

Safety Data Sheet

Product : Dinitrogen tetroxide (Nitrogen dioxide)

Page :1/5

MSDS Nr : 351-00-0002BOC(A)

Version : 1.02

Date : 03/12/2003

1 IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY

Product name	Dinitrogen tetroxide (Nitrogen dioxide)
Chemical formula	N ₂ O ₄ (NO ₂)
Company identification	see heading and/or footer
Emergency phone numbers	see heading and/or footer

2 COMPOSITION/INFORMATION ON INGREDIENTS

Substance/Preparation	Substance.
Components/Impurities	Contains no other components or impurities which will influence the classification of the product.
CAS Nr	10544-72-6 (10102-44-0)
EC Nr (from EINECS)	234-126-4 (233-272-6)

3 HAZARDS IDENTIFICATION

Hazards identification	Very toxic by inhalation. Corrosive to eyes, respiratory system and skin. Oxidant. Strongly supports combustion. May react violently with combustible materials. Liquefied gas
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4 FIRST AID MEASURES

Inhalation	Very toxic by 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. Delayed adverse effects possible.
Skin/eye contact	May cause chemical burns to skin and cornea (with temporary disturbance to vision) Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contaminated clothing. Drench affected area with water for at least 15 minutes Obtain medical assistance
Ingestion	Ingestion is not considered a potential route of exposure.

5 FIRE FIGHTING MEASURES

Specific hazards	Supports combustion. Exposure to fire may cause containers to rupture/explode. Non flammable
Hazardous combustion products	None that are more toxic than the product itself.
Suitable extinguishing media	All known extinguishants can be used.

Safety Data Sheet

Product : Dinitrogen tetroxide (Nitrogen dioxide)

Page :2/5

MSDS Nr : 351-00-0002BOC(A)

Version : 1.02

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Specific methods	If possible, stop flow of product. Move away from the container and cool with water from a protected position.
Special protective equipment for fire fighters	Use self-contained breathing apparatus and chemically protective clothing.

6 ACCIDENTAL RELEASE MEASURES

Personal precautions	Evacuate area. Ensure adequate air ventilation. Eliminate ignition sources. Use self-contained breathing apparatus and chemically protective clothing.
Environmental precautions	Try to stop release. Reduce vapour with fog or fine water spray. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
Clean up methods	Ventilate area. Wash contaminated equipment or sites of leaks with copious quantities of water. Hose down area with water.

7 HANDLING AND STORAGE

Handling and storage	Use no oil or grease. Open valve slowly to avoid pressure shock. Keep container below 50°C in a well ventilated place. Refer to supplier's container handling instructions. 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 allow backfeed into the container. Suck back of water into the container must be prevented. Segregate from flammable gases and other flammable materials in store.
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8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure limit value for country	UK: (1)Nitrogen dioxide/(2)Dinitrogen tetroxide - LTEL: 1ppm max (CHAN 29 - Withdrawn from EH40 April 2003)
Personal protection	Keep suitable chemically resistant protective clothing readily available for emergency use. Keep self contained breathing apparatus readily available for emergency use. Do not smoke while handling product.

Safety Data Sheet

Product : Dinitrogen tetroxide (Nitrogen dioxide)

Page :3/5

MSDS Nr : 351-00-0002BOC(A)

Version : 1.02

Date : 03/12/2003

Ensure adequate ventilation.

Protect eyes, face and skin from liquid splashes.

9 PHYSICAL AND CHEMICAL PROPERTIES

Molecular weight	92 (46)
Melting point	-11.2 °C
Boiling point	20.9 °C
Critical temperature	158 °C
Relative density, gas	2.8 (air=1)
Relative density, liquid	1.4 (water=1)
Vapour Pressure 20°C	720 mm Hg
Solubility mg/l water	No reliable data available.
Appearance/Colour	Brownish gas
Odour	Pungent
	Poor warning properties at low concentrations.
Flammability range	Oxidiser.
Autoignition temperature	Not applicable
Other data	Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

10 STABILITY AND REACTIVITY

Stability and reactivity	Violently oxidises organic material. May react violently with reducing agents. May react violently with combustible materials Reacts with water to form corrosive acids. May react violently with alkalis. Reacts with most metals in the presence of moisture, liberating hydrogen, an extremely flammable gas.
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11 TOXICOLOGICAL INFORMATION

General	Delayed fatal pulmonary oedema possible. Severe corrosion to skin, eyes and respiratory tract at high concentrations.
LC50/1h (ppm)	115 ppm

Safety Data Sheet

Product : Dinitrogen tetroxide (Nitrogen dioxide)

Page :4/5

MSDS Nr : 351-00-0002BOC(A)

Version : 1.02

Date : 03/12/2003

12 ECOLOGICAL INFORMATION

General May cause pH changes in aqueous ecological systems.

13 DISPOSAL CONSIDERATIONS

General Avoid discharge to atmosphere.
Do not discharge into any place where its accumulation could be dangerous.
Gas may be scrubbed in alkaline hypochlorite solution under controlled conditions to avoid violent reaction.
Contact supplier if guidance is required.

14 TRANSPORT INFORMATION

Proper shipping name DINITROGEN TETROXIDE (NITROGEN DIOXIDE)
UN Nr 1067
Class 2.3
Subsidiary risk 5.1 + 8
ADR/RID Classification code 2TOC
ADR/RID Hazard Nr 265
Labelling ADR Label 2.3: toxic substance.
Label 5.1: fire intensifying risk.
Label 8: corrosive substance.
Other transport information Avoid transport on vehicles where the load space is not separated from the driver's compartment.
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 they are firmly secured and:
- cylinder valve is closed and not leaking
- valve outlet cap nut or plug (where provided) is correctly fitted
- valve protection device (where provided) is correctly fitted
- there is adequate ventilation.
- compliance with applicable regulations.

15 REGULATORY INFORMATION

Number in Annex I of Dir 67/548 007-002-00-0.
EC Classification T+;R26(C);R34

Safety Data Sheet

Product : Dinitrogen tetroxide (Nitrogen dioxide)

Page :5/5

MSDS Nr : 351-00-0002BOC(A)

Version : 1.02

Date : 03/12/2003

-Symbols	T+
Labelling of cylinders	
-Symbols	Label 2.3: toxic substance. Label 8: corrosive substance. Label 5.1: fire intensifying risk.
-Risk phrases	R8 Contact with combustible material may cause fire. R26 Very toxic by inhalation. R34 Cause burns (to eyes, respiratory system and skin).
-Safety phrases	S1 Keep locked up. S9 Keep container in well ventilated place. S17 Keep away from combustible material. S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S36/37/39 Wear suitable protective clothing, gloves and eye/face protection. S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

16 OTHER INFORMATION

Ensure all national/local regulations are observed.

Ensure operators understand the toxicity hazard.

Users of breathing apparatus must be trained.

This Safety Data Sheet has been established in accordance with the applicable European Directives and applies to all countries that have translated the Directives in their national laws.

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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Number of pages :5