

Danger



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

1.1. Product identifier

Trade name : Nitrogen trifluoride
 SDS no : 091
 Chemical description : Nitrogen trifluoride
 CAS No : 7783-54-2
 EC No : 232-007-1
 EC Index No : ---
 Registration-No. : 01-2119962459-23
 Chemical formula : NF3

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

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.
 Test gas/Calibration gas.
 Laboratory use.
 Chemical reaction / Synthesis.
 Use for manufacture of electronic/photovoltaic components.
 Contact supplier for more information on uses.

Uses advised against : Consumer use.

1.3. Details of the supplier of the safety data sheet

Company identification : SOL SpA
 Via G. Borgazzi 27
 20900 MONZA Italia
 +39 039 23.96.1
<http://www.sol.it>
msds@sol.it

1.4. Emergency telephone number

Emergency telephone number : Linea verde SET - 800452661 (24h/24h, 365 giorni l'anno)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

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

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP)



Signal word (CLP)

: Danger

Hazard statements (CLP)

: 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 statements (CLP)

- Prevention : P220 - Keep away from combustible materials.
P260 - Do not breathe gas, vapours.
P244 - Keep valves and fittings free from oil and grease.
- Response : P370+P376 - In case of fire: stop leak if safe to do so.
P304+P340+P315 - IF INHALED : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get immediate medical advice / attention.
- Storage : P403 - Store in a well-ventilated place.

2.3. Other hazards

: Contact with liquid may cause cold burns/frostbite.

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Nitrogen trifluoride	(CAS No) 7783-54-2 (EC No) 232-007-1 (EC Index No) --- (Registration-No.) 01-2119962459-23	100	Ox. Gas 1, H270 Press. Gas (Liq.), H280 Acute Tox. 4 (Inhalation:gas), H332 STOT RE 2, H373

Contains no other components or impurities which will influence the classification of the product.

Full text of H-statements see section 16.

3.2. Mixtures : Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

- Inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Perform cardiopulmonary resuscitation if breathing stopped.
- Skin contact : In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.
For liquid spillage - flush with water for at least 15 minutes.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.

4.2. Most important symptoms and effects, both acute and delayed Most important symptoms and effects, both acute and delayed

: Delayed adverse effects possible.
Prolonged or repeated exposure may affect the red blood cells and haemoglobin.
Refer to section 11.

4.3. Indication of any immediate medical attention and special treatment needed

: Obtain medical assistance.

SECTION 5: Fire-fighting measures**5.1. Extinguishing media**

- Suitable extinguishing media : Water spray or fog.
Carbon dioxide.
- Unsuitable extinguishing media : Dry powder.
Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

- Specific hazards : Exposure to fire may cause containers to rupture/explode.
Supports combustion.
- 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.

5.3. Advice for firefighters

- Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
If possible, stop flow of product.
Use water spray or fog to knock down fire fumes if possible.
Move containers away from the fire area if this can be done without risk.
- Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters.

SECTION 6: Accidental release measures**6.1. Personal precautions, protective equipment and emergency procedures**

- : Try to stop release.
Evacuate area.
Monitor concentration of released product.
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Eliminate ignition sources.
Ensure adequate air ventilation.
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
Act in accordance with local emergency plan.
Stay upwind.

6.2. Environmental precautions

- : Try to stop release.

6.3. Methods and material for containment and cleaning up

- : Ventilate area.

6.4. Reference to other sections

: See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Safe use of the product

: The product must be handled in accordance with good industrial hygiene and safety procedures.
Only experienced and properly instructed persons should handle gases under pressure.
Consult supplier for specific recommendations.
Consider pressure relief device(s) in gas installations.
Ensure the complete gas system was (or is regularly) checked for leaks before use.
Do not smoke while handling product.
Use no oil or grease.
Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
Avoid suck back of water, acid and alkalis.
Keep away from ignition sources (including static discharges).
Do not breathe gas.
Avoid release of product into atmosphere.
For more guidance on safe use, refer to the EIGA Doc.92 "Code of practice Nitrogen trifluoride", downloadable at <http://www.eiga.org> and consult your supplier.

Safe handling of the gas receptacle

: Refer to supplier's container handling instructions.
Do not allow backfeed into the container.
Protect cylinders from physical damage; do not drag, roll, slide or drop.
When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.
Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.
Never attempt to repair or modify container valves or safety relief devices.
Damaged valves should be reported immediately to the supplier.
Keep container valve outlets clean and free from contaminants particularly oil and water.
Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
Close container valve after each use and when empty, even if still connected to equipment.
Never attempt to transfer gases from one cylinder/container to another.
Never use direct flame or electrical heating devices to raise the pressure of a container.
Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.
Open valve slowly to avoid pressure shock.

7.2. 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.

7.3. Specific end use(s)

: None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

OEL (Occupational Exposure Limits) : No data available.

Nitrogen trifluoride (7783-54-2)	
DNEL: Derived no effect level (Workers)	
Acute - local effects, inhalation	44 mg/m ³
Acute - systemic effects, inhalation	44 mg/m ³
Long-term - systemic effects, inhalation	29 mg/m ³

PNEC (Predicted No-Effect Concentration) : No data available.

8.2. Exposure controls

8.2.1. Appropriate engineering controls

: Provide adequate general and local exhaust ventilation.
 Product to be handled in a closed system.
 Systems under pressure should be regularly checked for leakages.
 Ensure exposure is below occupational exposure limits (where available).
 Gas detectors should be used when toxic gases may be released.
 Consider the use of a work permit system e.g. for maintenance activities.

8.2.2. Individual protection measures, e.g. personal protective equipment

: A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered:
 PPE compliant to the recommended EN/ISO standards should be selected.

• Eye/face protection

: Wear safety glasses with side shields.
 Wear goggles when transfilling or breaking transfer connections.
 Standard EN 166 - Personal eye-protection - specifications

• Skin protection

- Hand protection

: Wear working gloves when handling gas containers.
 Standard EN 388 - Protective gloves against mechanical risk.

- Other

: Wear safety shoes while handling containers.
 Standard EN ISO 20345 - Personal protective equipment - Safety footwear.

• Respiratory protection

: Keep self contained breathing apparatus readily available for emergency use.
 Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
 Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.

• Thermal hazards

: None necessary.

8.2.3. Environmental exposure controls

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

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

Physical state at 20°C / 101.3kPa

: Gas.

Colour

: Colourless.

Odour

: Mouldy.

Odour threshold

: Odour threshold is subjective and inadequate to warn of overexposure.

pH value

: Not applicable.

Molar mass

: 71 g/mol

Melting point

: -207 °C

Boiling point

: -129 °C

Flash point	: Not applicable for gases and gas mixtures.
Critical temperature [°C]	: -39 °C
Evaporation rate (ether=1)	: Not applicable for gases and gas mixtures.
Flammability range	: Non flammable.
Vapour pressure [20°C]	: Not applicable.
Vapour pressure [50°C]	: Not applicable.
Relative density, gas (air=1)	: 2.4
Relative density, liquid (water=1)	: 1.5
Solubility in water	: 61 mg/l
Partition coefficient n-octanol/water [log Kow]	: Not applicable for inorganic gases.
Auto-ignition temperature	: Not applicable.
Viscosity [20°C]	: Not applicable.
Explosive Properties	: Not applicable.
Oxidising Properties	: Oxidiser.
- Coefficient of oxygen equivalency (Ci)	: 1.6

9.2. Other information

Other data	: Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.
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SECTION 10: Stability and reactivity**10.1. Reactivity**

: No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

: Stable under normal conditions.

10.3. Possibility of hazardous reactions

: Violently oxidises organic material.

10.4. Conditions to avoid

: None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

: May react violently with reducing agents.
May react violently with combustible materials.
For additional information on compatibility refer to ISO 11114.

10.6. 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	: Harmful if inhaled
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LC50 inhalation rat (ppm)	3350 ppm/4h
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Skin corrosion/irritation	: No known effects from this product.
Serious eye damage/irritation	: No known effects from this product.
Respiratory or skin sensitisation	: No known effects from this product.
Germ cell mutagenicity	: No known effects from this product.
Carcinogenicity	: No known effects from this product.

Toxic for reproduction : Fertility	: No known effects from this product.
Toxic for reproduction : unborn child	: No known effects from this product.
STOT-single exposure	: Damage to red blood cells (haemolytic poison).
STOT-repeated exposure	: Prolonged or repeated exposure may affect the red blood cells and haemoglobin. May cause damage to organs through prolonged or repeated exposure
Target organ(s)	: heart liver blood
Aspiration hazard	: Not applicable for gases and gas mixtures.

SECTION 12: Ecological information

12.1. Toxicity

Assessment	: Product / Substance is a gas. Study scientifically unjustified.
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EC50 48h - Daphnia magna [mg/l]	No data available.
EC50 72h - Algae [mg/l]	No data available.
LC50 96 h - Fish [mg/l]	No data available.

12.2. Persistence and degradability

Assessment	: Not applicable for inorganic gases. Study scientifically unjustified.
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12.3. Bioaccumulative potential

Assessment	: Study scientifically unjustified. Product is an inorganic gas with a low potential to bioaccumulate in aquatic species.
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12.4. Mobility in soil

Assessment	: Because of its high volatility, the product is unlikely to cause ground or water pollution. Study scientifically unjustified.
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12.5. Results of PBT and vPvB assessment

Assessment	: Not classified as PBT or vPvB.
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12.6. Other adverse effects

Effect on the ozone layer	: None.
Global warming potential [CO ₂ =1]	: 17200
Effect on global warming	: When discharged in large quantities may contribute to the greenhouse effect. Contains Fluorinated greenhouse gases covered by the Kyoto protocol.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

	Avoid discharge to atmosphere. 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. Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at http://www.eiga.org for more guidance on suitable disposal methods.
List of hazardous waste codes (from Commission Decision 2001/118/EC)	: 16 05 04 *: Gases in pressure containers (including halons) containing dangerous substances.

13.2. Additional information

: None.

SECTION 14: Transport information

14.1. UN number

UN-No. : 2451

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : NITROGEN TRIFLUORIDE

Transport by air (ICAO-TI / IATA-DGR) : NITROGEN TRIFLUORIDE

Transport by sea (IMDG) : NITROGEN TRIFLUORIDE

14.3. Transport hazard class(es)

Labelling :



2.2 : Non-flammable, non-toxic gases

5.1 : Oxidizing substances

Transport by road/rail (ADR/RID)

Class : 2

Classification code : 20

Hazard identification number : 25

Tunnel Restriction : C/E - Tank carriage : Passage forbidden through tunnels of category C, D and E. Other carriage : Passage forbidden through tunnels of category E

Transport by air (ICAO-TI / IATA-DGR)

Class / Div. (Sub. risk(s)) : 2.2 (5.1)

Transport by sea (IMDG)

Class / Div. (Sub. risk(s)) : 2.2 (5.1)

Emergency Schedule (EmS) - Fire : F-C

Emergency Schedule (EmS) - Spillage : S-W

14.4. Packing group

Transport by road/rail (ADR/RID) : Not applicable

Transport by air (ICAO-TI / IATA-DGR) : Not applicable

Transport by sea (IMDG) : Not applicable

14.5. Environmental hazards

Transport by road/rail (ADR/RID) : None.

Transport by air (ICAO-TI / IATA-DGR) : None.

Transport by sea (IMDG) : None.

14.6. Special precautions for user

Packing Instruction(s)

Transport by road/rail (ADR/RID) : P200

Transport by air (ICAO-TI / IATA-DGR)

Passenger and Cargo Aircraft : 200

Cargo Aircraft only : 200

Transport by sea (IMDG) : P200

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.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

: Not applicable.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
EU-Regulations

Restrictions on use : None.

Seveso Directive : 2012/18/EU (Seveso III) : Covered.

National regulations

National legislation : Ensure all national/local regulations are observed.

Water hazard class (WGK) : -

15.2. Chemical safety assessment

: A CSA has been carried out.

SECTION 16: Other information

Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 2015/830.

Training advice : Users of breathing apparatus must be trained. Ensure operators understand the toxicity hazard.

Further information : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.

Full text of H- and EUH-statements

Acute Tox. 4 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 4
Ox. Gas 1	Oxidising Gases, Category 1
Press. Gas (Liq.)	Gases under pressure : Liquefied gas
STOT RE 2	Specific target organ toxicity — Repeated exposure, Category 2
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



Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Nitrogen trifluoride

SDS reference: 091

Revision date: 02/03/2017

Supersedes:

Version: 1.0

DISCLAIMER OF LIABILITY

: Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
Details given in this document are believed to be correct at the time of going to press.
Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.

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