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

1.1. Product identifier

Trade name : Sulphur hexafluoride , SULPHUR HEXAFLUORIDE (N30, N38, N48, N58, UHP)
SDS Nr : 110
Chemical description : Sulphur hexafluoride
CAS No :2551-62-4
EC No :219-854-2
Index No :---
Registration-No. : 01-2119458769-17-
Chemical formula : SF6

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 : Do not inhale product on purpose.

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)

• Physical hazards : Gases under pressure - Liquefied gas - Warning - (CLP : Press. Gas) - H280

Classification EC 67/548 or EC 1999/45

Classification : Not included in Annex VI.
No EC labelling required.
Not classified as dangerous substance / mixture.

2.2. Label elements

Labelling Regulation EC 1272/2008 (CLP)

• Hazard pictograms

• Hazard pictograms code : GHS04
• Signal words : Warning
• Hazard statements : H280 - Contains gas under pressure; may explode if heated.
• Precautionary statements

SECTION 2. Hazards identification (continued)

- Storage : P403 - Store in a well-ventilated place.

2.3. Other hazards

Other hazards : Contact with liquid may cause cold burns/frostbite.
Contains Fluorinated greenhouse gases covered by the Kyoto protocol.
Asphyxiant in high concentrations.

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)
Sulphur hexafluoride	:	100 %	2551-62-4 219-854-2 ----- 01-2119458769-17-	Not classified (DSD/DPD)	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 : 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

: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/ consciousness. Victim may not be aware of asphyxiation.

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

: None.

SECTION 5. Fire-fighting measures

5.1. Extinguishing media

- 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.

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

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.
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

: Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Ensure adequate air ventilation.
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.

SECTION 7. Handling and storage

7.1. Precautions for safe handling

Safe use of the product : Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
Do not smoke while handling product.
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.
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 : Suck back of water into the container must be prevented.
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. 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 8. Exposure controls/personal protection

8.1. Control parameters

Occupational Exposure Limits

Sulphur hexafluoride : AGW (8h) - Germany [mg/m³] TRGS 900 : 6100
: AGW (8h) - Germany [ppm] TRGS 900 : 1000
: Exceeding factor AGW - Germany TRGS 900 : 8

DNEL: Derived no effect level (Workers)

Sulphur hexafluoride : Inhalation-long term (local) [mg/m3] : 77900
: Inhalation-long term (local) [mg/m3] : 77900

SECTION 8. Exposure controls/personal protection (continued)

: Inhalation-long term (systemic) [mg/m3] : 77900
: Inhalation-long term (systemic) [mg/m3] : 77900

PNEC: Predicted no effect concentration

Sulphur hexafluoride
: Aqua (freshwater) [mg/l] : 0.15
: Aqua (marine water) [mg/l] : 1.5

8.2. Exposure controls

8.2.1. Appropriate engineering controls
: Provide adequate general and local exhaust ventilation.
Systems under pressure shoud be regularily checked for leakages.
Ensure exposure is below occupational exposure limits (where available).
Oxygen detectors should be used when asphixiating gases may be released.
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.

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

• 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	: No odour warning properties.
Odour threshold	: Odour threshold is subjective and inadequate to warn for overexposure.
Molar mass [g/mol]	: 146
Melting point [°C]	: -50.8
Boiling point [°C]	: -64 (s)
Critical temperature [°C]	: 45.5
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]	: 21 bar

SECTION 9. Physical and chemical properties (continued)

Relative density, gas (air=1)	: 5
Relative density, liquid (water=1)	: 1.4
Solubility in water [mg/l]	: 41
Partition coefficient n-octanol/water [log Pow]	: 1.68
Auto-ignition temperature [°C]	: Not applicable.

9.2. Other information

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

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

: None.

10.4. Conditions to avoid

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

10.5. Incompatible 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	: No known toxicological effects from this product.
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	: No known effects from this product.
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

EC50 48h - Daphnia magna [mg/l] : 247
EC50 72h - Algae [mg/l] : No data available.
LC50-96h - fish [mg/l] : 236

12.2. Persistence and degradability

: Not applicable for inorganic gases.

12.3. Bioaccumulative potential

: No data available.

12.4. Mobility in soil

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

12.5. Results of PBT and vPvB assessment

: Not classified as PBT or vPvB.

12.6. Other adverse effects

Effect on ozone layer : None.
Effect on the global warming : Contains Fluorinated greenhouse gases covered by the Kyoto protocol.
Global warming potential [CO2=1] : 22200

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 EIGA (Doc. 30/10 “Disposal of Gases, downloadable at http://www.eiga.org) for more guidance on suitable disposal methods

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 : 1080
Labelling ADR, IMDG, IATA

: 2.2 : Non flammable, non toxic gas.

Land transport (ADR/RID)

H.I. nr : 20
UN proper shipping name : SULPHUR HEXAFLUORIDE
Transport hazard class(es) : 2
Classification code : 2 A

SECTION 14. Transport information (continued)

Packing Instruction(s)	:	P200
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
Environmental hazards	:	None.

Sea transport (IMDG)

Proper shipping name	:	SULPHUR HEXAFLUORIDE
Class	:	2.2
Emergency Schedule (EmS) - Fire	:	F-C
Emergency Schedule (EmS) - Spillage	:	S-V
Packing instruction	:	P200
IMDG-Marine pollutant	:	No
Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	:	Not applicable.

Air transport (ICAO-TI / IATA-DGR)

Proper shipping name (IATA)	:	SULPHUR HEXAFLUORIDE
Class	:	2.2
Passenger and Cargo Aircraft	:	Allowed.
Packing instruction - Passenger and Cargo Aircraft	:	200
Cargo Aircraft only	:	Allowed.
Packing instruction - Cargo Aircraft only	:	200

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.
- 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

Restrictions on use	:	Not allowed for magnesium die casting in uses above 850 kg/y. (Regulation 842/2006). Not allowed for inflating tyres. (Regulation 842/2006)
Seveso directive 96/82/EC	:	Not covered.

National legislation

	:	Ensure all national/local regulations are observed.
- 4. BImschV (Germany)		
- Water hazard class (WGK)	:	WGK Germany: Not hazardous to waters.
- Other regulations and technical rules (not complete)	:	[German regulations] BetriebssicherheitsV mit TRBSen insbesondere TRBS 3145 / TRGS 725 "Ortsbewegliche Druckgasbehälter", TRGS 2141, BGRegel 500 Teil 2.33: "Umgang mit Gasen", GefahrstoffV mit Technischen Regeln Gefährliche Stoffe TRGS insbesondere TRGS 407 "Tätigkeiten mit

SECTION 15. Regulatory information (continued)

Gasen - Gefährdungsbeurteilung", TRGS 400, 500, 510, 900.

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 commisssion regulation (EU) No 453/2010
Training advice	: The hazard of asphyxiation is often overlooked and must be stressed during operator training.
List of full text of H-statements in section 3.	: H280 - Contains gas under pressure; may explode if heated.
Note	: This Safety Data Sheet has been established in accordance with the applicable European Union legislation.
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.

End of document