmatinterps@dot.gov>
Subject: FW: Request for Interpretation

Hello Hazmat Interps,

Below and in the attached word document is a request for letter of interpretation.

Thanks,

Jonathon, HMIC

From: Mike R Stephens <<u>mike.r.stephens@linde.com</u>>
Sent: Thursday, April 14, 2022 12:23 PM
To: INFOCNTR (PHMSA) <<u>INFOCNTR.INFOCNTR@dot.gov</u>>
Cc: LG US DISTRIBUTION COMPLIANCE <<u>LG.US.DISTRIBUTION.COMPLIANCE@linde.com</u>>
Subject: Request for Interpretation

CAUTION: This email originated from outside of the Department of Transportation (DOT). Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Re: Request for Interpretation

Dear Sir or Madame:

In accordance with 49 CFR § 105.20, this letter is being submitted to PHMSA to request an interpretation of the Hazard Materials Transportation Regulations.

Linde Gas and Equipment Inc (LGE) requests PHMSA to review an interpretation we have made regarding the carriage by vessel of certain Division 2.3 (Gas poisonous by inhalation) gases with a subsidiary hazard of 2.1 (Flammable gas) and Class 8

(corrosive) and certain Division 2.3 gases with a subsidiary hazard of Class 8 (corrosive).

Specifically, LGE requests PHMSA to review our interpretation that the gas combinations listed in Table 1 do not require segregation as is allowed by§ 176.83 (a) (8) as these gases (substances) do not react dangerously with each other and lead to the conditions listed in§ 176.83 (a) (8) i-iv.

Attached above is an Interpretation reference number 12-0239 PHMSA approved that supports our request.

Table I - List of Gas Combinations

Div. 2.3 (2.1) (8) gas Name	Div. 2.3 (8) Gas Name	Chemically Compatible	Segregation Required as per § 176.83						
Un 3305 Compressed gas, toxic, flammable, corrosive, n.o.s. Inhalation Hazard Zone B	UN 3308 Liquefied gas, toxic, corrosive, n.o.s. Inhalation Hazard Zone B	Yes	No						

Analysis of Current Segregation Regulations for Gases with Division 2.1 and Class 8 Subsidiary Risks

49 CFR § 176.83 specifies the segregation requirements for hazardous materials transported by vessel stowed in cargo spaces on deck and under deck and in cargo transport units.

Table 176.83 (B) sets forth the general segregation requirements between the various classes (& divisions) of hazardous materials.

49 CFR § 176.83 Table 176.83 (B)

Table 176.83(b) --- General Segregation Requirements for Hazardous Materials (Segregation must also take account of a single secondary hazard label, as required by paragraph (a)(6) of this section.]

Class	1.1, 1.2, 1.5	1.3	1.4, 1.6	2.1	2.2	2.3	3	4.1	4.2	4.3	5.1	5.2	6.1	6.2	7	8	9
Explosives, 1.1, 1.2, 1.5	(*)	(*)	(*)	4	2	2	4	4	4	4	4	4	2	4	2	4	х
Explosives, 1.3	(*)	(*)	(*)	4	2	2	4	3	3	4	4	4	2	4	2	2	х
Explosives, 1.4, 1.6	(*)	(*)	(*)	2	1	1	2	2	2	2	2	2	Х	4	2	2	х
Flammable gases 2.1	4	4	2	Х	х	X	2	1	2	2	2	2	Х	4	2	1	X
Non-toxic, non-flammable gases 2.2	2	2	1	х	х	х	1	х	1	х	х	1	Х	2	1	х	X
Poisonous gases 2.3	2	2	1	х	х	х	2	X	2	Х	х	2	Х	2	1	X	X
Flammable liquids 3	4	4	2	2	1	2	х	х	2	2	2	2	х	3	2	X	X
Flammable solids 4.1	4	3	2	1	х	х	х	х	1	х	1	2	х	3	2	1	х
Spontaneously combustible substances 4.2	4	3	2	2	1	2	2	1	х	1	2	2	1	3	2	1	х
Substances which are dangerous when wet 4.3	4	4	2	2	х	х	2	х	1	х	2	2	х	2	2	1	х
Oxidizing substances 5.1	4	4	2	2	х	х	2	1	2	2	Х	2	1	3	1	2	х
Organic peroxides 5.2	4	4	2	2	1	2	2	2	2	2	2	х	1	3	2	2	х
Poisons 6.1	2	2	х	х	х	х	х	х	1	х	1	1	х	1	х	X	Х
Infectious substances 6.2	4	4	4	4	.2	2	3	3	3	2	3	3	1	х	3	3	X
Radioactive materials 7	2	2	2	2	1	1	2	2	2	2	1	2	х	3	х	2	X
Corrosives 8	4	2	2	1	х	х	х	1	1	1	2	2	х	3	2	X	X
Miscellaneous dangerous substances 9	×	X	X	X	x	X	X	X	X	X	X	X	X	X	X	X	X

Numbers and symbols relate to the following terms as defined in this section:

1 -- "Away from."

2 - "Separated from."

3 --- "Separated by a complete compartment or hold from."

4 — "Separated longitudinally by an intervening complete compartment or hold from."

X — The segregation, if any, is shown in the \$172.101 table.

* --- See \$176.144 of this part for segregation within Class 1.

An example of using Table 176.83 (B) as it applies to one of the gas combinations listed in Table 1 is as follows:

In the case of UN 3305 Compressed Gas, Toxic, Flammable, Corrosive, n.o.s. (Germanium Tetrafluoride in Hydrogen), Toxic Inhalation Hazard Zone B which has a primary hazard of 2.3 and a subsidiary hazard of Division 2.1 (flammable gas), Class 8 (corrosive)

and

UN 3308 Liquefied gas, toxic, corrosive, n.o.s. (Germanium Tetrafluoride) Inhalation Hazard Zone B which has a subsidiary hazard of Class 8 (corrosive).

Table 176.83 (B) lists the number "1" at the intersection of Division 2.1 with Class 8. In this example these two hazardous materials would require segregation "Away from" as defined by the numbers and symbols used in Table 176.83 (B).

This requirement is inferred from Table 176.83 (B) based on the requirement of § 176.83 (a) (6) which states:

"When the§ 172.101 Table or§ 172.402 requires packages to bear a subsidiary hazard label or labels, the segregation appropriate to the subsidiary hazards must be applied when that segregation is more restrictive than that required by the primary hazard."

Furthermore, any two hazardous materials requiring segregation cannot be stowed in the same cargo transport unit based on the requirement of §176.83 (d) which states:

"Segregation in cargo transport units: Two hazardous materials for which any segregation is required may not be stowed in the same cargo transport

unit."

At this stage of the interpretation, it would appear that any Division 2.3 gas with a subsidiary hazard of 2.1 would need to be segregated from a Division 2.3 gas with a subsidiary hazard of Class 8 and they could not be stowed in the same cargo transport unit together.

However further analysis of the regulations reveals there are exceptions to the requirement of segregation for hazardous materials of the same class even though the subsidiary hazards appear to necessitate segregation.

LGE believes that the statement in § 178.86 (a) (8) is included in the regulations to accommodate situations where substances of the same class which are chemically compatible can be stowed together irrespective of the subsidiary hazards which would otherwise mandate unnecessary segregation.

§ **178.86 (a) (8)** "Notwithstanding the requirements of paragraphs (a)(6) and (a)(7) of this section, hazardous materials of the same class may be stowed together without regard to segregation required by secondary hazards (subsidiary risk label(s)), provided the substances do not react dangerously with each other and cause:"

- (i) Combustion and/or evolution of considerable heat;
- (ii) Evolution of flammable, toxic or asphyxiant gases;
- (iii) The formation of corrosive substances; or
- (iv) The formation of unstable substances.

Using Germanium Tetrafluoride/Hydrogen mix and Germanium Tetrafluoride as an example, we believe that§ 178.86 (a) (8) would allow these two gases to be stowed together in the same cargo transport unit without the need for segregation as these two gases do not react with one another.

Hydrogen + Germanium Tetrafluoride -----> No Dangerous Reaction under transport conditions

In summary, LGE requests PHMSA to provide an interpretation of the following as they pertain to our transport situation, specifically with regards to the gas combinations cited in Table 1.

If a Division 2.3 gas with a subsidiary hazard of Division 2.1 and Class 8 and a Division 2.3 gas with a subsidiary hazard of Class 8 do not react dangerously with each other under transportation conditions, then they do not require segregation per§ 176.83 (a) (8) then they can they be stowed in the same cargo transport unit when transported by cargo vessel.

It is our belief that based on our review of the chemical literature and our own

experience and data that the gas combinations listed in Table 1 do not react dangerously with each other; then they would not require segregation and can stowed together in the same cargo transport unit when transported by cargo vessel. Cited References

If PHMSA has any questions related to this document, please contact:

Mike Stephens Linde Gas & Equipment Inc 217 Loren St Washington, II 61571 Phone 314-568-6764 e-mail: LG.US.Distribution.Compliance@Linde.com

Mike Stephens Manager Distribution Compliance Linde Gas & Equipment Inc. LG.US.DISTRIBUTION.COMPLIANCE@LINDE.COM Cell 314-568-6764

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Pipeline and Hazardous Materials Safety Administration

Mr. James McManus ATMI, Inc. 7 Commerce Drive Danbury, CT 06810

DEC 2 0 2012

Ref. No.: 12-0239

Dear Mr. McManus:

This responds to your October 23, 2012 letter requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to the segregation of hazardous materials when transported by vessel. Your questions are paraphrased and answered below.

- Q1: You ask if a Division 2.3 gas (with a subsidiary hazard of Division 2.1) and a Division 2.3 gas (with a subsidiary hazard of Class 8) require segregation?
- A1: The answer is no, provided the Division 2.3 gases are shipped in accordance with the applicable provisions detailed in § 176.83. Multiple Division 2.3 gases may be stowed in the same container for vessel transportation without regard to the subsidiary hazards, provided the different poison gas materials are not capable of reacting dangerously with each other and causing any of the conditions listed below. Specifically, as provided in § 176.83(a)(8) and notwithstanding the requirements of paragraphs (a)(6) and (a)(7), hazardous materials of the same class may be stowed together without regard to segregation required by secondary hazards (subsidiary risk label(s)), provided the substances do not react dangerously with each other and cause: (1) a combustion and/or evolution of considerable heat; (2) an evolution of flammable, toxic or asphyxiant gases; (3) the formation of corrosive substances; or (4) the formation of unstable substances.
- Q2: You ask if a Division 2.3 gas (with a subsidiary hazard of Division 2.1) and a Division 2.3 gas (with a subsidiary hazard of Class 8) can be stowed in the same transport unit when transported by vessel?

A2: The answer is yes, as provided in A1.

I trust this satisfies your inquiry. Please contact us if we can be of further assistance.

Sincerely,

Alenn Foster

T. Glenn Foster Chief, Regulatory Review and Reinvention Branch Standards and Rulemaking Division

1200 New Jersey Avenue, SE Washington, D.C. 20590