

Issue Date: 06-Apr-2023

Revision Date: 01-Jul-2024

Version 2

## 1. IDENTIFICATION

**Product identifier****Product Name** Nitric Oxide**Other means of identification****SDS #** EF-051**Synonyms**

Nitrogen oxide; Nitrogen monoxide; Nitrosyl radical; NO; Amidogen, oxo-

**UN/ID No**

UN1660

**Recommended use of the chemical and restrictions on use****Recommended Use** Synthetic/Analytical chemistry.**Details of the supplier of the safety data sheet****Supplier Address**EFC Gases & Advanced Materials  
3266 Bergey Road  
Hatfield, PA 19440  
Email: [efcsafety@efcgases.com](mailto:efcsafety@efcgases.com)**Emergency telephone number****Company Phone Number**

215-443-9600

**Emergency Telephone**

INFOTRAC 1-352-323-3500 (International)

1-800-535-5053 (North America)

## 2. HAZARDS IDENTIFICATION

**Appearance** Colorless gas Compressed gas**Physical state** Gas**Odor** Sharp odor Unpleasant**Classification**

Acute toxicity - Inhalation (Gases)	Category 1
Skin corrosion/irritation	Category 1
Serious eye damage/eye irritation	Category 1
Oxidizing gases	Category 1
Gases under pressure	Compressed gas

**Signal Word****Danger****Hazard statements**

Fatal if inhaled

Causes severe skin burns and eye damage

May cause or intensify fire; oxidizer

Contains gas under pressure; may explode if heated

**Precautionary Statements - Prevention**

Do not breathe dust/fume/gas/mist/vapors/spray

Use only outdoors or in a well-ventilated area

Wear respiratory protection

Wash face, hands and any exposed skin thoroughly after handling

Wear protective gloves/protective clothing/eye protection/face protection

Keep reduction valves free from grease and oil

Keep/Store away from clothing/ combustible materials

**Precautionary Statements - Response**

Immediately call a poison center or doctor/physician

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

Immediately call a poison center or doctor/physician

IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower

Wash contaminated clothing before reuse

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Immediately call a poison center or doctor/physician

IF SWALLOWED: Rinse mouth. Do NOT induce vomiting

In case of fire: Stop leak if safe to do so

**Precautionary Statements - Storage**

Store in a well-ventilated place. Keep container tightly closed

Store locked up

Store in a well-ventilated place

Protect from sunlight

**Precautionary Statements - Disposal**

Dispose of contents/container to an approved waste disposal plant

### 3. COMPOSITION/INFORMATION ON INGREDIENTS

**Synonyms** Nitrogen oxide; Nitrogen monoxide; Nitrosyl radical; NO; Amidogen, oxo-.

Chemical name	CAS No	Weight-%
Nitric oxide	10102-43-9	100

\*\*If Chemical Name/CAS No is "proprietary" and/or Weight-% is listed as a range, the specific chemical identity and/or percentage of composition has been withheld as a trade secret.\*\*

### 4. FIRST AID MEASURES

**Description of first aid measures**

**General Advice** Provide this SDS to medical personnel for treatment.

**Eye Contact** Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center or doctor/physician.

**Skin Contact** Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Wash contaminated clothing before reuse. Immediately call a poison center or doctor/physician.

**Inhalation** Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

**Ingestion** As this product is a gas, refer to the inhalation section.

#### **Most important symptoms and effects, both acute and delayed**

**Symptoms** Fatal if inhaled. Causes severe skin burns and eye damage. Contact with rapidly expanding gas may cause burns or frostbite.

#### **Indication of any immediate medical attention and special treatment needed**

**Notes to Physician** Treat symptomatically.

### **5. FIRE-FIGHTING MEASURES**

#### **Suitable Extinguishing Media**

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

**Unsuitable Extinguishing Media** Not determined.

#### **Specific Hazards Arising from the Chemical**

Contains gas under pressure. Oxidizing material. This material increases the risk of fire and may aid combustion. Contact with combustible material may cause fire. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

#### **Protective equipment and precautions for firefighters**

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

### **6. ACCIDENTAL RELEASE MEASURES**

#### **Personal precautions, protective equipment and emergency procedures**

**Personal Precautions** Use personal protective equipment as required. Avoid contact with skin, eyes or clothing. Ensure adequate ventilation, especially in confined areas. Remove all sources of ignition. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

**For Emergency Responders** Use personal protection recommended in Section 8.

#### **Environmental precautions**

**Environmental precautions** Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). See Section 12 for additional Ecological Information.

**Methods and material for containment and cleaning up**

- Methods for Containment**            Prevent further leakage or spillage if safe to do so.
- Methods for Clean-Up**            Stop leak if possible without personal risk.

**7. HANDLING AND STORAGE**

**Precautions for safe handling**

- Advice on Safe Handling**            Handle in accordance with good industrial hygiene and safety practice. Do not breathe dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area. Wear respiratory protection. Wash face, hands and any exposed skin thoroughly after handling. Wear protective gloves/protective clothing and eye/face protection. Keep reduction valves free from grease and oil. Keep/store away from clothing and other combustible materials.

**Conditions for safe storage, including any incompatibilities**

- Storage Conditions**            Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).
- Incompatible Materials**            Combustible material. Reducing materials. Greases. Oils.

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

**Exposure Guidelines**

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Nitric oxide 10102-43-9	TWA: 25 ppm	TWA: 25 ppm TWA: 30 mg/m <sup>3</sup> (vacated) TWA: 25 ppm (vacated) TWA: 30 mg/m <sup>3</sup>	IDLH: 100 ppm TWA: 25 ppm TWA: 30 mg/m <sup>3</sup>

**Appropriate engineering controls**

- Engineering Controls**            Apply technical measures to comply with the occupational exposure limits.

**Individual protection measures, such as personal protective equipment**

- Eye/Face Protection**            Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles. Refer to 29 CFR 1910.133 for eye and face protection regulations.
- Skin and Body Protection**            Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated. Refer to 29 CFR 1910.138 for appropriate skin and body protection.

**Respiratory Protection**

Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Refer to 29 CFR 1910.134 for respiratory protection requirements.

**General Hygiene Considerations** Handle in accordance with good industrial hygiene and safety practice.

**9. PHYSICAL AND CHEMICAL PROPERTIES**

Information on basic physical and chemical properties

<p><b>Physical state</b>  <b>Appearance</b>  <b>Color</b></p>	<p>Gas                  Colorless gas Compressed gas                  Colorless</p>	<p><b>Odor</b>  <b>Odor Threshold</b></p>	<p>Sharp odor Unpleasant                  Not determined</p>
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Property	Values	Remarks • Method
pH	No data available	
Melting point / freezing point	-163.6 °C / -262.48 °F	
Initial boiling point and boiling range	-151.8 °C / -241.24 °F	
Flash point	Product does not sustain combustion	
Evaporation Rate	2600	(Butyl Acetate=1)
Flammability (Solid, Gas)	Extremely flammable in the presence of the following materials or conditions: reducing materials and combustible materials.	
Flammability Limit in Air		
Upper flammability or explosive limits	No data available	
Lower flammability or explosive limits	No data available	
Vapor Pressure	Not determined	
Vapor Density	1.04	(Air=1)
Relative Density	Not determined	
Water Solubility	Not determined	
Solubility in other solvents	Not determined	
Partition Coefficient	Not determined	
Autoignition temperature	No data available	
Decomposition temperature	Not determined	
Kinematic viscosity	Not determined	
Dynamic Viscosity	Not determined	
Explosive Properties	Not determined	
Oxidizing Properties	Not determined	

Other information

Molecular weight	30.01 g/mole
VOC Content	Molecular formula N-O
Liquid Density	Specific Volume 12.987 (ft3/lb)
Bulk density	Gas Density 0.077 (lb/ft3)

**10. STABILITY AND REACTIVITY**

Reactivity

Not reactive under normal conditions.

**Chemical stability**

Stable under recommended storage conditions.

**Possibility of hazardous reactions**

None under normal processing.

**Hazardous Polymerization** Hazardous polymerization does not occur.

**Conditions to Avoid**

Keep out of reach of children.

**Incompatible materials**

Combustible material. Reducing materials. Greases. Oils.

**Hazardous decomposition products**

None known based on information supplied.

## 11. TOXICOLOGICAL INFORMATION

**Information on likely routes of exposure****Product Information**

**Eye Contact** Avoid contact with eyes.

**Skin Contact** Avoid contact with skin.

**Inhalation** Fatal if inhaled.

**Ingestion** Do not ingest.

**Component Information**

Chemical name	Oral LD50	Dermal LD50	Inhalation LC50
Nitric oxide 10102-43-9	-	-	= 1068 mg/m <sup>3</sup> ( Rat ) 4 h

**Symptoms related to the physical, chemical and toxicological characteristics**

**Symptoms** Please see section 4 of this SDS for symptoms.

**Delayed and immediate effects as well as chronic effects from short and long-term exposure**

**Skin corrosion/irritation** Causes severe skin burns.

**Serious eye damage/eye irritation** Causes severe eye damage.

**Carcinogenicity** Based on the information provided, this product does not contain any carcinogens or potential carcinogens as listed by OSHA, IARC or NTP.

**Numerical measures of toxicity**

The following values are calculated based on chapter 3.1 of the GHS document Not determined.

**12. ECOLOGICAL INFORMATION**

**Ecotoxicity**

The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

**Persistence/Degradability**

Not determined.

**Bioaccumulation**

There is no data for this product.

**Mobility**

Not determined

**Other adverse effects**

Not determined

**13. DISPOSAL CONSIDERATIONS**

**Waste Treatment Methods**

**Disposal of Wastes**

Disposal should be in accordance with applicable regional, national and local laws and regulations.

**Contaminated Packaging**

Disposal should be in accordance with applicable regional, national and local laws and regulations.

**US EPA Waste Number**

Chemical name	RCRA	RCRA - Basis for Listing	RCRA - D Series Wastes	RCRA - U Series Wastes
Nitric oxide 10102-43-9	P076			

Chemical name	RCRA - Halogenated Organic Compounds	RCRA - P Series Wastes	RCRA - F Series Wastes	RCRA - K Series Wastes
Nitric oxide 10102-43-9		P076		

**14. TRANSPORT INFORMATION**

**Note**

Please see current shipping paper for most up to date shipping information, including exemptions and special circumstances.

**DOT**

**UN/ID No** UN1660  
**Proper Shipping Name** Nitric oxide, Compressed  
**Transport hazard class(es)** 2.3  
**Subsidiary Hazard Class** 5.1, 8

**IATA**

Forbidden

**IMDG**

**UN number or ID number** UN1660  
**Proper Shipping Name** Nitric oxide, Compressed  
**Transport hazard class(es)** 2.3  
**Subsidiary Hazard Class** 5.1, 8

**15. REGULATORY INFORMATION**

**International Inventories**

Chemical name	TSCA	TSCA Inventory Status	DSL/NDSL	EINECS/ELINCS	ENCS	IECSC	KECL	PICCS	AICS
Nitric oxide	X	ACTIVE	X	X	X	X	X	X	X

**Legend:**

- TSCA - United States Toxic Substances Control Act Section 8(b) Inventory*
- DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List*
- EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances*
- ENCS - Japan Existing and New Chemical Substances*
- IECSC - China Inventory of Existing Chemical Substances*
- KECL - Korean Existing and Evaluated Chemical Substances*
- PICCS - Philippines Inventory of Chemicals and Chemical Substances*
- AICS - Australian Inventory of Chemical Substances*

**US Federal Regulations**

**CERCLA**

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ)
Nitric oxide 10102-43-9	10 lb	10 lb	RQ 10 lb final RQ RQ 4.54 kg final RQ

**SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

**CWA (Clean Water Act)**

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

**US State Regulations**

**California Proposition 65**

This product does not contain any Proposition 65 chemicals.

**U.S. State Right-to-Know Regulations**

Chemical name	New Jersey	Massachusetts	Pennsylvania
Nitric oxide 10102-43-9	X	X	X



**16. OTHER INFORMATION**

<u><b>NFPA</b></u>	<b>Health hazards</b> -	<b>Flammability</b> -	<b>Instability</b> -	<b>Special hazards</b> -
<u><b>HMIS</b></u>	<b>Health hazards</b> -	<b>Flammability</b> -	<b>Physical hazards</b> -	<b>Personal Protection</b> Not determined

**Issue Date:** 06-Apr-2023  
**Revision Date:** 01-Jul-2024  
**Revision Note:** Regulatory review

**Disclaimer**

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**End of Safety Data Sheet**