SAFETY DATA SHEET

1. Product and Company Identification

Product identifier	**Rx11-Flush Cylinders (4300-15, 4300-26)**
Other means of identification	Not available
Recommended use	For flushing AC and refrigeration systems
Recommended restrictions	None known.
Manufacturer information	Nu-Calgon 2611 Schuetz Road St. Louis, MO 63043 US Phone: 314-469-7000 / 800-554-5499 Emergency Phone: 1-800-424-9300 (CHEMTREC)
Supplier	See above.

2. Hazards Identification

Physical hazards	Gases under pressure	Liquefied gas
Health hazards	Acute toxicity, inhalation	Category 4
	Serious eye damage/eye irritation	Category 2
	Specific target organ toxicity, single exposure	Category 3 narcotic effects
Environmental hazards	Not classified.	
WHMIS 2015 defined hazards	Not classified	
Label elements		

Signal word	Warning
Hazard statement	Contains gas under pressure; may explode if heated. Harmful if inhaled. Causes serious eye irritation. May cause drowsiness or dizziness.
Precautionary statement	
Prevention	Avoid breathing mist or vapor. Use only outdoors or in a well-ventilated area. Wash thoroughly after handling. Wear eye protection.
Response	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER if you feel unwell. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.
Storage	Protect from sunlight. Store in a well-ventilated place. Keep container tightly closed. Store locked up.
Disposal	Dispose of container in accordance with local, regional, national and international regulations.
WHMIS 2015: Health Hazard(s) not otherwise classified (HHNOC)	None known
WHMIS 2015: Physical Hazard(s) not otherwise classified (PHNOC)	None known
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

3. Composition/Information on Ingredients

Mixture

Chemical name	Common name and synonyms	CAS number	%
(E)-1,2-Dichloroethene		156-60-5	40-70*
Butane, 1,1,1,3,3-pentafluoro-		406-58-6	5-10*
Dimethyl carbonate		616-38-6	1-5*

Chemical name	Common name and synonyms	CAS number	%
Ethane, 1,1,1,2-tetrafluoro-		811-97-2	10-30*
Pentane, 1,1,1,2,2,3,4,5,5,5-decafluoro-		138495-42-8	5-10*

All concentrations are in percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

Composition comments US GHS: The exact percentage (concentration) of composition has been withheld as a trade secret in accordance with paragraph (i) of §1910.1200.
*CANADA GHS: The exact percentage (concentration) of composition has been withheld as a trade secret.

4. First Aid Measures

Inhalation IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor if you feel unwell.

Skin contact Flush with cool water. Wash with soap and water. Obtain medical attention if irritation persists.

Eye contact IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

Ingestion Rinse mouth. Do not induce vomiting. If vomiting occurs naturally, have victim lean forward to reduce risk of aspiration. Never give anything by mouth if victim is unconscious or is convulsing. Obtain medical attention.

Most important symptoms/effects, acute and delayed Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause redness and pain.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. In case of shortness of breath, give oxygen. Symptoms may be delayed.

General information Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves. In the case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Use of an impervious apron is recommended. Show this safety data sheet to the doctor in attendance. Avoid contact with eyes and skin. Keep out of reach of children.

5. Fire Fighting Measures

Suitable extinguishing media Alcohol foam. Carbon dioxide. Dry chemical. Fog.

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters Firefighters should wear full protective clothing including self-contained breathing apparatus.

Fire-fighting equipment/instructions In case of fire: Stop leak if safe to do so. Move containers from fire area if you can do so without risk. Cool containers with flooding quantities of water until well after fire is out. For massive fire in cargo area, use unmanned hose holder or monitor nozzles, if possible. If not, withdraw and let fire burn out.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards Contents under pressure. Pressurized container may explode when exposed to heat or flame.

Hazardous combustion products May include and are not limited to: Oxides of carbon.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Avoid inhalation of vapors and spray mists. Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental precautions Avoid discharge into drains, water courses or onto the ground. Do not discharge into lakes, streams, ponds or public waters.

7. Handling and Storage

Precautions for safe handling Do not taste or swallow. Avoid breathing vapor. Avoid contact with eyes, skin and clothing. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Use good industrial hygiene practices in handling this material. When using, do not eat, drink or smoke. Wash thoroughly after handling. Keep container tightly closed.

Conditions for safe storage, including any incompatibilities Store locked up. Store in a closed container away from incompatible materials. Store in a well-ventilated place. Refrigeration recommended. Store away from incompatible materials (see Section 10 of the SDS). Keep out of reach of children.

8. Exposure Controls/Personal Protection

Occupational exposure limits

Canada. Alberta OELs (Occupational Health & Safety Code, Schedule 1, Table 2)

Components	Type	Value
(E)-1,2-Dichloroethene (CAS 156-60-5)	TWA	793 mg/m3
		200 ppm

Canada. British Columbia OELs. (Occupational Exposure Limits for Chemical Substances, Occupational Health and Safety Regulation 296/97, as amended)

Components	Type	Value
(E)-1,2-Dichloroethene (CAS 156-60-5)	TWA	200 ppm

Canada. Manitoba OELs (Reg. 217/2006, The Workplace Safety And Health Act)

Components	Type	Value
(E)-1,2-Dichloroethene (CAS 156-60-5)	TWA	200 ppm

Canada. Ontario OELs. (Control of Exposure to Biological or Chemical Agents)

Components	Type	Value
(E)-1,2-Dichloroethene (CAS 156-60-5)	TWA	200 ppm

Canada. Quebec OELs. (Ministry of Labor - Regulation Respecting the Quality of the Work Environment)

Components	Type	Value
(E)-1,2-Dichloroethene (CAS 156-60-5)	TWA	793 mg/m3
		200 ppm

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
(E)-1,2-Dichloroethene (CAS 156-60-5)	PEL	790 mg/m3
		200 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
(E)-1,2-Dichloroethene (CAS 156-60-5)	TWA	200 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
(E)-1,2-Dichloroethene (CAS 156-60-5)	TWA	790 mg/m3
		200 ppm

US. AIHA Workplace Environmental Exposure Level (WEEL) Guides

Components	Type	Value
Ethane, 1,1,1,2-tetrafluoro- (CAS 811-97-2)	TWA	4240 mg/m3
		1000 ppm

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection	Tightly fitting safety goggles.
Skin protection	
Hand protection	Impervious gloves. Confirm with reputable supplier first. Avoid contact with the skin.
Other	Wear suitable protective clothing. As required by employer code.
Respiratory protection	Where exposure guideline levels may be exceeded, use an approved NIOSH respirator. Respirator should be selected by and used under the direction of a trained health and safety professional following requirements found in OSHA's respirator standard (29 CFR 1910.134), CAN/CSA-Z94.4 and ANSI's standard for respiratory protection (Z88.2).
Thermal hazards	Not applicable.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. When using do not eat or drink.

9. Physical and Chemical Properties

Appearance	Clear
Physical state	Gas.
Form	Liquefied gas.
Color	Colorless
Odor	Slight ethereal.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	Not available.
Initial boiling point and boiling range	105.8 °F (41 °C)
Pour point	Not available.
Specific gravity	Not available.
Partition coefficient (n-octanol/water)	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	> 5
Flammability limit - upper (%)	< 14.4
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	284 mm Hg
Vapor density	3.4 (air = 1)
Relative density	Not available.
Solubility(ies)	0.4 g/100g H2O @ 20°C
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.
Percent volatile	100 %
VOC (Weight %)	697 g/l

10. Stability and Reactivity

Reactivity	May react with strong bases or oxidizing agents. Alkali metals. Powdered metal.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Chemical stability	Material is stable under normal conditions.
Conditions to avoid	Do not mix with other chemicals.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	May include and are not limited to: Oxides of carbon. Hydrogen fluoride.

11. Toxicological Information

Routes of exposure Eye, Skin contact, Inhalation, Ingestion.

Information on likely routes of exposure

Ingestion May cause stomach distress, nausea or vomiting.

Inhalation Harmful if inhaled. May cause drowsiness and dizziness. Headache. Nausea, vomiting.

Skin contact No adverse effects due to skin contact are expected.

Eye contact Causes serious eye irritation.

Symptoms related to the physical, chemical and toxicological characteristics May cause drowsiness and dizziness. Headache. Nausea, vomiting. Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. May cause respiratory irritation.

Information on toxicological effects

Acute toxicity Harmful if inhaled. Narcotic effects.

Components	**Species**	**Test Results**
(E)-1,2-Dichloroethene (CAS 156-60-5)		
Acute		
Dermal		
LD50	Rabbit	> 5000 mg/kg, ECHA
Inhalation		
LC50	Mouse	21723 ppm, 6 Hours
	Rat	> 95552 mg/m3, 4 Hours, ECHA
		> 24100 ppm, 4 Hours, ECHA
Oral		
LD50	Rat	9939 mg/kg, ECHA, female
		7902 mg/kg, ECHA, male
		1235 mg/kg
Butane, 1,1,1,3,3-pentafluoro- (CAS 406-58-6)		
Acute		
Inhalation		
LC50	Rat	100000 ppm, 4 hours, Harp International Limited
Oral		
LD50	Rat	> 2000 mg/kg, Harp International Limited
Dimethyl carbonate (CAS 616-38-6)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg, 24 Hours, ECHA
Inhalation		
LC50	Rat	> 5.4 mg/L
		> 5.4 mg/L, 4 hours, ECHA
Oral		
LD50	-	> 5000 mg/kg
	Rat	> 5000 mg/kg, ECHA

Components	Species	Test Results
Ethane, 1,1,1,2-tetrafluoro- (CAS 811-97-2)		
Acute		
Dermal		
LD50	Not available	
Inhalation		
LC50	Rat	1500000 mg/m³, 4 hours, Sigma Aldrich
Oral		
LD50	Not available	
Pentane, 1,1,1,2,2,3,4,5,5,5-decafluoro- (CAS 138495-42-8)		
Acute		
Dermal		
LD50	Rabbit	> 5000 mg/kg, ECHA
Inhalation		
LC50	Rat	15463 mg/m³, 4 hours, ECHA
		11100 ppm, 4 hours, ECHA
Oral		
LD50	Rat	> 5000 mg/kg, ECHA

Skin corrosion/irritation Prolonged skin contact may cause temporary irritation.

Exposure minutes Not available.

Erythema value Not available.

Oedema value Not available.

Serious eye damage/eye irritation Causes serious eye irritation.

Corneal opacity value Not available.

Iris lesion value Not available.

Conjunctival reddening value Not available.

Conjunctival oedema value Not available.

Recover days Not available.

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity No ingredients listed by IARC, ACGIH, NTP or OSHA.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Teratogenicity Not available.

Specific target organ toxicity - single exposure May cause drowsiness and dizziness.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological Information

Ecotoxicity See below

Ecotoxicological data

Components		Species	Test Results
(E)-1,2-Dichloroethene (CAS 156-60-5)			
Aquatic			
Fish	LC50	Bluegill (Lepomis macrochirus)	120 - 160 mg/L, 96 hours

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential	
Mobility in soil	No data available.
Mobility in general	Not available.
Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal Considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport Information

Transport of Dangerous Goods (TDG) Proof of Classification	Classification Method: Classified as per Part 2, Sections 2.1 – 2.8 of the Transportation of Dangerous Goods Regulations. If applicable, the technical name and the classification of the product will appear below.

U.S. Department of Transportation (DOT)

Basic shipping requirements:

UN number	UN1956
Proper shipping name	Compressed gas, n.o.s
Technical name	Ethane, 1,1,1,2-tetrafluoro-
Hazard class	2.2
Packaging exceptions	306, 307

Transportation of Dangerous Goods (TDG - Canada)

Basic shipping requirements:

UN number	UN1956
Proper shipping name	COMPRESSED GAS, N.O.S.
Hazard class	2.2
Special provisions	16, 148

IATA/ICAO (Air)

Basic shipping requirements:

UN number	UN1956
Proper shipping name	Compressed gas, n.o.s.
Technical name	Ethane, 1,1,1,2-tetrafluoro-
Hazard class	2.2
ERG code	2L

IMDG (Marine Transport)

Basic shipping requirements:

UN number	UN1956
Proper shipping name	COMPRESSED GAS, N.O.S.
Technical name	Ethane, 1,1,1,2-tetrafluoro-
Hazard class	2.2

DOT

IATA; IMDG; TDG

15. Regulatory Information

Canadian federal regulations

This product has been classified in accordance with the hazard criteria of the HPR and the SDS contains all the information required by the HPR.

Prior to importation, please consult with the Ozone-depleting Substances and Halocarbon Alternatives Regulations, SOR/2016-137.

Canada CEPA Schedule I: Listed substance

Butane, 1,1,1,3,3-pentafluoro- (CAS 406-58-6)	Listed.
Ethane, 1,1,1,2-tetrafluoro- (CAS 811-97-2)	Listed.
Pentane, 1,1,1,2,2,3,4,5,5,5-decafluoro- (CAS 138495-42-8)	Listed.

Export Control List (CEPA 1999, Schedule 3)

Not listed.

Greenhouse Gases

Ethane, 1,1,1,2-tetrafluoro- (CAS 811-97-2)
Pentane, 1,1,1,2,2,3,4,5,5,5-decafluoro- (CAS 138495-42-8)

Precursor Control Regulations

Not regulated.

WHMIS 2015 Exemptions

Not applicable

US federal regulations

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

138495-42-8: SNUR: 40 CFR 721.5645

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Pentane, 1,1,1,2,2,3,4,5,5,5-decafluoro- (CAS 138495-42-8)	1.0 % One-Time Export Notification only.

CERCLA Hazardous Substance List (40 CFR 302.4)

(E)-1,2-Dichloroethene (CAS 156-60-5)	Listed.
Dimethyl carbonate (CAS 616-38-6)	Listed.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - Yes
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

No

SARA 311/312 Hazardous chemical

No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
(E)-1,2-Dichloroethene	156-60-5	40-70*

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

US state regulations

See below

US - California Hazardous Substances (Director's): Listed substance

(E)-1,2-Dichloroethene (CAS 156-60-5) Listed.

US - Illinois Chemical Safety Act: Listed substance

(E)-1,2-Dichloroethene (CAS 156-60-5)
Dimethyl carbonate (CAS 616-38-6)

US - Louisiana Spill Reporting: Listed substance

(E)-1,2-Dichloroethene (CAS 156-60-5) Listed.
Dimethyl carbonate (CAS 616-38-6) Listed.

US - Minnesota Haz Subs: Listed substance

(E)-1,2-Dichloroethene (CAS 156-60-5) Listed.
Ethane, 1,1,1,2-tetrafluoro- (CAS 811-97-2) Listed.

US - New Jersey RTK - Substances: Listed substance

(E)-1,2-Dichloroethene (CAS 156-60-5)
Dimethyl carbonate (CAS 616-38-6)

US - Texas Effects Screening Levels: Listed substance

(E)-1,2-Dichloroethene (CAS 156-60-5) Listed.
Butane, 1,1,1,3,3-pentafluoro- (CAS 406-58-6) Listed.
Dimethyl carbonate (CAS 616-38-6) Listed.
Ethane, 1,1,1,2-tetrafluoro- (CAS 811-97-2) Listed.
Pentane, 1,1,1,2,2,3,4,5,5,5-decafluoro- (CAS 138495-42-8) Listed.

US. Massachusetts RTK - Substance List

(E)-1,2-Dichloroethene (CAS 156-60-5)
Dimethyl carbonate (CAS 616-38-6)

US. New Jersey Worker and Community Right-to-Know Act

(E)-1,2-Dichloroethene (CAS 156-60-5)

US. Pennsylvania Worker and Community Right-to-Know Law

(E)-1,2-Dichloroethene (CAS 156-60-5)
Dimethyl carbonate (CAS 616-38-6)

US. Rhode Island RTK

(E)-1,2-Dichloroethene (CAS 156-60-5)

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

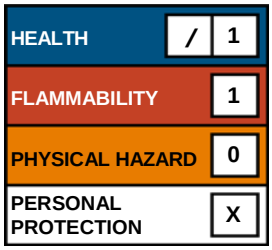
Inventory status

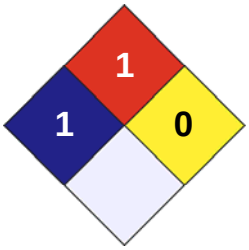
Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

16. Other Information

LEGEND	
Severe	4
Serious	3
Moderate	2
Slight	1
Minimal	0





Disclaimer

The information in the sheet was written based on the best knowledge and experience currently available. Information contained herein was obtained from sources considered technically accurate and reliable. While every effort has been made to ensure full disclosure of product hazards, in some cases data is not available and is so stated. Since conditions of actual product use are beyond control of the supplier, it is assumed that users of this material have been fully trained according to the requirements of all applicable legislation and regulatory instruments. No warranty, expressed or implied, is made and supplier will not be liable for any losses, injuries or consequential damages which may result from the use of or reliance on any information contained in this document.

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Prepared by Nu-Calgon Technical Service Phone: (314) 469-7000

Other information

For an updated SDS, please contact the supplier/manufacturer listed on the first page of the document.