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

1.1. Product identifier

Trade name : PROCESS F2 10%/N2

SDS Nr : 301093

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. Process gas for the fluorination of Plastic surfaces. Contact supplier for more uses information.

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 3 - Danger - (CLP : Acute Tox. 3) - H331
Skin corrosion - Category 1A - Danger - (CLP : Skin Corr. 1A) - H314
Specific Target Organ Toxicity - Single exposure - Respiratory tract irritation - Category 3 - Warning - (CLP : STOT SE 3) - H335

• Physical hazards : Oxidizing gases - Category 1 - Danger - (CLP : Ox. Gas 1) - H270
Gases under pressure - Compressed gas - Warning - (CLP : Press. Gas) - H280

Classification EC 67/548 or EC 1999/45

Classification : O; R8
T+; R26
C; R35

2.2. Label elements

Labelling Regulation EC 1272/2008 (CLP)

• Hazard pictograms

• Hazard pictograms code : GHS06 - GHS03 - GHS05 - GHS04

• Signal words : Danger

• Hazard statements : H270 - May cause or intensify fire; oxidizer.
H280 - Contains gas under pressure; may explode if heated.
H314 - Causes severe skin burns and eye damage.
H331 - Toxic if inhaled.

• Supplemental hazard information : EUH071 - Corrosive to respiratory tract.

• Precautionary statements

- Prevention : P260 - Do not breathe gas, vapours.
P280 - Wear protective gloves, protective clothing, eye protection, face protection.
P244 - Keep valves and fittings free from oil and grease
P220 - Keep away from combustible materials.

SECTION 2. Hazards identification (continued)

- 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.
P305+P351+P338+P315 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice / attention.
P303+P361+P353+P315 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. 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.
P405 - Store locked up.

2.3. Other hazards

Other hazards : Corrosive to respiratory tract.

SECTION 3. Composition/information on ingredients

3.1. Substance / 3.2. Mixture

Mixture.

Substance name		Content [Vol-%]	CAS No EC No Index No Registration no.	Classification(DSD)	Classification(CLP)
Fluorine	:	10 %	7782-41-4 231-954-8 009-001-00-0 * 2	O; R8 T+; R26 C; R35	Acute Tox. 1 (H330) Ox. Gas 1 (H270) Skin Corr. 1A (H314) Press. Gas (H280)
Nitrogen	:	90 %	7727-37-9 231-783-9 ----- *1	Not classified (DSD/DPD)	Press. 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 : Remove contaminated clothing. Drench affected area with water for at least 15 minutes.

- 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

: May cause severe chemical burns to skin and cornea. Suitable first-aid treatment should be immediately available. Seek medical advice before using product.
Refer to section 11.
Corrosive to respiratory tract.

SECTION 4. First aid measures (continued)

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

: Obtain medical assistance.
Treat with corticosteroid spray as soon as possible after inhalation

SECTION 5. Fire-fighting measures

5.1. Extinguishing media

Extinguishing media : All known extinguishants can be used.

- Suitable extinguishing media : Water spray or fog.

- Unsuitable extinguishing media : 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 : None that are more toxic than the product itself.

5.3. Advice for firefighters

Specific methods : 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 : Use self-contained breathing apparatus.
Use chemically protective clothing. Former 0131: Use chemically protective clothing.
Standard EN 137 - self-contained open-circuit compressed air breathing apparatus with full face mask.
EN 943-2: Protective clothing against liquid and gaseous chemicals, aerosols and solid particles. Gas-tight chemical protective suits for emergency teams.
Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
EN 469: Protective clothing for firefighters. EN 659: Protective gloves for firefighters.

SECTION 6. Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

: Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Ensure adequate air ventilation.
Eliminate ignition sources.
Evacuate area.
Try to stop release.
Use chemically protective clothing.
Monitor concentration of released product.

6.2. Environmental precautions

: Try to stop release.
Reduce vapour with fog or fine water spray.

6.3. Methods and material for containment and cleaning up

: Wash contaminated equipment or sites of leaks with copious quantities of water.
Hose down area with water.
Ventilate area.

SECTION 6. Accidental release measures (continued)

6.4. Reference to other sections

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 :
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 exposure, obtain special instructions before use.
Do not smoke while handling product.
Keep equipment free from oil and grease.
Only experienced and properly instructed persons should handle gases under pressure.
Ensure the complete gas system was (or is regularily) checked for leaks before use.
Installation of a cross purge assembly between the cylinder and the regulator is recommended.
Purge system with dry inert gas (e.g. helium or nitrogen) before gas is introduced and when system is placed out of service.
The product must be handled in accordance with good industrial hygiene and safety procedures.
Consider pressure relief device(s) in gas installations.

Safe handling of the gas receptacle :
Secure gas cylinder against overturning.
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

Storage :
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.

SECTION 7. Handling and storage (continued)

SECTION 8. Exposure controls/personal protection

8.1. Control parameters

Occupational Exposure Limits

Fluorine

: ILV (EU) - 8 H - [mg/m³] : 1.58
: ILV (EU) - 8 H - [ppm] : 1
: ILV (EU) - 15 min - [mg/m³] : 3.16
: ILV (EU) - 15 min - [ppm] : 2
: AGW (8h) - Germany [mg/m³] TRGS 900 : 1
: AGW (8h) - Germany [ppm] TRGS 900 : 1.6
: Exceeding factor AGW - Germany TRGS 900 : 2

DNEL: Derived no effect level (Workers)

: No data available.

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 shoud be regularily checked for leakages.
Product to be handled in a closed system and under strictly controlled conditions.
Ensure exposure is below occupational exposure limits (where available).
Consider work permit system e.g. for maintenance activities.
Preferably use only permanent leak-tight installations (e.g. welded pipes).

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

: Ensure adequate ventilation.
Keep self contained breathing apparatus readily available for emergency use.
Keep suitable chemically resistant protective clothing readily available for emergency use.
Wear leather safety gloves and safety shoes when handling cylinders.
Wear goggles and a face shield when transfilling or breaking transfer connections
Wear safety glasses with side shields
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
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

: Consider the use of flame resistant safety clothing.
Standard EN ISO 14116 - Limited flame spread materials.
Wear safety shoes while handling containers.
Standard EN ISO 20345 Personal protective equipment - Safety footwear.

• Respiratory protection

: Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmosphere.
Standard EN 137 - self-contained open-circuit compressed air breathing apparatus with full face mask.

• Thermal hazards

: None necessary.

SECTION 8. Exposure controls/personal protection (continued)

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	: Pungent. There may be no odour warning properties, odour is subjective and inadequate to warn of overexposure.
Odour threshold	: Odour threshold is subjective and inadequate to warn for overexposure.
pH value	: Not applicable for gas-mixtures.
Molar mass [g/mol]	: Not applicable for gases and gas-mixtures.
Melting point [°C]	: Not applicable for gas-mixtures.
Boiling point [°C]	: Not applicable for gas-mixtures.
Flash point [°C]	: Not applicable for gas-mixtures.
Evaporation rate (ether=1)	: Not applicable for gas-mixtures.
Flammability range [vol% in air]	: Not applicable for gas-mixtures.
Vapour pressure [20°C]	: Not applicable.
Relative density, gas (air=1)	: Lighter or similar to air.
Solubility in water [mg/l]	: • Nitrogen : 20 • Fluorine : Reacts violently with water. Solubility in water of component(s) of the mixture :
Partition coefficient n-octanol/water [log Pow]	: Not applicable for gas-mixtures.
Viscosity at 20°C [mPa.s]	: Not applicable.
Explosive Properties	: Not applicable.

9.2. Other information

Other data : None.

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

: Reacts with water to form corrosive acids. With water causes rapid corrosion of some metals.

10.4. Conditions to avoid

: Moisture.

10.5. Incompatible materials

: Violently oxidises organic material. May react violently with reducing agents. May react violently with combustible materials. May react violently with alkalis.
For additional information on compatibility refer to ISO 11114

SECTION 10. Stability and reactivity (continued)

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	: Toxic if inhaled.
Rat inhalation LC50 [ppm/4h]	: • Fluorine : 92.5
Skin corrosion/irritation	: Severe corrosion to skin at high concentrations.
Serious eye damage/irritation	: Severe corrosion to the eyes at high concentrations.
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.
Toxic for reproduction : Fertility	: No known effects from this product.
Toxic for reproduction : unborn child	: No known effects from this product.
STOT-single exposure	: Corrosive to respiratory tract.
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

: No data available.

12.2. Persistence and degradability

: No data available.

12.3. Bioaccumulative potential

: No data available.

12.4. Mobility in soil

: No data available.

12.5. Results of PBT and vPvB assessment

: No data available.

12.6. Other adverse effects

: May cause pH changes in aqueous ecological systems.

Effect on ozone layer	: None.
Effect on the global warming	: No known ecological damage caused by this product.

SECTION 13. Disposal considerations

13.1. Waste treatment methods

: Must not be discharged to atmosphere.
Contact supplier if guidance is required.
Refer to the code of practice of EIGA (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 : 16 05 04 - gases in pressure containers (including halons) containing dangerous substances.

13.2. Additional information

: None.

SECTION 14. Transport information

UN number : 3306

Labelling ADR, IMDG, IATA

: 2.3 : Toxic gas.
5.1 : Oxidizing substances.
8 : Corrosive substance.

Land transport (ADR/RID)

H.I. nr : 265
UN proper shipping name : COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S. (Fluorine, Nitrogen)
Transport hazard class(es) : 2
Classification code : 1 TOC
Packing Instruction(s) : P200
Tunnel Restriction : C/D : Passage forbidden through tunnels of category C when carried in tanks. Passage forbidden through tunnels of category D and E.
Environmental hazards : None.

Sea transport (IMDG)

Proper shipping name : COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S. (Fluorine, Nitrogen)
Class : 2.3
Emergency Schedule (EmS) - Fire : F-C
Emergency Schedule (EmS) - Spillage : S-W
Packing instruction : P200
IMDG-Marine pollutant : No

Air transport (ICAO-TI / IATA-DGR)

Proper shipping name (IATA) : COMPRESSED GAS, TOXIC, OXIDIZING, CORROSIVE, N.O.S. (Fluorine, Nitrogen)
Class : 2.3
Passenger and Cargo Aircraft : DO NOT LOAD IN PASSENGER AIRCRAFT.
Cargo Aircraft only : FORBIDDEN.

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 :
- Ensure that containers are firmly secured.

SECTION 14. Transport information (continued)

- 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.

SECTION 15. Regulatory information

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

EU legislation

Seveso directive 96/82/EC : Covered

National legislation

: Ensure all national/local regulations are observed.

- 4. BImschV : Covered

- Water hazard class WGK (Germany) : 1 - Low hazard to waters.

- Other regulations and technical rules (not complete) : [German regulations]
GefahrstoffV, BetriebssicherheitsV, BGRegel 500 Teil 2.33: Umgang mit Gasen, Technische Regel Gase TRG 280, Technische Regeln Gefährliche Stoffe TRGS 400, 500, 510, 900.

15.2. Chemical safety assessment

: A CSA does not need to be carried out for this product.

SECTION 16. Other information

Indication of changes : Revised safety data sheet in accordance with commisssion regulation (EU) No 453/2010

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

List of full text of R-phrases in section 3. : R8 : Contact with combustible material may cause fire.
R26 : Very toxic by inhalation.
R35 : Causes severe burns.

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.
H314 - Causes severe skin burns and eye damage.
H330 - Fatal if inhaled.

Further information : This Safety Data Sheet has been established in accordance with the applicable European Union legislation.
Classification in accordance with calculation methods of regulation (EC) 1272/2008 CLP / (EC) 1999/45 DPD.

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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