ChemicalBook

Chemical Safety Data Sheet MSDS / SDS

Nitrogen trifluoride

Revision Date:2025-01-11 Revision Number:1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product identifier

Product name	: Nitrogen trifluoride
CBnumber	: CB7152340
CAS	: 7783-54-2
EINECS Number	: 232-007-1
Synonyms	: NF3,Nitrogen trifluoride

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	: For R&D use only. Not for medicinal, household or other use.
Uses advised against	: none

Company Identification

Company	: Chemicalbook
Address	: Building 1, Huihuang International, Shangdi 10th Street, Haidian District, Beijing
Telephone	: 400-158-6606

SECTION 2: Hazards identification

Classification of the substance or mixture

Oxidizing gases, Category 1

Gases under pressure: Liquefied gas

Acute toxicity - Category 4, Inhalation

Specific target organ toxicity – repeated exposure, Category 2

Label elements

Pictogram(s)

□□□□

Signal word Danger

Hazard statement(s)

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

Precautionary statement(s)

Prevention

P220 Keep away from clothing and other combustible materials.

P244 Keep valves and fittings free from oil and grease.

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P271 Use only outdoors or in a well-ventilated area.

P260 Do not breathe dust/fume/gas/mist/vapours/spray.

Response

P370+P376 In case of fire: Stop leak if safe to do so.

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P317 Get medical help.

P319 Get medical help if you feel unwell.

Storage

P403 Store in a well-ventilated place.

P410+P403 Protect from sunlight. Store in a well-ventilated place.

Disposal

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards

no data available

SECTION 3: Composition/information on ingredients

Substance

Product name	: Nitrogen trifluoride
Synonyms	: NF3,Nitrogen trifluoride
CAS	: 7783-54-2
EC number	: 232-007-1
MF	: F3N
MW	: 71

SECTION 4: First aid measures

Description of first aid measures

If inhaled

Fresh air, rest.

Following skin contact

Remove contaminated clothes.

Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Following ingestion

Rinse mouth with water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Call a doctor or Poison Control Center immediately.

Most important symptoms and effects, both acute and delayed

Excerpt from ERG Guide 122 [Gases - Oxidizing (Including Refrigerated Liquids)]: Vapors may cause dizziness or asphyxiation without warning. Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite. Fire may produce irritating and/or toxic gases. (ERG, 2016)

Indication of any immediate medical attention and special treatment needed

Immediate first aid: Ensure that adequate decontamination has been carried out. If patient is not breathing, start artificial respiration, preferably with a demand-valve resuscitator, bag-valve-mask device, or pocket mask, as trained. Perform CPR if necessary. Immediately flush contaminated eyes with gently flowing water. Do not induce vomiting. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain an open airway and prevent aspiration. Keep patient quiet and maintain normal body temperature. Obtain medical attention. Fluorine and Related Compounds

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SECTION 5: Firefighting measures

Extinguishing media

Do not extinguish the fire unless the flow of gas can be stopped and any remaining gas is out of the line. Specially trained personnel may use fog lines to cool exposures and let the fire burn itself out. Vapors are heavier than air and will collect in low areas. Containers may explode in fire. Storage containers and parts of containers may rocket great distances, in many directions. If material or contaminated runoff enters waterways, notify downstream users of potentially contaminates waters. Notify local health and fire officials and pollution control agencies. From a secure, explosion-proof location, use water spray to cool exposed containers. If cooling streams are ineffective (venting sound increases in volume and pitch, tank discolors, or shows any signs of deforming), withdraw immediately to a secure location. ... The only respirators recommended for firefighting are self-contained breathing apparatuses that have full face-pieces and are operated in a pressure-demand or other positive-pressure mode.

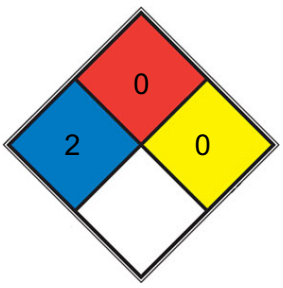
Specific Hazards Arising from the Chemical

Excerpt from ERG Guide 122 [Gases - Oxidizing (Including Refrigerated Liquids)]: Substance does not burn but will support combustion. Some may react explosively with fuels. May ignite combustibles (wood, paper, oil, clothing, etc.). Vapors from liquefied gas are initially heavier than air and spread along ground. Runoff may create fire or explosion hazard. Containers may explode when heated. Ruptured cylinders may rocket. (ERG, 2016)

Advice for firefighters

In case of fire in the surroundings, use appropriate extinguishing media. In case of fire: keep cylinder cool by spraying with water.

NFPA 704



■	HEALTH	2	Intense or continued but not chronic exposure could cause temporary incapacitation or possible residual injury (e.g. diethyl ether, ammonium phosphate, iodine)
■	FIRE	0	Materials that will not burn under typical fire conditions, including intrinsically noncombustible materials such as concrete, stone, and sand. Materials that will not burn in air when exposed to a temperature of 820 °C (1,500 °F) for a period of 5 minutes.(e.g. Carbon tetrachloride)
■	REACT	0	Normally stable, even under fire exposure conditions, and is not reactive with water (e.g. helium,N2)
□	SPEC. HAZ.		

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Ventilation. NEVER direct water jet on liquid. Personal protection: self-contained breathing apparatus.

Environmental precautions

Ventilation. NEVER direct water jet on liquid. Personal protection: self-contained breathing apparatus.

Methods and materials for containment and cleaning up

If in a building, evacuate building and confine vapors by closing doors and shutting down HVAC systems. Restrict persons not wearing protective equipment from area of spill or leak until cleanup is complete. Remove all ignition sources. Ventilate area of spill or leak to disperse the gas. Wear chemical protective suit with self-contained breathing apparatus to combat spills. Stay upwind and use water spray to "knock down" vapor; contain runoff. Stop the flow of gas, if it can be done safely from a distance. If source is a cylinder and the leak cannot be stopped in place, remove the leaking cylinder to a safe place, and repair leak or allow cylinder to empty. Keep this chemical out of confined spaces, such as a sewer, because of the possibility of explosion, unless the sewer is designed to prevent the buildup of explosive concentrations.

SECTION 7: Handling and storage

Precautions for safe handling

NO contact with flammables. NO contact with reducing agents. Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

Conditions for safe storage, including any incompatibilities

Fireproof if in building. Separated from combustible substances and reducing agents. Cool.Store separately in an area isolated from flammables, combustibles, or other yellow coded materials. ... High concentrations cause a deficiency of oxygen with the risk of unconsciousness or death. Check that oxygen content is at least 19% before entering storage or spill area.

SECTION 8: Exposure controls/personal protection

Control parameters

Occupational Exposure limit values

TLV: 10 ppm as TWA; BEI issued

Biological limit values

no data available

Exposure controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

Individual protection measures

Eye/face protection

Wear safety goggles.

Skin protection

Wear fire/flame resistant and impervious clothing. Handle with gloves. Gloves must be inspected prior to use. Wash and dry hands. The selected protective gloves have to satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it.

Respiratory protection

Use ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties

Information on basic physicochemical properties

Physical state	colorless gas
Colour	Colorless gas [Note: Shipped as a nonliquified compressed gas]
Odour	Moldy odor
Melting point/freezing point	-207°C
Boiling point or initial boiling point and boiling range	-129°C
Flammability	Nonflammable Gas
Lower and upper explosion limit/flammability limit	no data available
Flash point	no data available
Auto-ignition temperature	no data available
Decomposition temperature	no data available
pH	no data available
Kinematic viscosity	no data available
Solubility	Slight (NIOSH, 2016)
Partition coefficient n-octanol/water	no data available
Vapour pressure	greater than 1 atm (NIOSH, 2016)
Density and/or relative density	1.361 g/cm3

Relative vapour density	2.46
Particle characteristics	no data available

SECTION 10: Stability and reactivity

Reactivity

Decomposes on heating. This produces toxic fumes including fluoride. The substance is a strong oxidant. It reacts with combustible and reducing materials. Reacts violently with ammonia, carbon monoxide, diborane, hydrogen, hydrogen sulfide, methane and tetrafluorohydrazine. This generates explosion hazard. Attacks metals. The substance is decomposed by electric sparks.

Chemical stability

no data available

Possibility of hazardous reactions

This material is a nonflammable gas.The gas is heavier than air and may accumulate in lowered spaces causing a deficiency of oxygen.NITROGEN TRIFLUORIDE is a very powerful oxidizing agent. Presents dangerous fire hazard in the presence of reducing agents. Etches glass in the presence of moisture. Emits toxic and corrosive fumes of fluoride when heated to decomposition [Lewis, 3rd ed., 1993, p. 937]. Can react violently with hydrogen, ammonia, carbon monoxide, diborane, hydrogen sulfide, methane, tetrafluorohydrazine, charcoal. Explosive reaction with chlorine dioxide. A severe explosion may occur when exposed to reducing agents under pressure [Bretherick, 5th ed., 1995, p. 1427].

Conditions to avoid

no data available

Incompatible materials

Can react violently with /ammonia/, /carbon monoxide/, diborane, /hydrogen/, /hydrogen sulfide/, /methane/, tetrafluorohydrazine. Can react vigorously with reducing materials.

Hazardous decomposition products

Decomposed by electric sparks.

SECTION 11: Toxicological information

Acute toxicity

- Oral: no data available
- Inhalation: LC50 Mouse inhalation 7500 ppm/1 hr
- Dermal: no data available

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

no data available

Reproductive toxicity

no data available

STOT-single exposure

no data available

STOT-repeated exposure

The substance may have effects on the liver and kidneys. Repeated or prolonged inhalation may cause fluorosis.

Aspiration hazard

A harmful concentration of this gas in the air will be reached very quickly on loss of containment.

SECTION 12: Ecological information

Toxicity

Toxicity to fish: no data available

Toxicity to daphnia and other aquatic invertebrates: no data available

Toxicity to algae: no data available

Toxicity to microorganisms: no data available

Persistence and degradability

no data available

Bioaccumulative potential

no data available

Mobility in soil

no data available

Toxics Screening Level

The initial threshold screening level (ITSL) for nitrogen trifluoride is 290 µg/m3 based on an 8 hr. averaging time.

Other adverse effects

no data available

SECTION 13: Disposal considerations

Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

SECTION 14: Transport information

UN Number

ADR/RID: UN2451 (For reference only, please check.)

IMDG: UN2451 (For reference only, please check.)

IATA: UN2451 (For reference only, please check.)

UN Proper Shipping Name

ADR/RID: NITROGEN TRIFLUORIDE (For reference only, please check.)

IMDG: NITROGEN TRIFLUORIDE (For reference only, please check.)

IATA: NITROGEN TRIFLUORIDE (For reference only, please check.)

Transport hazard class(es)

ADR/RID: 2.2 (For reference only, please check.)

IMDG: 2.2 (For reference only, please check.)

IATA: 2.2 (For reference only, please check.)

Packing group, if applicable

ADR/RID: (For reference only, please check.)

IMDG: (For reference only, please check.)

IATA: (For reference only, please check.)

Environmental hazards

ADR/RID: No

IMDG: No

IATA: No

Special precautions for user

no data available

Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

Safety, health and environmental regulations specific for the product in question

European Inventory of Existing Commercial Chemical Substances (EINECS)

Listed.

EC Inventory

Listed.

United States Toxic Substances Control Act (TSCA) Inventory

Listed.

China Catalog of Hazardous chemicals 2015

Listed.

New Zealand Inventory of Chemicals (NZIoC)

Not Listed.

PICCS

Listed.

Vietnam National Chemical Inventory

Not Listed.

IECSC

Listed.

Korea Existing Chemicals List (KECL)

Listed.

SECTION 16: Other information

Abbreviations and acronyms

CAS: Chemical Abstracts Service

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

RID: Regulation concerning the International Carriage of Dangerous Goods by Rail

IMDG: International Maritime Dangerous Goods

IATA: International Air Transportation Association

TWA: Time Weighted Average

STEL: Short term exposure limit

LC50: Lethal Concentration 50%

LD50: Lethal Dose 50%

EC50: Effective Concentration 50%

References

IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home

HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm

IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/

eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?

pageID=0&request_locale=en

CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple

ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp

ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg

Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp

ECHA - European Chemicals Agency, website: https://echa.europa.eu/

Other Information

Density of the liquid at boiling point: 1.885 kg/l.The odour warning when the exposure limit value is exceeded is insufficient.Methemoglobinemia has been observed in animals, but relevance to humans is unclear.Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.Wear protective equipment during this operation.Check oxygen content before entering area.High concentrations in the air cause a deficiency of oxygen with the risk of unconsciousness or death.