U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

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

JUN 21 2012

EG Valkenburgh
Pelchem
PO Box 582
Pretoria, South Africa 0001

Reference No.: 12-0086

Dear Mr. Valkenburgh:

This responds to your March 15, 2012 letter requesting clarification of the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180) applicable to pressure relief devices for cylinders. Specifically, you ask if a pressure relief device is required on a pressure cylinder filled with Xenon Difluoride using the proper shipping name, "UN3085, Oxidizing Solid Corrosive, n.o.s.?"

The answer is no. The Hazardous Materials Table (HMT) in § 172.101 designates approved non-bulk packagings for "UN3085, Oxidizing Solid Corrosive, n.o.s.," in §§ 173.211, 173.212, and 173.213 depending on the packing group. These sections allow for the use of cylinders as an approved non-bulk packaging for "UN3085, Oxidizing Solid Corrosive, n.o.s." In addition, § 173.301(f)(1) states that "a cylinder filled with a gas and offered for transportation must be equipped with one or more pressure relief devices." Therefore, because your cylinder only contains a solid material, and is thus not a gas, it would not be required to have a pressure relief device.

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

Sincerely,

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

A subsidiary of Necsa Ltd

PO Box 582
Pretoria 0001
South Africa

+27 12 305 3415
+27 12 305 4445
+27 83 628 0831

eddyv@pelchem.necsa.co.za
www.pelchem.com

pelchem
We're in your world

15 March 2012

Office of Hazardous Materials Standards
Pipeline and Hazardous Materials Safety Administration
PHH10
U.S. Department of Transportation
East Building
1200 New Jersey Avenue, SE
Washington, DC 20590-0001

Andrews
§178. Appendix D & E
§171.22
§173.301
Cylinders
12-0086

Dear Madam or Sir

Request for Guidance and Interpretation

In accordance with 49 CFR 105.20 Guidance and Interpretations, Pelchem (Pty) Ltd is requesting an interpretation of the requirements for packing and shipping Xenon difluoride: XeF_2 (UN 3085 Oxidizing Solid Corrosive N.O.S) in high pressure DOT 3AL cylinders, by Airfreight, to and within the USA.

I have reviewed the 49 CFR sections 171, 173 and 178 against other International Regulations UN, IMDG and IATA Regulations for Transport of Dangerous Goods and could not locate anything that directly answers my questions.

For your convenience I attach the known properties of Xenon difluoride (XeF_2), classification and packaging details to this letter.

Question: Is a Pressure Relief Device required on a pressure cylinder filled with XeF_2 :UN 3085 Oxidizing Solid Corrosive NOS (not classified as a Gas)?

Pelchem Interpretation: 49 CFR 171.22 (a) – (d) Authorization and Conditions for the use of international standards and regulations, allows a hazardous material to be offered for transport in the USA on the basis that it is in full compliance with accepted international regulations.

Pelchem interprets that XeF_2 packaged in a cylinder that complies with UN, IMDG or IATA Regulations can be offered for on carriage transport in the USA, without a Pressure Relief Device.

The UN Regulations Rev 17 of 2011 (and IMDG) allows Pressure receptacles for liquids and solids (not classified as gases) in Packaging Instruction P002, subject to conditions in 4.1.3.6. The conditions in 4.1.3.6 refer to a pressure relief device as optional to prevent a receptacle from bursting in case of overfill or fire conditions.

Similarly the IATA Regulations 53 rd Edition of 2012 allows the use of cylinder for liquids and solids under Packaging Instruction PI 562, subject to conditions in 5.0.6.6. The conditions in 5.0.6.6 refer to a pressure relief device as optional to prevent a receptacle from bursting in case of overfill or fire conditions.

From CFR Vol 20 of 31 Jan 2007 – Transportation of Oxygen and other Oxidizing gases and Oxygen generators on Aircraft, and reference to 49 CFR 178 Appendix D & E Thermal resistance and Flame penetration tests – I take the fire condition in a Cargo plane fitted with fire suppression, as 205°C (400°F). At this temperature the vapour pressure of XeF2 is calculated at 25 Bar (170 psi) which is far below the 122 Bar (1800 psi) Working pressure of the cylinders and does not pose a risk of rupture.

Does DOT confirm the interpretation of Pelchem?

Thank you for your assistance in this matter. If I can be of any further assistance, please contact me on +27-83-628 0831 or e mail at Eddy.Valkenburgh@pelchem.necsa.co.za

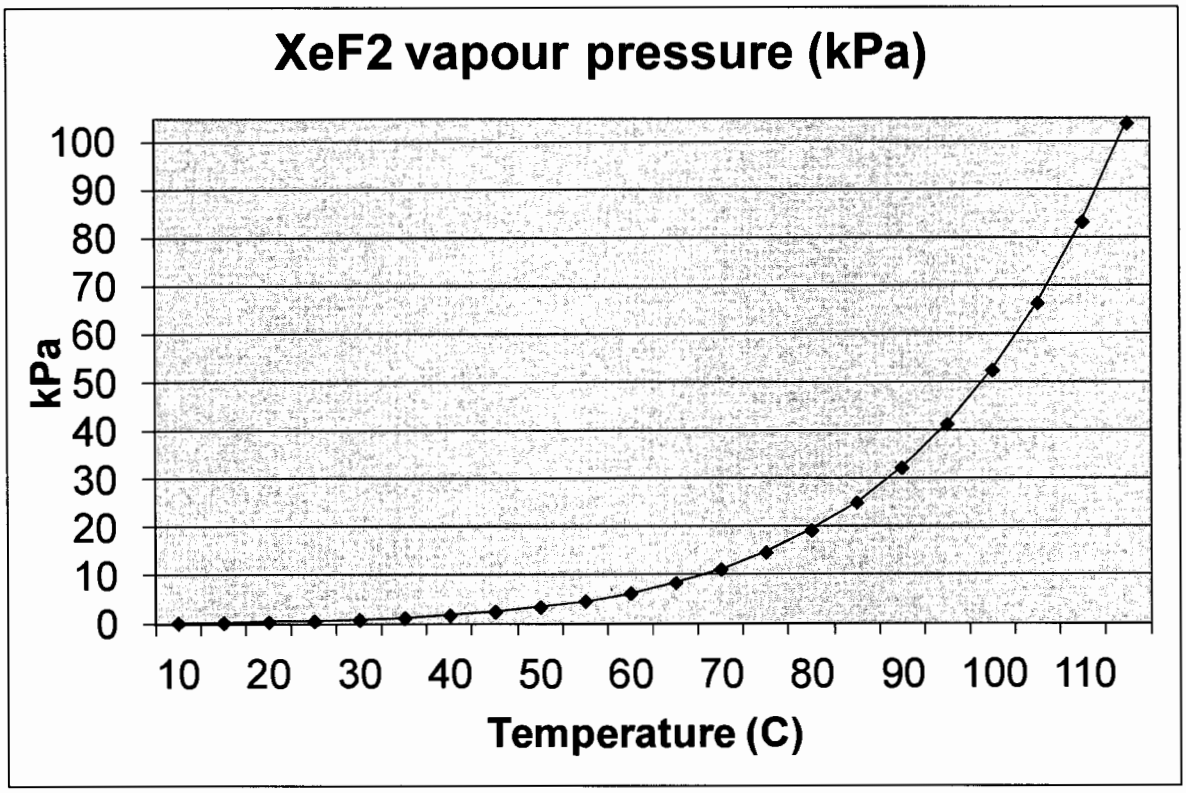
Respectfully submitted

EG Valkenburgh
Chief Advisor: Special Projects
Pelchem (Pty) Ltd
South Africa
Office ph +27-12-305 2415
Mobile ph +27-83-628 0831

The Properties, Classification and Packaging of Xenon difluoride

1. XeF_2 Properties

Boiling point: 114°C
Melting point: 129°C
Non flammable
Combustible with cellulose materials
Vapour pressure:
Reference: Gutman, Halogen Chemistry Vol 1, 1976
(Temp range 0 °C - 115 °C)



2. XeF_2 Classification for Transport

UN Transport of Dangerous Goods: Model Regulations Rev 17 of 2011
Volume 1 Par 2.2.1 Gases – definition and general provisions

XeF_2 is does not meet the criteria to be classified as a compressed gas.

XeF_2 is classified as (Supported by tests conducted at an accredited laboratory)

UN 3085 Oxidizing Solid, Corrosive NOS: Xenon difluoride

3. XeF_2 packaging in DOT 3AL cylinders

0.3 liter Catalina cylinder 9001-P
Diameter 51 mm; Height 238 mm
Working pressure: 1800 psi; 124 Bar
Test pressure DOT: 3000 psi; 207 Bar
600 gram max per cylinder in a UN certified outer pack (transport case)

1.0 liter Catalina cylinder 9077-P
Diameter 81 mm; Height 298 mm
Working pressure: 2216 psi; 153 Bar
Test pressure DOT 3693 psi; 255 Bar
2000 gram max per cylinder in a UN certified outer pack (transport case)

3.0 liter Catalina cylinder 9021-P
Diameter 111 mm; Height 422 mm
Working pressure: 2015 psi; 139 Bar
Test pressure DOT: 3358 psi; 232 Bar
5000 gram max per cylinder in a UN certified outer pack (transport case)

15 liter Luxfer cylinder N088
Diameter 184 mm; Height 835 mm
Working pressure: 2216 psi; 153 Bar
Test pressure DOT: 3693 psi; 255 Bar
25 000 gram max in an uncertified over pack (transport case)