

SAFETY DATA SHEET

NTO

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

Date issued 21.11.2012
Revision date 07.10.2013

1.1. Product identifier

Product name NTO
Chemical name 1,2-dihydro-5-nitro-3H-1,2,4-triazol-3-one
REACH Reg No. 01-2119985730-30-0000
CAS no. 932-64-9
EC no. 213-254-4
Formula C₂H₂N₄O₃

1.2. Relevant identified uses of the substance or mixture and uses advised against

Product group Explosives
Use of the substance/preparation Industrial use, professional use, explosive, ammunition, pyrotechnic articles, Laboratory activities
See SECTION 16 for a complete list of uses for which an exposure scenario is provided as an annex.
Uses advised against No information available.

1.3. Details of the supplier of the safety data sheet

Manufacturer

Company name Chemring Nobel AS
Postal address Engeneveien 7
Postcode N-3475
City SÆTRE
Country Norway
Tel +47 32 27 86 00
E-mail Richard.Gjersoe@chemringnobel.no
Website <http://www.chemringnobel.no/>
Contact person Richard Gjersøe

1.4. Emergency telephone number

Emergency telephone NHS Direct (UK):0845 4647 (24h/24h)

SECTION 2: Hazards identification

2.1. Classification of substance or mixture

Classification according to 67/548/EEC or 1999/45/EC Xi; R36/37/38
E; R2
Classification according to Regulation (EC) No 1272/2008 [CLP/GHS] Expl. 1.1; H201;
Skin Irrit. 2; H315;
Eye Irrit. 2; H319;
STOT SE3; H335;
Substance / mixture hazardous properties Explosive with mass explosion hazard. Irritating to eyes, respiratory system and skin.

2.2. Label elements

Hazard Pictograms (CLP)



Signal word	Danger
Hazard statements	H201 Explosive; mass explosion hazard. H315 Causes skin irritation. H319 Causes serious eye irritation. H335 May cause respiratory irritation.
Precautionary statements	P210 Keep away from heat/sparks/open flames/hot surfaces. – No smoking. P250 Do not subject to grinding/shock/friction. P370 + P380 In case of fire: Evacuate area. P280 Wear protective gloves/protective clothing/eye protection/face protection. P302 + P352 IF ON SKIN: Wash with plenty of soap and water. P373 DO NOT fight fire when fire reaches explosives.

2.3. Other hazards

PBT / vPvB	Not PBT / vPvB.
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SECTION 3: Composition/information on ingredients

3.1. Substances

Substance	Identification	Classification	Contents
1,2-dihydro-5-nitro-3H-1,2,4-triazol-3-one (NTO)	CAS no.: 932-64-9 EC no.: 213-254-4 Registration number: 01-2119985730-30-0000	Xi; R36/37/38 E; R2 Expl. 1.1; H201; Skin Irrit. 2; H315; Eye Irrit. 2; H319; STOT SE3; H335;	100 %
Column headings	CAS no. = Chemical Abstracts Service; EU (Einecs or Elincs number) = European inventory of Existing Commercial Chemical Substances; Ingredient name = Name as specified in the substance list (substances that are not included in the substance list must be translated, if possible). Contents given in; %, %wt/wt, %vol/wt, %vol/vol, mg/m3, ppb, ppm, weight%, vol%		
HH/HF/HE	T+ = Very toxic, T = Toxic, C = Corrosive, Xn = Harmful, Xi = Irritating, E = Explosive, O = Oxidizing, F+ = Extremely flammable, F = Very flammable, N = Environmental hazard		
Substance comments	See section 16 for explanation of H- and R-phrases listed above.		

SECTION 4: First aid measures

4.1. Description of first aid measures

General	Emergency telephone number: see section 1.4. In case of unconsciousness or severe accidents, call 112.
Inhalation	Fresh air and rest. Contact physician if symptoms persist.
Skin contact	Remove contaminated clothing. Wash the skin immediately with soap and water. If skin irritation or rash occurs: Get medical advice/ attention.
Eye contact	Immediately flush with plenty of water for up to 15 minutes. Remove any contact lenses and open eyes wide apart. By prolonged rinsing, use luke warm water to avoid damage to the eye. Contact physician if irritation persists.
Ingestion	Drink a few glasses of water or milk. Induce vomiting, if person is conscious. Vomiting should be induced only in consultation with medical personnel. Seek medical attention. Unconscious people shall immediately be brought to

hospital.

4.2. Most important symptoms and effects, both acute and delayed

Acute symptoms and effects Burning eyes.

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

Other Information No specific treatment required, see section 4.1.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media Extinguish surrounding fires with suitable extinguisher.

Improper extinguishing media Do not fight fires involving explosives, risk of explosion! Fire in explosives can not be extinguished with any fire equipment.

5.2. Special hazards arising from the substance or mixture

Fire and explosion hazards Explosive by shock, friction, fire or other sources of ignition. By explosion or fire, toxic gases such as nitrogen oxides (NO, NO₂ and N₂O₄) and carbon oxides (CO, CO₂) may be formed.

5.3. Advice for firefighters

Personal protective equipment Use compressed air equipment when the chemical is involved in fire. In case of evacuation, an approved protection mask should be used. See also section 8.

Other Information Evacuate all personell to a predetermined safe location.
Notify authorities in accordance with emergency response procedures.
Containers close to fire should be removed immediately or cooled with water.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal protection measures Use protective equipment as referred to in section 8.

6.2. Environmental precautions

Environmental precautionary measures Do not allow to enter into sewer, water system or soil.

6.3. Methods and material for containment and cleaning up

Cleaning method Moisten with water before handling. Spillage should be removed with an aluminum or wooden shovel and placed in a suitable container for later burning.

Dispose of in accordance with local regulations for waste handling (see section 13).

6.4. Reference to other sections

Other instructions See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Handling Only to be handled by authorized personnel. The explosives must be under supervision and unavailable for persons not concerned.
Keep away from sources of ignition - No smoking.
Protect against heating.
Protect against physical damage and/or friction.
Explosion risk in case of fire.
Avoid handling which leads to dust formation.
Avoid inhalation of dust.
Avoid contact with skin and eyes. It is particularly important to avoid contact

with the substance by moist skin.

Protective Safety Measures

Advice on general occupational hygiene

Wash hands after contact with the chemical. Change contaminated clothing and take off protective equipment before the meal. Do not smoke, drink or eat in the workplace.

7.2. Conditions for safe storage, including any incompatibilities

Storage

Store dry in a well-ventilated place.
Storage room must be locked and secured from fire.
Store separated from: igniters.
To be stored at temperatures between 0 and 30 °C.

Special risks and properties

Explosive by shock and heating.

Other Information

Comply with national regulation on the handling of explosives.

Conditions for safe storage

Requirements for storage rooms and vessels

Store in approved storage for explosives.

7.3. Specific end use(s)

Specific use(s)

See section 16.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Other Information about threshold limit values

Contains no substances with occupational exposure limit values.

8.2. Exposure controls

Occupational exposure limits

Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment. Provide adequate ventilation.

Precautionary measures to prevent exposure

Technical measures to prevent exposure

Provide adequate ventilation.

Respiratory protection

Respiratory protection

Normally not required. Use mask with filter P2 in case of dust formation.

Hand protection

Hand protection

Use suitable protective gloves if risk of skin contact. No special material is recommended, as the chemical will not penetrate plastic or rubber.

Eye / face protection

Eye protection

Wear approved safety goggles.

Skin protection

Skin protection (except hands)

Wear appropriate protective clothing to protect against skin contact.

Appropriate environmental exposure control

Environmental exposure controls

Do not allow to enter into sewer, water system or soil.

Other Information

Other Information

Eye wash facilities should be available when handling this chemical. Contaminated and wet clothing should be changed. The listed protective equipment is a recommendation. A risk assessment of the actual risk may lead to other requirements.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state

Solid. / Powder.

Colour	White.
Odour	None.
Comments, pH (as supplied)	Not relevant.
Melting point/melting range	Value: 270 °C
Comments, Boiling point / boiling range	Not applicable since the substance decomposes without boiling.
Comments, Flash point	Not relevant. (Solid)
Comments, Evaporation rate	Not relevant.
Flammability (solid, gas)	Waiver. Substance has explosive properties.
Vapour pressure	Value: 0,000077 Pa Test temperature: 25 °C
Comments, Vapour density	Not relevant.
Bulk density	Value: 0,5-1 g/cm ³
Solubility in water	Poorly soluble. (17,2 mg/l. T=25 °C)
Partition coefficient: n-octanol/water	Value: -1,699 Method of testing: Log Pow
Decomposition temperature	Value: 270-273 °C
Comments, Viscosity	Not applicable. (Solid at room temperature and normal pressure).
Explosive properties	Explosive.
Oxidising properties	Test not conducted. The substance is explosive.

9.2. Other information

Other physical and chemical properties

Physical and chemical properties	Sensitivity to friction: >4,5. Drop hammer sensitivity 291 cm.
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SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity	No reactivity hazards.
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10.2. Chemical stability

Stability	Stable under normal temperature conditions and recommended use.
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10.3. Possibility of hazardous reactions

Possibility of hazardous reactions	Explosive when mixed with oxidizing substances.
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10.4. Conditions to avoid

Conditions to avoid	May detonate with impact, friction or on heating.
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10.5. Incompatible materials

Materials to avoid	Strong oxidizing agents, strong acids, strong bases.
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10.6. Hazardous decomposition products

Hazardous decomposition products	Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapours. Nitrous gases (NOx).
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SECTION 11: Toxicological information

11.1. Information on toxicological effects

Toxicological Information:

LD50 oral	Value: > 5000 mg/kg Animal test species: Rat
LD50 dermal	Value: > 2000 mg/kg Animal test species: Rat

Potential acute effects

Inhalation	Irritating to respiratory system.
Skin contact	May cause serious skin irritation / inflammation.

Eye contact	Causes serious eye irritation.
Ingestion	No harmful effects expected in amounts likely to be ingested by accident.
corrosivity	Based on available data the classification criteria are not met.

Delayed effects / repeated exposure

Sensitisation	Based on available data, the classification criteria are not met.
STOT-single exposure	Based on available data, the classification criteria are not met.
STOT-repeated exposure	Based on available data the classification criteria are not met.

Carcinogenic, Mutagenic or Reprotoxic

Carcinogenicity	Based on available data, the classification criteria are not met.
Mutagenicity	Based on available data, the classification criteria are not met.
Teratogenic properties	Based on available data, the classification criteria are not met.
Reproductive toxicity	Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic, fish	Value: > 1000 mg/l Method of testing: LC50 Fish, species: Fresh water fish Duration: 96 h Test reference: ECOSAR v. 1
Acute aquatic, algae	Value: 113 mg/l Method of testing: EC50 Algae, species: Skeletonema costatum Duration: 72 h
Acute aquatic, Daphnia	Value: 460 mg/l Method of testing: LC50 Daphnia, species: Ceriodaphnia dubia Duration: 48 h
Acute aquatic, Daphnia, Comments	NOEC (7 d): 34 mg/l. Ceriodaphnia dubia
Ecotoxicity	The chemical is not classified as harmful to the environment.

12.2. Persistence and degradability

Persistence and degradability	Not readily biodegradable. BOD28:3%
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12.3. Bioaccumulative potential

Bioaccumulative potential	Will not bio-accumulate. Log Pow = -1,669
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12.4. Mobility in soil

Mobility	Solubility in water 10-15 g/l
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12.5. Results of PBT and vPvB assessment

PBT assessment results	The substance does not meet current criteria for PBT (Persistent, bioaccumulative and toxic).
vPvB evaluation results	The substance does not meet current criteria for vPvB (very persistent and very bioaccumulative).

12.6. Other adverse effects

Other adverse effects / Remarks	Do not allow to enter into sewer, water system or soil.
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SECTION 13: Disposal considerations

13.1. Waste treatment methods

Specify the appropriate methods of disposal	Residues of explosives must immediately be removed for intermediate storage and disposed for safely destruction. Product and package is hazardous waste.
	Contact local authorities regarding waste treatment of explosives.

Product classified as hazardous waste Yes

SECTION 14: Transport information

14.1. UN number

ADR 0490
 RID 0490
 IMDG 0490
 ICAO/IATA 0490

14.2. UN proper shipping name

ADR NTO
 RID NTO
 IMDG NTO
 ICAO/IATA NTO

14.3. Transport hazard class(es)

ADR 1.1D
 RID 1.1D
 IMDG 1.1D
 ICAO/IATA 1.1D

14.4. Packing group

Comment Not relevant.

14.5. Environmental hazards

IMDG Marine pollutant No

14.6. Special precautions for user

ADR additional information Packing instructions: P112 (b) (c) MP20
 RID Other applicable information Packing instructions: P112 (b) (c) MP20
 EmS F-B, S-Y
 ICAO/IATA Additional information PROHIBITED

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Additional information.

Additional information. Not applicable.

SECTION 15: Regulatory information

EC no. 213-254-4

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

References (laws/regulations) CHIP Regulations. The Chemicals (Hazard Information and Packaging for Supply) Regulation.
 Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP-regulation) with later amendments.
 Regulation (EC) No 1907/2006 (REACH) Annex II: Safety data sheets, with later amendments.
 EH40/2005 Workplace exposure limits, with later amendments.
 The Hazardous Waste (England and Wales) Regulations 2005 with amendments.
 National regulation regarding handling of explosives. (Directive 93/15 EEC)
 Dangerous Goods regulations

15.2. Chemical safety assessment

Chemical safety assessment performed Yes

SECTION 16: Other information

Supplier's notes	The information contained in this SDS must be made available to all those who handle the product.
Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]	Expl. 1.1; H201; Skin Irrit. 2; H315; Eye Irrit. 2; H319; STOT SE3; H335;
List of relevant R-phrases (under headings 2 and 3).	R36/37/38 Irritating to eyes, respiratory system and skin. R2 Risk of explosion by shock, friction, fire or other sources of ignition.
List of relevant H-phrases (Section 2 and 3).	H201 Explosive; mass explosion hazard. H319 Causes serious eye irritation. H315 Causes skin irritation. H335 May cause respiratory irritation.
Recommended restrictions on use	The product can only be handed out to personnel that have valid permits issued by the police.
Abbreviations and acronyms used	PBT: Persistent, Bioaccumulative and Toxic vPvB: very Persistent and very Bioaccumulative LD50: Lethal dose, is the amount of a substance given to a group of test animals, which causes the death of 50%. LC50: Concentration in water having 50% chance of causing death to aquatic life EC50: The effective concentration of substance that causes 50% of the maximum response NOEC: No observed effect concentration
Additional information	Overview of identified uses of the substance: Manufacture of NTO: PROC 2, 3, 4, 8b. ERC 1. Formulation of NTO: PROC 3, 4, 5, 9, 8b, 14, 15, 24. ERC 2. Formulation in materials: PROC 3, 4, 5, 8b, 14, 15, 24, 9. ERC 3. Production of ammunition: PROC 3, 8b, 9, 14, 23, 24, 5. ERC 5. Production of explosive articles: PROC 3, 8b, 14, 9, 4, 5. ERC 5. Laboratory activities – Research and Development: PROC 14. ERC 5. Use of ammunition: PROC 1. Use of explosive items or articles: PROC 1. Use in small scale laboratory: PROC 15. ERC 8a.
Important data sources used to construct the safety data sheet	Information in CSR Report. Dossier from Chemring Nobel AS (CLP).
Information which has been added, deleted or revised	Version: 2. Amendment, section: 1-16.
Checking quality of information	This SDS is quality controlled by National Institute of Technology in Norway, certified according to the Quality Management System requirements specified in ISO 9001:2008.
Responsible for safety data sheet	Chemring Nobel AS
Prepared by	National Institute of Technology as, Norway v/ Knut Finsveen