Safety data sheet · UN 1070

Nitrous oxide (N2O)

Safety Data Sheet

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Nitrous oxide (N_2O, CAS 10024-97-2, UN 1070) is a liquefied oxidising gas that vigorously accelerates combustion. At roughly 600–650 °C it decomposes exothermically into oxygen and nitrogen, so it can sustain a fire with no air present at all. It is also anaesthetic.

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Safety data sheet (kigl.co.in/sds/oxygen)

UN 1070
UN number

2.2 with subsidiary risk 5.1
Transport class

10024-97-2
CAS number

About 600
Decomposition temperature

1.84 kg/m³ at 21.1 °C
Vapour density

Section 1 — Identification

Product name

Nitrous oxide **Chemical formula:** N_2O **CAS number:** 10024-97-2 · **EC number:** 233-032-0 · **UN number:** UN 1070

Identified uses

Medical anaesthesia and analgesia under a drug licence; propellant and packaging gas in food processing; oxidant in analytical instrumentation, particularly atomic absorption spectroscopy; industrial process oxidant. **Uses advised against:** Recreational inhalation. Any use with oil, grease or combustible contamination present. Any substitution of industrial grade for medical use.

Supplier

The Kamrup Industrial Gases Limited.

Section 2 — Hazards identification

GHS classification

Oxidising gases — Category 1. Gases under pressure — liquefied gas.

Signal word

WARNING

Hazard statements

- H270 — May cause or intensify fire; oxidiser.

- H280 — Contains gas under pressure; may explode if heated.

The property that makes this gas unusual. Nitrous oxide is not flammable and will not burn. It is dangerous because **it supplies the oxidant that lets other things burn**, and because it carries that oxidant within the molecule.

Above roughly **600–650 °C it decomposes exothermically into oxygen and nitrogen**. Once that begins, the gas is producing both heat and free oxygen from itself. A fire involving nitrous oxide can therefore continue **with no air present at all**, which defeats the ordinary firefighting instinct of smothering.

Second, it is an anaesthetic. Overexposure causes drowsiness, euphoria and loss of coordination before it causes unconsciousness — it degrades judgement first, which is the worst possible order for someone who needs to recognise a problem and leave.

Section 3 — Composition

Component	CAS	Concentration
Nitrous oxide	10024-97-2	>98 % (IP grade)

Single-substance product.

Section 4 — First aid

Inhalation

Remove to fresh air. Because the gas is heavier than air, **do not enter a pit, basement or low space without oxygen monitoring, air-supplied breathing apparatus and a standby person outside.** Give oxygen if trained. If breathing has

stopped, give artificial respiration. Seek immediate medical attention — and tell the clinician it was nitrous oxide, because the B_{12} interaction is relevant to treatment.

Skin contact (liquid or rapidly expanding gas)

Frostbite: flush with copious tepid water, do not rub, do not apply direct heat, cover loosely with a sterile dressing, seek immediate medical attention.

Eye contact (liquid or rapidly expanding gas)

Freezing injury is possible. Flush with tepid water for at least 15 minutes and seek immediate medical attention.

Section 5 — Firefighting

Nitrous oxide does not burn, but **it will vigorously accelerate any fire it reaches** and can sustain combustion in the absence of air.

Suitable media

Flood with water. Cool cylinders continuously from a protected position.

Do not rely on smothering

Carbon dioxide, foam and inerting will not necessarily stop a fire being fed by decomposing nitrous oxide, because the oxidant is coming from the gas itself.

Specific hazards

Cylinders exposed to fire may rupture violently. Stop the flow if it can be done safely; otherwise evacuate and cool from behind protection. Withdraw immediately if a cylinder is discolouring or venting.

Section 6 — Accidental release

Evacuate, **paying particular attention to pits, basements, drains and low-lying areas** where the dense gas collects and persists. Remove all combustible material from the area: under enrichment, ordinary materials become readily ignitable.

Eliminate ignition sources. Ventilate at **low level**. Do not enter to isolate a leak without oxygen monitoring and, where deficiency or anaesthetic concentration is possible, air-supplied breathing apparatus.

Section 7 — Handling and storage

No oil, no grease, no combustible contamination — anywhere

This is the same discipline required for oxygen and for the same reason. Hydrocarbon contamination on a valve or regulator can ignite from the heat of compression when the valve is opened.

Open the valve slowly

Rapid pressurisation of a regulator generates significant heat.

Handling

Secure cylinders upright — nitrous oxide is a liquefied gas and must be drawn as vapour unless the installation is designed otherwise. Use only equipment rated for

oxidising service and dedicated to this gas.

Storage

Well-ventilated area ventilated at low level, never a basement or pit. Segregate from flammable gases, oil, grease and combustible stores. Keep secured, capped, below 52 °C, and away from any heat source that could approach the decomposition temperature.

Medical stock must be stored, recorded and issued under the pharmaceutical regime, separately from industrial stock.

Section 8 — Exposure controls

Two distinct control problems: **anaesthetic exposure** and **fire risk**.

For occupational exposure, scavenging at the point of use and adequate room ventilation are the primary controls. This is why theatres and dental surgeries have dedicated scavenging systems. *No Indian occupational exposure limit is stated on this sheet because none has been confirmed; the figure to publish must be established before sign-off.*

Chronic control matters as much as acute here: repeated low-level exposure is the pathway to the B_{12} effects in Section 11.

Personal protection: oxygen and, where used clinically, nitrous oxide monitoring; air-supplied breathing apparatus for entry into a suspect space; gloves and face shield when making and breaking connections; cryogenic-rated gloves where liquid may be contacted.

Section 9 — Physical and

chemical properties

Property	Value	Source
Physical state	Liquefied compressed gas	—
Appearance	Colourless	—
Odour	Slightly sweet	Group technical data
Molecular weight	44.01	Group technical data
Normal boiling point	−88.5 °C	Group technical data
Critical temperature	36.4 °C	Group technical data
Critical pressure	1,054 psia (≈72.7 bar)	Group technical data
Vapour density	1.84 kg/m³ at 21.1 °C	Group technical data
Specific volume	8.73 ft³/lb at 21.1 °C, 1 atm	Group technical data
Decomposition temperature	About 600–650 °C, releasing O_2 and N_2	Group technical data
Water solubility	Soluble	Group technical data
Flammability	Non-flammable — but oxidising	—

Note the critical temperature: 36.4 °C. That is within the range of an Indian summer. Above it the contents cannot exist as liquid however hard they are compressed, and cylinder pressure behaviour changes with ambient temperature in a way that catches people out. Storage below 52 °C is a rule, not a guideline.

Constants from group technical data.

Section 10 — Stability and reactivity

Stable under normal conditions. **Decomposes exothermically above approximately 600–650 °C.**

Incompatible materials

Combustible and organic materials, oil and grease, reducing agents, flammable gases — particularly hydrogen, ammonia and hydrocarbons.

Conditions to avoid

Heat above 52 °C, open flames, hot surfaces, and any combustible contamination of the system.

Hazardous decomposition products

Oxygen and nitrogen, which accelerate fire; nitrogen oxides where the gas is involved in a flame.

Section 11 — Toxicological information

Acute. An anaesthetic gas. Overexposure causes drowsiness, dizziness, euphoria, loss of coordination and unconsciousness. Severe overexposure without adequate oxygen can be fatal.

Chronic. Prolonged occupational overexposure inactivates **vitamin B_{12}**, with effects on the nervous system and on blood formation, and has been associated with adverse reproductive outcomes. This is a genuine occupational health concern where the gas is used routinely, and the reason exposure control is a continuing obligation rather than an emergency measure.

Section 12 — Ecological information

Nitrous oxide is a **potent greenhouse gas** and contributes to stratospheric ozone depletion. It should not be vented casually. Minimise release, recover where practicable, and dispose of surplus through the supplier rather than to atmosphere.

Section 13 — Disposal

Do not vent to atmosphere as a matter of routine; see Section 12. Return surplus and part-used cylinders to the supplier. Where venting is unavoidable, do so in a safe, well-ventilated **outdoor** location away from pits, drains, basements, building intakes and any combustible material.

Section 14 — Transport

UN number	UN 1070
Proper shipping name	NITROUS OXIDE
Class	2.2 — Non-flammable gas
Subsidiary risk	5.1 — Oxidising
Labels	2.2 and 5.1

Transport upright and secured, valves closed, caps fitted, in a ventilated vehicle. **Segregate from flammable gases and from oil, grease and combustible loads.** Never carry cylinders in an enclosed passenger compartment.

Section 15 — Regulatory information

- **Gas Cylinders Rules, 2016** (PESO)
- **Drugs and Cosmetics Act, 1940** — where supplied as a medical gas
- **IS 7285** — seamless steel cylinders
- **IS 3224** — cylinder valves
- **ADR 2025** — UN 1070, Class 2.2 (5.1)

Section 16 — Other information

Revision 1, issued 10 August 2026.

Relates to nitrous oxide as supplied and does not release the user from assessing their own installation and application. Where the product is supplied for medical use, the pharmaceutical documentation accompanying the batch takes precedence for clinical purposes. A signed PDF copy is available on request for audit files; this HTML page is the current version.

PRODUCT	CAS NUMBER	UN NUMBER
Nitrous oxide	**10024-97-2**	**UN 1070**
TRANSPORT CLASS	REVISION	
2.2 — Non-flammable gas, subsidiary 5.1 Oxidising	**1 · 10 August 2026**	

Also known as: N2O · Dinitrogen monoxide · Laughing gas · Medical nitrous oxide

Nitrous oxide — frequently asked questions

- Why is an oxidiser dangerous if it will not burn itself? +
- What happens above 600–650 °C? +
- Is the sweet smell a usable warning? +
- What is the chronic risk from repeated low-level exposure? +
- Does it collect high or low? +

Are medical and industrial nitrous oxide the same product? +

References

Bureau of Indian Standards. (2021). *Valve for compressed gas cylinders excluding LPG cylinders — Specification* (IS 3224:2021, Fourth Revision).

Government of India. (2016). *Gas Cylinders Rules, 2016* (G.S.R. 1081(E)). Petroleum and Explosives Safety Organisation.

The Kamrup Industrial Gases Limited. (2026). *Company information and manufacturer's data* [Company statement].

ENQUIRIES

Request a quotation

State the gas or equipment, the quantity or capacity, and your location. KIGL will confirm the grade, the cylinder or plant size, and whether the location can be served from Noonmati, or through the agent network.

Request a quotation (kigl.co.in/contact) 0361-4519363

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