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

1.1. Product identifier

Trade name : Gas mixture (5% N2O in CF4)

SDS no : 301033

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. 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)

• Physical hazards : 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 : GHS04

• Signal words : Warning

• Hazard statements : H280 - Contains gas under pressure; may explode if heated.

• Precautionary statements

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

2.3. Other hazards

Other hazards : Asphyxiant in high concentrations.
Contains Fluorinated greenhouse gases covered by the Kyoto protocol.

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)
Tetrafluoromethane (R14)	:		75-73-0 200-896-5 ----- * 2		Liq. Gas (H280)
Nitrous oxide	:		10024-97-2 233-032-0 ----- * 2		Ox. Gas 1 (H270) 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.
- **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.
Refer to section 11.

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

: None.

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.
- **Hazardous combustion products** : Carbon monoxide. Carbonyl fluoride. Hydrogen fluoride. Nitric oxide/nitrogen dioxide.

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.
Use fire control measures appropriate to the surrounding fire. Exposure to fire and heat

SECTION 5. Fire-fighting measures (continued)

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 : In confined space 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

: 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.
Evacuate area.
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 : Do not breathe gas.
Avoid release of product into atmosphere.
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.
Protect eyes, face and skin from liquid splashes.
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 : Secure gas cylinder against overturning.
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.

SECTION 7. Handling and storage (continued)

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.
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

Nitrous oxide

: AGW (8h) - Germany [mg/m³] TRGS 900 : 180

: AGW (8h) - Germany [ppm] TRGS 900 : 100

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.
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

: Wear goggles and a face shield when transfilling or breaking transfer connections
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.

SECTION 8. Exposure controls/personal protection (continued)

- 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	:	Sweetish. Mixture contains one or more component(s) which have the following odour(s): 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)	:	Heavier than air.
Solubility in water [mg/l]	:	• Tetrafluoromethane (R14) : 20 • Nitrous oxide : 2.2 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.
Oxidising properties	:	None.

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

: Violently oxidises organic material.

10.4. Conditions to avoid

: Heat. Pressurized nitrous oxide can also decompose at temperatures equal or greater than 300°C. At temperatures over 575°C and at atmospheric pressure, nitrous oxide decomposes into nitrogen and oxygen.

10.5. Incompatible materials

: May react violently with reducing agents. May react violently with combustible materials. In the presence of catalysts (e.g. halogen products, mercury, nickel, platinum) the rate of decomposition increases and decomposition can occur at even lower temperatures. Keep equipment free from oil and grease.
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.
Rat inhalation LC50 [ppm/4h]	: No data available.
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.
Toxic for reproduction : Fertility	: No known effects from this product.
Toxic for reproduction : unborn child	: 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

Assessment : Classification criteria are not met.

12.2. Persistence and degradability

Assessment : No data available.

12.3. Bioaccumulative potential

Assessment : No data available.

12.4. Mobility in soil

Assessment : No data available.

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 : Contains fluorinated greenhouse gases covered by the Kyoto protocol.
Calculated GWP of mixture : 5554.
For quantities refer to cylinder label.

SECTION 13. Disposal considerations

13.1. Waste treatment methods

: Contact supplier if guidance is required.
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
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 05 - gases in pressure containers other than those mentioned in 16 05 04.

13.2. Additional information

: None.

SECTION 14. Transport information

14.1. UN number

UN number : 3163

Labelling ADR, IMDG, IATA

: 2.2 : Non flammable, non toxic gas.

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : LIQUEFIED GAS, N.O.S. (Tetrafluoromethane (R14), Nitrous oxide)

Transport by air (ICAO-TI / IATA-DGR) : LIQUEFIED GAS, N.O.S. (Tetrafluoromethane (R14), Nitrous oxide)

Transport by sea (IMDG) : LIQUEFIED GAS, N.O.S. (Tetrafluoromethane (R14), Nitrous oxide)

SECTION 14. Transport information (continued)

14.3. Transport hazard class(es)

Transport by road/rail (ADR/RID)

Class	: 2
Classification code	: 2 A
H.I. nr	: 20
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-V

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

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

Passenger and Cargo Aircraft	: Allowed.
Packing instruction - Passenger and Cargo Aircraft	: 200
Cargo Aircraft only	: Allowed.
Packing instruction - Cargo Aircraft only	: 200
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 : - 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

Seveso directive 96/82/EC : Not covered.

National legislation

: Ensure all national/local regulations are observed.

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

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

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 : Receptacle under pressure.

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

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.

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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