

Nitrogen trifluoride**091****SECTION 1. Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Trade name : Nitrogen trifluoride , NITROGEN TRIFLUORIDE (N30, N40, N45, UHP)
SDS no : 091
Chemical description : Nitrogen trifluoride
CAS No :7783-54-2
EC No :232-007-1
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. Chemical reaction / Synthesis. Laboratory use.
Contact supplier for more uses information. Use for manufacture of electronic/photovoltaic components.
Uses advised against : Consumer use.

1.3. Details of the supplier of the safety data sheet

Company identification : AIR LIQUIDE Deutschland GmbH
Hans-Günther-Sohl-Straße 5
D-40235 Düsseldorf GERMANY
Telefon: +49 (0)211 6699-0 - Fax: +49 (0)211 6699-222
E-Mail address (competent person) : Info.SDB@AirLiquide.de

1.4. Emergency telephone number

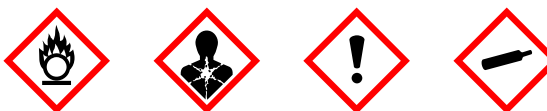
Emergency telephone number : +49 (0)2151 398668
- Availability : (24 / 7)

SECTION 2. Hazards identification**2.1. Classification of the substance or mixture****Hazard Class and Category Code(s), Regulation (EC) No 1272/2008 (CLP)**

- Health hazards : Acute toxicity, Inhalation - Category 4 - Warning - (CLP : Acute Tox. 4) - H332
Specific Target Organ Toxicity - Repeated exposure - Category 2 - Warning - (CLP : STOT RE 2) - H373
- Physical hazards : Oxidizing gases - Category 1 - Danger - (CLP : Ox. Gas 1) - H270
Gases under pressure - Liquefied gas - Warning - (CLP : Press. Gas) - H280

2.2. Label elements**Labelling Regulation EC 1272/2008 (CLP)**

- Hazard pictograms



- Hazard pictograms code : GHS03 - GHS08 - GHS07 - GHS04
- Signal words : Danger
- Hazard 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.



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- Prevention : P260 - Do not breathe gas, vapours.
P244 - Keep valves and fittings free from oil and grease
P220 - Keep away from combustible materials.
- Response : 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.
P370+P376 - In case of fire : Stop leak if safe to do so.
- Storage : P403 - Store in a well-ventilated place.

2.3. Other hazards

Other hazards : None.

SECTION 3. Composition/information on ingredients**3.1. Substance / 3.2. Mixture**

Substance.

Substance name	Content [Vol-%]	CAS No EC No Index No Registration no.	Classification(DSD)	Classification(CLP)
Nitrogen trifluoride	100 %	7783-54-2 232-007-1 ----- 01-2119962459-23-		Ox. Gas 1 (H270) Acute Tox. 4 (H332) Liq. Gas (H280)

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

* 1: Listed in Annex IV / V REACH, exempted from registration.

* 2: Registration deadline not expired.

* 3: Registration not required: Substance manufactured or imported < 1t/y

Full text of R-phrases see chapter 16. Full text of H-statements see chapter 16

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. Apply artificial respiration if breathing stopped.
- Skin contact : For liquid spillage - flush with water for at least 15 minutes.
In case of frostbite spray with water for at least 15 minutes. Apply a sterile dressing. Obtain medical assistance.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.
- Ingestion : Ingestion is not considered a potential route of exposure.

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

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

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

- : Obtain medical assistance.



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SECTION 5. Fire-fighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Carbon dioxide.
Water spray or fog.
- 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 :
Nitric oxide/nitrogen dioxide. Hydrogen fluoride.

5.3. Advice for firefighters

- Specific methods : Move containers away from the fire area if this can be done without risk.
If possible, stop flow of product.
If possible, stop flow of product.
Use fire control measures appropriate to 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.
Use water spray or fog to knock down fire fumes if possible.
- Special protective equipment for fire fighters : Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
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

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

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

- Reference to other sections : See also sections 8 and 13.



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SECTION 7. Handling and storage

7.1. Precautions for safe handling

Safe use of the product

- : Only experienced and properly instructed persons should handle gases under pressure. The product must be handled in accordance with good industrial hygiene and safety procedures.
- Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
- Keep away from ignition sources (including static discharges).
- Use no oil or grease.
- Do not smoke while handling product.
- Keep equipment free from oil and grease.
- Ensure the complete gas system was (or is regularly) checked for leaks before use.
- Avoid suck back of water, acid and alkalis.
- Consider pressure relief device(s) in gas installations.
- 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.
- Do not breathe gas.
- Avoid release of product into atmosphere.

Safe handling of the gas receptacle

- : Open valve slowly to avoid pressure shock.
- Refer to supplier's container handling instructions.
- Do not allow backfeed into the container.
- Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
- Protect cylinders from physical damage; do not drag, roll, slide or drop.
- Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.
- 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.
- Close container valve after each use and when empty, even if still connected to equipment.
- Never attempt to repair or modify container valves or safety relief devices.
- Keep container valve outlets clean and free from contaminants particularly oil and water.
- 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.
- Damaged valves should be reported immediately to the supplier.

7.2. Conditions for safe storage, including any incompatibilities

- : 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. Stored containers should be periodically checked for general condition and leakage.
- Observe all regulations and local requirements regarding storage of containers.
- Containers should not be stored in conditions likely to encourage corrosion. Containers should be stored in the vertical position and properly secured to prevent toppling. Container valve guards or caps should be in place. Keep away from combustible materials.

7.3. Specific end use(s)

- : None.



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SECTION 8. Exposure controls/personal protection

8.1. Control parameters

DNEL: Derived no effect level (Workers)

Nitrogen trifluoride : Inhalation-short term (local) [mg/m3] : 44
: Inhalation-short term (systemic) [mg/m3] : 44
: Inhalation-long term (local) [mg/m3] : 29
: Inhalation-long term (systemic) [mg/m3] : 29

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.
Alarm detectors should be used when toxic gases may be released.
Systems under pressure should be regularly checked for leakages.
Product to be handled in a closed system.
Ensure exposure is below occupational exposure limits (where available).
Consider 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 or goggles when transfilling or breaking transfer connections
Wear safety glasses with side shields
Standard EN 166 - Personal eye-protection.
 - 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 : Gas.
Physical state at 20°C / 101.3kPa : Gas.
Colour : Colourless.
Odour : Mouldy.
Odour threshold : Odour threshold is subjective and inadequate to warn for overexposure.
pH value : Not applicable.
Molar mass [g/mol] : 71

Nitrogen trifluoride**091****SECTION 9. Physical and chemical properties (continued)**

Melting point [°C]	: -207
Boiling point [°C]	: -129
Critical temperature [°C]	: -39
Flash point [°C]	: Not applicable for gases and gas-mixtures.
Evaporation rate (ether=1)	: Not applicable for gases and gas-mixtures.
Flammability range [vol% in air]	: Non flammable.
Vapour pressure [20°C]	: Not applicable.
Relative density, gas (air=1)	: 2.4
Relative density, liquid (water=1)	: 1.5
Solubility in water [mg/l]	: 61
Partition coefficient n-octanol/water [log Pow]	: Not applicable for inorganic gases.
Auto-ignition temperature [°C]	: Not applicable.
Viscosity at 20°C [mPa.s]	: Not applicable.
Explosive Properties	: Not applicable.
Oxidising properties	: Oxidiser.
- Coefficient of oxygen equivalency (Ci) ISO10156:	: 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.

10.5. Incompatible materials: May react violently with combustible materials.
May react violently with reducing agents.
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.



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SECTION 11. Toxicological information

11.1. Information on toxicological effects

Acute toxicity	: No known toxicological effects from this product.
Rat inhalation LC50 [ppm/4h]	: 3350
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.
Carcinogenicity	: No known effects from this product.
Germ cell mutagenicity	: No known effects from this product.
Reproductive toxicity	: No known effects from this product.
STOT-single exposure	: Damage to red blood cells (haemolytic poison).
STOT-repeated exposure	: No known effects from this product.
Aspiration hazard	: Not applicable for gases and gas-mixtures.

SECTION 12. Ecological information

12.1. Toxicity

Assessment : No data available.

12.2. Persistence and degradability

Assessment : Not applicable for inorganic gases.

12.3. Bioaccumulative potential

Assessment : No data available.

12.4. Mobility in soil

Assessment : Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Results of PBT and vPvB assessment

: No data available.

12.6. Other adverse effects

Effect on ozone layer	: None.
Effect on the global warming	: Greenhouse gas
Global warming potential [CO2=1]	: 17200

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.
Refer to the code of practice of ELGA (Doc. 30/10 "Disposal of Gases, downloadable at <http://www.eiga.org>) for more guidance on suitable disposal methods
Ensure that the emission levels from local regulations or operating permits are not exceeded.
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.

Nitrogen trifluoride**091****SECTION 13. Disposal considerations (continued)****SECTION 14. Transport information****14.1. UN number**

UN number : 2451
Labelling ADR, IMDG, IATA



2.2 : Non flammable, non toxic gas.
5.1 : Oxidizing substances.

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)

Transport by road/rail (ADR/RID)
Class : 2
Classification code : 2 O
H.I. nr : 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)
Transport by sea (IMDG)
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) : No

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 : Allowed.
Cargo Aircraft only : Allowed.
Transport by sea (IMDG) : P200
Special precautions for user : - Ensure there is adequate ventilation.
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 :



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Nitrogen trifluoride**091****SECTION 14. Transport information (continued)**

- 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.
- Avoid transport on vehicles where the load space is not separated from the driver's compartment.

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

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 legislation

Restrictions on use : None.
Seveso directive 96/82/EC : Covered

National legislation

- : Ensure all national/local regulations are observed.
- : [German regulations]
BetriebssicherheitsV mit TRBSen insbesondere TRBS 3145 / TRGS 725 "Ortsbewegliche Druckgasbehälter", TRGS 2141, BGR Regel 500 Teil 2.33: "Umgang mit Gasen", GefahrstoffV mit Technischen Regeln Gefährliche Stoffe TRGS insbesondere TRGS 407 "Tätigkeiten mit Gasen - Gefährdungsbeurteilung", TRGS 400, 500, 510, 900.
- 4. BlmschV (Germany) : Listed.
- Water hazard class (WGK) : WGK Germany: 3 - Severe hazard to waters.

15.2. Chemical safety assessment

: A Chemical safety assessment (CSA) has been carried out for this product.

SECTION 16. Other information

- Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010
- Training advice : Users of breathing apparatus must be trained.
- Further information : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.
- List of full text of H-statements in section 3. : H270 - May cause or intensify fire; oxidizer.
H280 - Contains gas under pressure; may explode if heated.
H332 - Harmful if inhaled.
- 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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