



SAFETY DATA SHEET in accordance with REACH regulation 1907/2006/EC

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Revised edition no : 1 - 02

Date : 17 / 11 / 2015

Supersedes : 19 / 10 / 2012

ALIGAL™ 9**093A_03**

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

Trade name : ALIGAL™ 9
SDS no : 093A_03
Chemical description : Nitrous oxide
CAS No : 10024-97-2
EC No : 233-032-0
Index No : ---
Registration-No. : 01-2119970538-25-
Chemical formula : N₂O

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. Food applications.
Contact supplier for more uses information.
Uses advised against : Do not inhale product on purpose because of the risk of asphyxiation.

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 : 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 - GHS04
• Signal words : Danger
• Hazard statements : H270 - May cause or intensify fire; oxidizer.
H280 - Contains gas under pressure; may explode if heated.
• Precautionary statements
- Prevention : P244 - Keep valves and fittings free from oil and grease
P220 - Keep away from combustible materials.
- Response : 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 : Contact with liquid may cause cold burns/frostbite.
Asphyxiant in high concentrations.



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ALIGAL™ 9**093A_03****SECTION 2. Hazards identification (continued)****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)
Nitrous oxide	: 100 %	10024-97-2 233-032-0 ----- 01-2119970538-25-		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 : Adverse effects not expected from this product.
- Eye contact : Adverse effects not expected from this product.
- 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.
In low concentrations may cause narcotic effects. Symptoms may include dizziness, headache, nausea and loss of co-ordination.

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.
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.



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SECTION 5. Fire-fighting measures (continued)

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 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** : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus.
None necessary.
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.

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.

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 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.
Do not smoke while handling product.
Keep equipment free from oil and grease.
Avoid suck back of water, acid and alkalis.
Only experienced and properly instructed persons should handle gases under pressure.
Ensure the complete gas system was (or is regularly) 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.



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SECTION 7. Handling and storage (continued)

- 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.

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 should be regularly checked for leakages.
 - Ensure exposure is below occupational exposure limits (where available).
 - Gas detectors should be used when oxidising 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.

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In case of emergency : +49 (0)2151 398668

ALIGAL™ 9**093A_03****SECTION 8. Exposure controls/personal protection (continued)**

- **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** : 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.
 - **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.
Poor warning properties at high concentrations.
- Odour threshold** : Odour threshold is subjective and inadequate to warn for overexposure.
- pH value** : Not applicable.
- Molar mass [g/mol]** : 44
- Melting point [°C]** : -90.81
- Boiling point [°C]** : -88.5
- Critical temperature [°C]** : 36.4
- 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]** : 50.8 bar
- Relative density, gas (air=1)** : 1.5
- Relative density, liquid (water=1)** : 1.2
- Solubility in water [mg/l]** : 2.2
- 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:** : 0.6

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 9. Physical and chemical properties (continued)

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. At temperatures over 575°C and at atmospheric pressure, nitrous oxide decomposes into nitrogen and oxygen. Pressurized nitrous oxide can also decompose at temperatures equal or greater than 300°C. 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.
Nitrous oxide dissociation is irreversible and exothermic, leading to a considerable rise in pressure.

10.3. Possibility of hazardous reactions

: Violently oxidises organic material.

10.4. Conditions to avoid

: Heat.

10.5. Incompatible materials

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

ALIGAL™ 9**093A_03****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

: Not classified as PBT or vPvB.

12.6. Other adverse effects

Effect on ozone layer : None.

Effect on the global warming : When discharged in large quantities may contribute to the greenhouse effect.

Global warming potential [CO2=1] : 298

SECTION 13. Disposal considerations**13.1. Waste treatment methods**

: May be vented to atmosphere in a well ventilated place.
Discharge to atmosphere in large quantities should be avoided.
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 04: Gases in pressure containers (including halons) containing dangerous substances.

13.2. Additional information

: None.

SECTION 14. Transport information**14.1. UN number**

UN number : 1070

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) : NITROUS OXIDE



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SECTION 14. Transport information (continued)

Transport by air (ICAO-TI / IATA-DGR) :
NITROUS OXIDE
Transport by sea (IMDG) : NITROUS OXIDE

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.
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.



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ALIGAL™ 9**093A_03****SECTION 14. Transport information (continued)****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.
- 4. BlmschV (Germany) : Listed.
- Water hazard class (WGK) : WGK Germany: 1 - Low hazard to waters.
- Other regulations and technical rules : [German regulations]
(not complete) 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.

15.2. Chemical safety assessment

: This product is either exempt from REACH, does not meet the minimum volume threshold for a CSR or the CSA has not yet been carried out.

SECTION 16. Other information

Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010
Training advice : The hazard of asphyxiation is often overlooked and must be stressed during operator training.
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.
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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