Nitrogen Trifluoride (Compressed)

Safety Data Sheet

according to the Hazardous Products Regulation (February 11, 2015)

Date of issue: 05/24/2017 Version: 1.0

SECTION 1: Identification

1.1. Product identifier

Product form	:	Substance
Substance name	:	Nitrogen Trifluoride (Compressed)
CAS-No.	:	7783-54-2
Product code	:	CA-1001-00484
Formula	:	NF_3
Synonyms	:	Nitrogen fluoride; Trifluorammonia; Trifluoramine

1.2. Recommended use and restrictions on use

Recommended uses and restrictions	:	Manufacture of substances

1.3. Supplier

Air Liquide Canada Inc.
1250, René Lévesque West Blvd. Suite 1700
H3B 5E6 Montreal, QC - Canada
T 1-800-817-7697
www.airliquide.ca

1.4. Emergency telephone number

Emergency number	:	514-878-1667

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

Classification (GHS-CA)

Oxidising Gases, Category 1	H270
Gases under pressure : Liquefied gas	H280
Acute toxicity (inhalation:gas) Category 4	H332
Specific target organ toxicity — Repeated exposure, Category 2	H373

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS-CA labelling

Hazard pictograms (GHS-CA) :

GHS03 GHS04 GHS07 GHS08

Signal word (GHS-CA) : Danger

Hazard statements (GHS-CA) :
H270 - May cause or intensify fire; oxidizer
H280 - Contains gas under pressure; may explode if heated
H332 - Harmful if inhaled
H373 - May cause damage to organs through prolonged or repeated exposure
CGA-HG01 - May cause frostbite
CGA-HG10 - Asphyxiating even with adequate oxygen
CGA-HG11 - Symptoms may be delayed

Precautionary statements (GHS-CA) :
P370+P376 - In case of fire: Stop leak if safe to do so
P501 - Dispose of contents/container in accordance with local/regional/national/international regulations.
P403 - Store in a well-ventilated place
P410+P403 - Protect from sunlight. Store in a well-ventilated place
P220 - Keep away from clothing and other combustible materials
P260 - Do not breathe dust/fume/gas/mist/vapours/spray
P244 - Keep valves and fittings free from oil and grease
P202 - Do not handle until all safety precautions have been read and understood
P312 - Call a POISON CENTER or doctor if you feel unwell
P314 - Get medical advice/attention if you feel unwell
P308+P313 - IF exposed or concerned: Get medical advice/attention
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove

contact lenses, if present and easy to do. Continue rinsing
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P271 - Use only outdoors or in a well-ventilated area
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
P302 - IF ON SKIN:
P336+P315 - Thaw frosted parts with lukewarm water. Do not rub affected area
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52 °C/125 °F
CGA-PG05 - Use a back flow preventive device in the piping
CGA-PG06 - Close valve after each use and when empty
CGA-PG10 - Use only with equipment rated for cylinder pressure
CGA-PG14 - Approach suspected leak area with caution
CGA-PG20 - Use only with equipment of compatible materials of construction and rated for cylinder pressure
CGA-PG21 - Open valve slowly
CGA-PG22 - Use only with equipment cleaned for oxygen service

2.3. Other hazards

Other hazards not contributing to the classification : This product contains a chemical asphyxiant.

2.4. Unknown acute toxicity (GHS-CA)

No data available

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Chemical name/Synonyms	Product identifier	%	Classification (GHS-CA)
Nitrogen Trifluoride (Compressed) (Main constituent)	Nitrogen fluoride; Trifluorammonia; Trifluoramine	(CAS-No.) 7783-54-2	> 99	Ox. Gas 1, H270 Press. Gas (Liq.), H280 Acute Tox. 4 (Inhalation:gas), H332 STOT RE 2, H373

Full text of hazard classes and H-statements : see section 16

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Apply artificial respiration with bag and mask if breathing stopped. Get immediate medical advice/attention.

First-aid measures after skin contact : Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects (acute and delayed)

Symptoms/effects after inhalation : Harmful if inhaled. Asphyxiating even with adequate oxygen.

Symptoms/effects after skin contact : May cause frostbite.

Symptoms/effects after eye contact : Contact with the product may cause cold burns or frostbite.

Symptoms/effects after ingestion : Ingestion is not considered a potential route of exposure.

Symptoms/effects upon intravenous administration : Not known.

Chronic symptoms : May cause damage to organs (blood) through prolonged or repeated exposure.

Most important symptoms and effects, both acute and delayed : Delayed adverse effects possible. Refer to section 11.

4.3. Immediate medical attention and special treatment, if necessary

Other medical advice or treatment : If you feel unwell, seek medical advice. If breathing is difficult, give oxygen.

SECTION 5: Fire-fighting measures

5.1. Suitable extinguishing media

Suitable extinguishing media : Use extinguishing media appropriate for surrounding fire.

5.2. Unsuitable extinguishing media

Unsuitable extinguishing media : Do not use water jet to extinguish.

5.3. Specific hazards arising from the hazardous product

Fire hazard : The product is not flammable.

Explosion hazard : Product is not explosive. Heat may build pressure, rupturing closed containers, spreading fire and increasing risk of burns and injuries.

Hazardous combustion products : If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Hydrogen fluoride. Nitric oxide/nitrogen dioxide.

5.4. Special protective equipment and precautions for fire-fighters

Firefighting instructions : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Exposure to fire may cause containers to rupture/explode.

Protection during firefighting : Standard protective clothing and equipment (e.g, Self Contained Breathing Apparatus) for fire fighters. Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Ensure adequate ventilation.

Personal Precautions, Protective Equipment and Emergency Procedures : EVACUATE ALL PERSONNEL FROM AFFECTED AREA. Use appropriate protective equipment. If leak is on user's equipment, be certain to purge piping before attempting repairs. If leak is on a container or container valve contact the closest Air Liquide Canada location.

6.2. Methods and materials for containment and cleaning up

For containment : Try to stop release if without risk.

Methods for cleaning up : Dispose of contents/container in accordance with local/regional/national/international regulations.

Methods and material for containment and cleaning up : Ventilate area.

6.3. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection"

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area.

Hygiene measures : Do not eat, drink or smoke when using this product.

Additional hazards when processed : Pressurized container: Do not pierce or burn, even after use. Use only with equipment rated for cylinder pressure. Close valve after each use and when empty.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations.

Storage conditions : Do not expose to temperatures exceeding 52 °C/ 125 °F. Keep container closed when not in use. Protect cylinders from physical damage; do not drag, roll, slide or drop. Store in well ventilated area.

Incompatible products : None known.

Incompatible materials : Flammable materials. Combustible materials. Reducing agents.

Conditions for safe storage, including any incompatibilities : Observe all regulations and local requirements regarding storage of containers. Containers should not be stored in conditions likely to encourage corrosion. Container valve guards or caps should be in place. Containers should be stored in the vertical position and properly secured to prevent them from falling over. Stored containers should be periodically checked for general condition and leakage. Keep container below 50°C in a well ventilated place. Segregate from flammable gases and other flammable materials in store. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible materials.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Nitrogen Trifluoride (Compressed) (7783-54-2)		
USA - ACGIH	ACGIH TWA (ppm)	10 ppm
USA - OSHA	OSHA PEL (TWA) (mg/m³)	29 mg/m³

Nitrogen Trifluoride (Compressed) (7783-54-2)		
USA - OSHA	OSHA PEL (TWA) (ppm)	10 ppm
Canada (Quebec)	VEMP (mg/m³)	29 mg/m³
Canada (Quebec)	VEMP (ppm)	10 ppm
Alberta	OEL TWA (mg/m³)	29 mg/m³
Alberta	OEL TWA (ppm)	10 ppm
British Columbia	OEL TWA (ppm)	10 ppm
Manitoba	OEL TWA (ppm)	10 ppm
New Brunswick	OEL TWA (mg/m³)	29 mg/m³
New Brunswick	OEL TWA (ppm)	10 ppm
New Foundland & Labrador	OEL TWA (ppm)	10 ppm
Nova Scotia	OEL TWA (ppm)	10 ppm
Nunavut	OEL STEL (ppm)	20 ppm
Nunavut	OEL TWA (ppm)	10 ppm
Northwest Territories	OEL STEL (ppm)	20 ppm
Northwest Territories	OEL TWA (ppm)	10 ppm
Ontario	OEL TWA (ppm)	10 ppm
Prince Edward Island	OEL TWA (ppm)	10 ppm
Saskatchewan	OEL STEL (ppm)	20 ppm
Saskatchewan	OEL TWA (ppm)	10 ppm
Yukon	OEL STEL (mg/m³)	45 mg/m³
Yukon	OEL STEL (ppm)	15 ppm
Yukon	OEL TWA (mg/m³)	29 mg/m³
Yukon	OEL TWA (ppm)	10 ppm

8.2. Appropriate engineering controls

Appropriate engineering controls : Ensure exposure is below occupational exposure limits (where available). Provide adequate general and local exhaust ventilation. Systems under pressure should be regularly checked for leakages. Oxygen detectors should be used when asphyxiating gases may be released. Consider the use of a work permit system e.g. for maintenance activities.

Environmental exposure controls : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Gloves. Safety glasses. Protective clothing. Safety shoes.

Hand protection:

Wear working gloves when handling gas containers.

Eye protection:

Wear safety glasses with side shields.

Skin and body protection:

Wear suitable protective clothing, e.g. lab coats, coveralls or flame resistant clothing.

Respiratory protection:

None necessary during routine operations. See Sections 5 & 6

Thermal hazard protection:

None necessary during routine operations.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Gas
Appearance	:	Clear, colorless gas.
Colour	:	Colourless
Odour	:	Mouldy.
Odour threshold	:	No data available
pH	:	Not applicable.
Relative evaporation rate (butylacetate=1)	:	No data available
Relative evaporation rate (ether=1)	:	Not applicable for gases and gas mixtures.
Molecular mass	:	71.1 g/mol
Melting point	:	No data available
Freezing point	:	-207 °C
Boiling point	:	No data available
Flash point	:	Not applicable (non-flammable gas)
Critical temperature	:	-38.15 °C
Auto-ignition temperature	:	Not applicable.
Decomposition temperature	:	No data available
Flammability (solid, gas)	:	See Section 2.1 and 2.2
Vapour pressure	:	3670607.53350726 mbar
Vapour pressure at 50 °C	:	No data available
Critical pressure	:	4460 kPa
Relative vapour density at 20 °C	:	2.46
Relative density	:	1.5
Relative gas density	:	Heavier than air
Solubility	:	Water: No data available
Log Pow	:	No data available
Viscosity, kinematic	:	Not applicable.
Viscosity, dynamic	:	Not applicable.
Explosive properties	:	Not applicable (non-flammable gas).
Oxidising properties	:	Not combustible but enhances combustion of other substances. May cause or intensify fire; oxidizer.
Explosive limits	:	Not applicable (non-flammable gas)
Ci	:	1.56

9.2. Other information

Additional information	:	Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	:	None known.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	May react violently with reducing agents. Can form explosive mix with flammable materials.
Conditions to avoid	:	None under recommended storage and handling conditions (see section 7).
Incompatible materials	:	Combustible materials. Flammable materials. Reducing agents.
Hazardous decomposition products	:	Under normal conditions of storage and use hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral)	:	Not classified
Acute toxicity (dermal)	:	Not classified

Acute toxicity (inhalation) : Inhalation:gas: Harmful if inhaled.

Nitrogen Trifluoride (Compressed) (\f)7783-54-2	
LC50 inhalation rat (ppm)	3350 ppm/4h
ATE CA (gases)	3350.00000000 ppmv/4h

Skin corrosion/irritation : Not classified
pH: Not applicable.

Serious eye damage/irritation : Not classified
pH: Not applicable.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

STOT-single exposure : Not classified

STOT-repeated exposure : May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No data available.

12.2. Persistence and degradability

Nitrogen Trifluoride (Compressed) (7783-54-2)	
Persistence and degradability	Not applicable for inorganic gases.

12.3. Bioaccumulative potential

Nitrogen Trifluoride (Compressed) (7783-54-2)	
Bioaccumulative potential	No data available.

12.4. Mobility in soil

Nitrogen Trifluoride (Compressed) (7783-54-2)	
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

GWP 100 years : 17200

Effect on ozone layer : No known effects from this product.

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste treatment methods : Contact supplier if guidance is required. Do not discharge into any place where its accumulation could be dangerous. Ensure that the emission levels from local regulations or operating permits are not exceeded.

Product/Packaging disposal recommendations : Refer to the CGA Pamphlet P-63 "Disposal of Gases" available at www.cganet.com for more guidance on suitable disposal methods.

SECTION 14: Transport information

14.1. Basic shipping description

In accordance with TDG

Transportation of Dangerous Goods

UN-No. (TDG) : UN2451

TDG Primary Hazard Classes : 2.2 - Class 2.2 - Non-Flammable, Non-Toxic Gas.

TDG Subsidiary Classes : 5.1

Transport Document Description : UN2451 NITROGEN TRIFLUORIDE, 2.2 (5.1)

Proper Shipping Name	:	NITROGEN TRIFLUORIDE
Hazard labels (TDG)	:	2.2 - Non-flammable, non-toxic gases 5.1 - Oxidizing substances

TDG Special Provisions	:	38 - A person must not handle, offer for transport or transport these dangerous goods in a large means of containment if they are in direct contact with the large means of containment. SOR/2014-306
ERAP Index	:	25
Explosive Limit and Limited Quantity Index	:	0
Passenger Carrying Ship Index	:	Forbidden
Excepted quantities (TDG)	:	E0
Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index	:	75 L

14.2. Transport information/DOT - USA

Department of Transport

DOT NA no.	:	UN2451
UN-No.(DOT)	:	2451
Transport Document Description	:	UN2451 Nitrogen trifluoride, 2.2 (5.1)
Proper Shipping Name (DOT)	:	Nitrogen trifluoride
Contains Statement Field Selection (DOT)	:	DOT_TECHNICAL - Proper Shipping Name - Technical (DOT)
Class (DOT)	:	2.2 - Class 2.2 - Non-flammable compressed gas 49 CFR 173.115
Division (DOT)	:	2.2
Hazard labels (DOT)	:	2.2 - Non-flammable gas 5.1 - Oxidiser

Dangerous for the environment	:	No
DOT Packaging Exceptions (49 CFR 173.xxx)	:	None
DOT Packaging Non Bulk (49 CFR 173.xxx)	:	302
DOT Packaging Bulk (49 CFR 173.xxx)	:	None
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	75 kg
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	150 kg
DOT Vessel Stowage Location	:	D - The material must be stowed ‘‘on deck only’’ on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers or one passenger per each 3 m of overall vessel length, but the material is prohibited on passenger vessels in which the limiting number of passengers is exceeded.
DOT Vessel Stowage Other	:	40 - Stow ‘‘clear of living quarters’’
Emergency Response Guide (ERG) Number	:	122

Special transport precautions	:	Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: - Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.
Other information	:	No supplementary information available.

14.3. Air and sea transport

IMDG

UN-No. (IMDG)	:	2451
Proper Shipping Name (IMDG)	:	NITROGEN TRIFLUORIDE
Transport Document Description (IMDG)	:	UN 2451 NITROGEN TRIFLUORIDE, 2
Class (IMDG)	:	2 - Gases
MFAG-No	:	122
Ship Safety Act	:	Gases under pressure/Gases nonflammable nontoxic under pressure(Dangerous Goods Notification Schedule first second and third Article Dangerous Goods Regulations)
Port Regulation Law	:	Hazardous materials/High pressure gas (Article 21, Paragraph 2 of Law, Article 12 rule, notice attached table that defines the type of dangerous goods)

IATA

UN-No. (IATA)	:	2451
Proper Shipping Name (IATA)	:	NITROGEN TRIFLUORIDE
Transport Document Description (IATA)	:	UN 2451 NITROGEN TRIFLUORIDE, 2.2
Class (IATA)	:	2.2 - Gases : Non-flammable, non-toxic
Civil Aeronautics Law	:	Gases under pressure/Gases nonflammable nontoxic under pressure(Hazardous materials notice Appended Table 1 Article 194 of the Enforcement Regulations)

SECTION 15: Regulatory information

15.1. National regulations

Nitrogen Trifluoride (Compressed) (7783-54-2)
Listed on the Canadian DSL (Domestic Substances List)

15.2. International regulations

Nitrogen Trifluoride (Compressed) (7783-54-2)
Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory
Listed on the Japanese ISHL (Industrial Safety and Health Law)
Listed on the Korean ECL (Existing Chemicals List)
Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)
Listed on the United States TSCA (Toxic Substances Control Act) inventory
Listed on INSQ (Mexican National Inventory of Chemical Substances)

SECTION 16: Other information

Date of issue : 05/24/2017

Full text of H-statements:

H270	May cause or intensify fire; oxidizer
H280	Contains gas under pressure; may explode if heated
H332	Harmful if inhaled
H373	May cause damage to organs through prolonged or repeated exposure

SDS Canada (GHS)