

Safety Data Sheet
according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and
OSHA GHS

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

- **1.1 Product identifier**
- **Trade name: Detonating Cord, Specialty (Oil Field) (Class 1.1D)**
- **Article number: 1121**
- **Other product identifiers:**
 - 8/40 RDX NYLON LS
 - 8/40 HMX NYLON LS
 - 8/40 RDX NYLON RIBBON LS
 - 8/40 HMX NYLON RIBBON LS
 - 17/80 RDX NYLON
 - 10/50 HMX LOPRO NYLON LS
 - 17/80 RDX NYLON LS
 - 13/60 HMX NYLON LS
 - 17/80 RDX NYLON XHV LS
 - 13/60 HMX HI-TEMP LOW PROFILE LS
 - 17/80 PETN Plastic
 - 13/60 HMX HI-TEMP LS
 - 21/100 PETN Plastic
 - 17/80 HMX NYLON LS
 - 17/80 HNS LS
 - 17/80 HMX HI-TEMP LS
 - 17/80 HMX NYLON XHV LS
 - 17/80 HMX EXPOSED
- **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
- **Application of the substance / the mixture**
Explosive product.
Commercial blasting applications
- **1.3 Details of the supplier of the Safety Data Sheet**
- **Manufacturer/Supplier:**
 - Dyno Nobel Inc.
 - 2795 East Cottonwood Parkway, Suite 500
 - Salt Lake City, Utah 84121
 - Phone: 801-364-4800
 - Fax: 801-321-6703
 - E-Mail: dnna.hse@am.dynonobel.com
- **1.4 Emergency telephone number:**
 - CHEMTREC
 - 1-800-424-9300 (US/Canada)
 - +01 703-527-3887 (International)

SECTION 2: Hazards identification

- **2.1 Classification of the substance or mixture**
- **Classification according to Regulation (EC) No 1272/2008**
Classifications listed also are applicable to the OSHA GHS Hazard Communication Standard (29CFR1910.1200).

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exploding bomb

Expl. 1.1 H201 Explosive; mass explosion hazard.

• **Classification according to Directive 67/548/EEC or Directive 1999/45/EC**



E; Explosive

R2: Risk of explosion by shock, friction, fire or other sources of ignition.

• **Information concerning particular hazards for human and environment:**

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

• **Classification system:**

The classification is according to the latest editions of the EU-lists, and extended by company and literature data.

The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

• **Additional information:**

There are no other hazards not otherwise classified that have been identified.

0 percent of the mixture consists of component(s) of unknown toxicity

• **2.2 Label elements**

• **Labelling according to Regulation (EC) No 1272/2008**

The product is additionally classified and labelled according to the Globally Harmonized System within the United States (GHS).

The product is classified and labelled according to the CLP regulation.

• **Hazard pictograms**



GHS01

• **Signal word** Danger

• **Hazard-determining components of labelling:**

pentaerythritol tetranitrate (PETN)

perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)

octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)

2,2',4,4',6,6'-hexanitrostilbene

• **Hazard statements**

H201 Explosive; mass explosion hazard.

• **Precautionary statements**

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P250 Do not subject to grinding/shock/friction.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P240 Ground/bond container and receiving equipment.

P373 DO NOT fight fire when fire reaches explosives.

P370+P380 In case of fire: Evacuate area.

P372 Explosion risk in case of fire.

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P401 Store in accordance with local/regional/national/international regulations.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

- **Hazard description:**
- **WHMIS-symbols:** Explosive products are not classified under WHMIS.
- **NFPA ratings (scale 0 - 4)** Not available.
- **HMIS-ratings (scale 0 - 4)** Not available

· **HMIS Long Term Health Hazard Substances**

None of the ingredients are listed.

- **2.3 Other hazards**
- **Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.

· **Explosive Product Notice**

PREVENTION OF ACCIDENTS IN THE USE OF EXPLOSIVES - The prevention of accidents in the use of explosives is a result of careful planning and observance of the best known practices. The explosives user must remember that he is dealing with a powerful force and that various devices and methods have been developed to assist him in directing this force. He should realize that this force, if misdirected, may either kill or injure both him and his fellow workers.

WARNING - All explosives are dangerous and must be carefully handled and used following approved safety procedures either by or under the direction of competent, experienced persons in accordance with all applicable federal, state, and local laws, regulations, or ordinances. If you have any questions or doubts as to how to use any explosive product, DO NOT USE IT before consulting with your supervisor, or the manufacturer, if you do not have a supervisor. If your supervisor has any questions or doubts, he should consult the manufacturer before use.

SECTION 3: Composition/information on ingredients

· **3.2 Mixtures**

· **Description:**

Mixture of substances listed below with nonhazardous additions.

Product will consist of flexible white or colored cord. Coloration will determine the explosive present.

White - Pentaerythritol tetranitrate (PETN - CAS 78-11-5) and/or Cyclotetramethylene tetranitramine (HMX - 2691-41-0)

Pink - Cyclotrimethylene trinitramine (RDX - 121-82-4)

Yellow - Hexanitrostilbene (HNS - 20062-22-0)

· **Dangerous components:**

CAS: 78-11-5

EINECS: 201-084-3

Index number: 603-035-00-5

pentaerythritol tetranitrate (PETN)



E R3



Unst. Expl., H200

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CAS: 121-82-4 EINECS: 204-500-1	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)  T R25;  E R2  Expl. 1.1, H201  Acute Tox. 3, H301
CAS: 2691-41-0 EINECS: 220-260-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)  T R24;  Xn R22;  E R2  Expl. 1.1, H201  Acute Tox. 3, H301; Acute Tox. 3, H311
CAS: 20062-22-0 EINECS: 243-494-5	2,2',4,4',6,6'-hexanitrostilbene  T R25;  E R2  Expl. 1.1, H201  Acute Tox. 3, H301
CAS: 126-73-8 EINECS: 204-800-2 Index number: 015-014-00-2	tributyl phosphate  Xn R22-40;  Xi R38 Carc. Cat. 3  Carc. 2, H351  Acute Tox. 4, H302; Skin Irrit. 2, H315
CAS: 1336-21-6 EINECS: 215-647-6 Index number: 007-001-01-2	ammonia, aqueous solution  C R34;  N R50  Skin Corr. 1B, H314  Aquatic Acute 1, H400

• **Additional information:**

For the listed ingredients, the identity and exact percentages are being withheld as a trade secret.
For the wording of the listed risk phrases refer to section 16.

SECTION 4: First aid measures

• **4.1 Description of first aid measures**

• **General information:** No special measures required.

• **After inhalation:**

Unlikely route of exposure.

Supply fresh air; consult doctor in case of complaints.

• **After skin contact:**

Generally the product does not irritate the skin.

Wash with soap and water.

If skin irritation is experienced, consult a doctor.

• **After eye contact:**

Remove contact lenses if worn.

Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.

• **After swallowing:**

Unlikely route of exposure.

Do not induce vomiting; call for medical help immediately.

• **4.2 Most important symptoms and effects, both acute and delayed** Blast injury if mishandled.

• **Hazards** Danger of blast or crush-type injuries.

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· **4.3 Indication of any immediate medical attention and special treatment needed**

Product may produce physical injury if mishandled. Treatment of these injuries should be based on the blast and compression effects.

SECTION 5: Firefighting measures

· **5.1 Extinguishing media**

· **Suitable extinguishing agents:** DO NOT fight fire when fire reaches explosives.

· **For safety reasons unsuitable extinguishing agents:** None.

· **5.2 Special hazards arising from the substance or mixture**

DO NOT ATTEMPT TO FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions. Can explode or detonate under fire conditions. Burning material may produce toxic vapors. It is recommended that users of explosives material be familiar with the Institute of Makers of Explosives Safety Library publications.

Explosive; mass explosion hazard.

· **5.3 Advice for firefighters**

· **Protective equipment:**

Wear self-contained respiratory protective device.

Wear fully protective suit.

· **Additional information**

Eliminate all ignition sources if safe to do so.

Flammability Classification: (defined by 29 CFR 1910.1200) Explosive. Can explode under fire conditions. Individual devices will randomly explode. Mass explosion of multiple devices is possible under certain conditions. Burning material may produce toxic and irritating vapors. In unusual cases, shrapnel may be thrown from exploding devices under containment. See 2012 Emergency response Guidebook for further information.

SECTION 6: Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures**

Remove persons from danger area.

Ensure adequate ventilation

Wear protective clothing.

Protect from heat.

Evacuate area.

Isolate area and prevent access.

· **6.2 Environmental precautions:** No special measures required.

· **6.3 Methods and material for containment and cleaning up:**

Pick up mechanically.

Send for recovery or disposal in suitable receptacles.

Dispose unusable material as waste according to item 13.

· **6.4 Reference to other sections**

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

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See Section 13 for disposal information.

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SECTION 7: Handling and storage

- **7.1 Precautions for safe handling**
Open and handle receptacle with care.
Handle with care. Avoid jolting, friction and impact.
Use only in well ventilated areas.
Do not subject to grinding/shock/friction.
- **Information about fire - and explosion protection:**
Prevent impact and friction.
Emergency cooling must be available in case of nearby fire.
- **7.2 Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**
Store in a cool location.
Avoid storage near extreme heat, ignition sources or open flame.
- **Information about storage in one common storage facility:** Store away from foodstuffs.
- **Further information about storage conditions:**
Store under lock and key and with access restricted to technical experts or their assistants only.
Keep away from heat.
- **7.3 Specific end use(s)** No further relevant information available.

SECTION 8: Exposure controls/personal protection

- **Additional information about design of technical facilities:** No further data; see item 7.
- **8.1 Control parameters**

Ingredients with limit values that require monitoring at the workplace:

121-82-4 perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)

REL (USA)	Short-term value: 3 mg/m ³ Long-term value: 1,5 mg/m ³ Skin
TLV (USA)	Long-term value: 0,5 mg/m ³ Skin
EL (Canada)	Long-term value: 0,5 mg/m ³ Skin
EV (Canada)	Long-term value: 0,5 mg/m ³ Skin

126-73-8 tributyl phosphate

PEL (USA)	Long-term value: 5 mg/m ³
REL (USA)	Long-term value: 2,5 mg/m ³ , 0,2 ppm

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TLV (USA)	Long-term value: 5* mg/m ³ BEI-A, *inhalable fraction and vapor
EL (Canada)	Long-term value: 0,2 ppm
EV (Canada)	Long-term value: 2,2 mg/m ³ , 0,2 ppm

- **DNELs** No further relevant information available.
- **PNECs** No further relevant information available.

• **Ingredients with biological limit values:**

126-73-8 tributyl phosphate

BEI (USA)	70 % of baseline Medium: red blood cells Time: discretionary Parameter: Cholinesterase activity (nonspecific)
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- **Additional information:** The lists valid during the making were used as basis.

• **8.2 Exposure controls**

• **Personal protective equipment:**

• **General protective and hygienic measures:**

The usual precautionary measures are to be adhered to when handling chemicals.

Keep away from foodstuffs, beverages and feed.

Wash hands before breaks and at the end of work.

• **Respiratory protection:**

Not required under normal conditions of use.

Respiratory protection may be required after product use.

• **Protection of hands:**



Protective gloves

Wear gloves for the protection against mechanical hazards according to NIOSH or EN 388.

• **Material of gloves**

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.

• **Penetration time of glove material**

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

• **Eye protection:**



Safety glasses

Face protection

• **Body protection:** Impervious protective clothing

• **Limitation and supervision of exposure into the environment**

No further relevant information available.

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- **Risk management measures**
Organizational measures should be in place for all activities involving this product.

SECTION 9: Physical and chemical properties

· 9.1 Information on basic physical and chemical properties

· General Information

· Appearance:

Form: Solid material
Colour: According to product specification

· **Odour:** Odourless

· **Odour threshold:** Not determined.

· **pH-value:** Not applicable.

· Change in condition

Melting point/Melting range: Not Determined.

Boiling point/Boiling range: Undetermined.

· **Flash point:** Not applicable.

· **Flammability (solid, gaseous):** Explosive; mass explosion hazard.

· **Auto/Self-ignition temperature:** Not determined.

· **Decomposition temperature:** Not determined.

· **Self-igniting:** Product is not self-igniting.

· **Danger of explosion:** Risk of explosion by shock, friction, fire or other sources of ignition.

· Explosion limits:

Lower: Not determined.

Upper: Not determined.

· **Vapour pressure:** Not applicable.

· **Density:** Not determined.

· **Relative density** Not determined.

· **Vapour density** Not applicable.

· **Evaporation rate** Not applicable.

· **Solubility in / Miscibility with water:**

Variable, dependent upon product composition and packaging.

· **Partition coefficient (n-octanol/water):** Not determined.

· Viscosity:

Dynamic: Not applicable.

Kinematic: Not applicable.

· **9.2 Other information** No further relevant information available.

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SECTION 10: Stability and reactivity

- **10.1 Reactivity**
- **10.2 Chemical stability**
- **Thermal decomposition / conditions to be avoided:**
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- **10.3 Possibility of hazardous reactions**
Danger of explosion.
Toxic fumes may be released if heated above the decomposition point.
- **10.4 Conditions to avoid** No further relevant information available.
- **10.5 Incompatible materials:** No further relevant information available.
- **10.6 Hazardous decomposition products:**
Carbon monoxide and carbon dioxide
Nitrogen oxides
Hydrocarbons

SECTION 11: Toxicological information

- **11.1 Information on toxicological effects**
 - **Acute toxicity:**
- | | | |
|--|------|------------------|
| · LD/LC50 values relevant for classification: | | |
| 126-73-8 tributyl phosphate | | |
| Oral | LD50 | 3000 mg/kg (rat) |
- **Primary irritant effect:**
 - **on the skin:**
Not a skin irritant in unused form. Vapors/particles from used product are possibly irritating to skin.
 - **on the eye:**
Not an eye irritant in unused form. Vapors/particles from used product are possibly irritating to eyes.
 - **Sensitisation:** No sensitising effects known.
 - **Subacute to chronic toxicity:** No further relevant information available.
 - **Acute effects (acute toxicity, irritation and corrosivity):** Danger of blast or crush-type injuries.
 - **Repeated dose toxicity:** No further relevant information available.

SECTION 12: Ecological information

- **12.1 Toxicity**
- **Aquatic toxicity:** No further relevant information available.
- **12.2 Persistence and degradability** No further relevant information available.
- **12.3 Bioaccumulative potential** No further relevant information available.
- **12.4 Mobility in soil** No further relevant information available.
- **Additional ecological information:**
- **General notes:**
Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

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- **12.5 Results of PBT and vPvB assessment**
- **PBT:** Not applicable.
- **vPvB:** Not applicable.
- **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

- **13.1 Waste treatment methods**
- **Recommendation**
Must not be disposed together with household garbage. Do not allow product to reach sewage system. Damaged materials pose a danger to anyone in the immediate area; consult experts for disposal of damaged products.
The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage and disposal for hazardous and nonhazardous wastes. Residual materials should be treated as hazardous.
- **Uncleaned packaging:**
- **Recommendation:** Disposal must be made according to official regulations.
- **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

SECTION 14: Transport information

- | | |
|---|---|
| <ul style="list-style-type: none"> · 14.1 UN-Number · DOT, ADR, IMDG · IATA · 14.2 UN proper shipping name · DOT, IMDG · ADR · IATA · 14.3 Transport hazard class(es) · DOT, ADR, IMDG | <p>UN0065
FORBIDDEN</p> <p>CORD, DETONATING, FLEXIBLE
0065 CORD, DETONATING, FLEXIBLE
FORBIDDEN</p> |
|  <ul style="list-style-type: none"> · Class · Label <hr style="border-top: 1px dashed black;"/> <ul style="list-style-type: none"> · IATA · Class · 14.4 Packing group · DOT, ADR, IMDG · IATA · 14.5 Environmental hazards: · Marine pollutant: · Special marking (IATA): | <p>1.1
1.1D</p> <p>FORBIDDEN</p> <p>II
FORBIDDEN</p> <p>No
FORBIDDEN BY AIR.</p> |

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- **14.6 Special precautions for user** Not applicable.
- **EMS Number:** F-B,S-X
- **14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.
- **Transport/Additional information:**

-
- **ADR**
 - **Limited quantities (LQ)** 0
 - **Excepted quantities (EQ)** Code: E0
Not permitted as Excepted Quantity
 - **Tunnel restriction code** 1

-
- **IMDG**
 - **Limited quantities (LQ)** 0
 - **Excepted quantities (EQ)** Code: E0
Not permitted as Excepted Quantity

-
- **IATA** FORBIDDEN.
 - **UN "Model Regulation":** UN0065, CORD, DETONATING, FLEXIBLE, 1.1D, II

SECTION 15: Regulatory information

- **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
- **United States (USA)**
- **SARA**

· **Section 355 (extremely hazardous substances):**

None of the ingredients are listed.

· **Section 313 (Specific toxic chemical listings):**

None of the ingredients are listed.

· **TSCA (Toxic Substances Control Act):**

All ingredients are listed.

· **Proposition 65 (California):**

· **Chemicals known to cause cancer:**

None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients are listed.

· **Chemicals known to cause reproductive toxicity for males:**

None of the ingredients are listed.

· **Chemicals known to cause developmental toxicity:**

None of the ingredients are listed.

· **Carcinogenic Categories**

· **EPA (Environmental Protection Agency)**

121-82-4 | perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)

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2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	D
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· IARC (International Agency for Research on Cancer)

None of the ingredients are listed.

· TLV (Threshold Limit Value established by ACGIH)

121-82-4	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)	A4
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· NIOSH-Ca (National Institute for Occupational Safety and Health)

None of the ingredients are listed.

· Canada

· Canadian Domestic Substances List (DSL)

Some components are listed on the NDSL.

All ingredients are listed.

· Canadian Ingredient Disclosure list (limit 0.1%)

None of the ingredients are listed.

· Canadian Ingredient Disclosure list (limit 1%)

126-73-8	tributyl phosphate
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· Other regulations, limitations and prohibitive regulations

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

· Substances of very high concern (SVHC) according to REACH, Article 57

None of the ingredients are listed.

· 15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

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· Relevant phrases

H200 Unstable explosives.

H201 Explosive; mass explosion hazard.

H301 Toxic if swallowed.

H302 Harmful if swallowed.

H311 Toxic in contact with skin.

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H314 Causes severe skin burns and eye damage.

H315 Causes skin irritation.

H351 Suspected of causing cancer.

H400 Very toxic to aquatic life.

R2 Risk of explosion by shock, friction, fire or other sources of ignition.

R22 Harmful if swallowed.

R24 Toxic in contact with skin.

R25 Toxic if swallowed.

R3 Extreme risk of explosion by shock, friction, fire or other sources of ignition.

R34 Causes burns.

R38 Irritating to skin.

R40 Limited evidence of a carcinogenic effect.

R50 Very toxic to aquatic organisms.

• **Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)

IMDG: International Maritime Code for Dangerous Goods

DOT: US Department of Transportation

IATA: International Air Transport Association

GHS: Globally Harmonised System of Classification and Labelling of Chemicals

ACGIH: American Conference of Governmental Industrial Hygienists

EINECS: European Inventory of Existing Commercial Chemical Substances

ELINCS: European List of Notified Chemical Substances

CAS: Chemical Abstracts Service (division of the American Chemical Society)

NFPA: National Fire Protection Association (USA)

HMIS: Hazardous Materials Identification System (USA)

WHMIS: Workplace Hazardous Materials Information System (Canada)

DNEL: Derived No-Effect Level (REACH)

PNEC: Predicted No-Effect Concentration (REACH)

LC50: Lethal concentration, 50 percent

LD50: Lethal dose, 50 percent

Expl. 1.1: Explosives, Division 1.1

Unst. Expl.: Explosives, Unstable explosives

Acute Tox. 3: Acute toxicity, Hazard Category 3

Acute Tox. 4: Acute toxicity, Hazard Category 4

Skin Corr. 1B: Skin corrosion/irritation, Hazard Category 1B

Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2

Carc. 2: Carcinogenicity, Hazard Category 2

Aquatic Acute 1: Hazardous to the aquatic environment - AcuteHazard, Category 1

• **Sources**

SDS Prepared by:

ChemTel Inc.

1305 North Florida Avenue

Tampa, Florida USA 33602-2902

Toll Free North America 1-888-255-3924 Intl. +01 813-248-0573

Website: www.chemtelinc.com

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and
OSHA GHS

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

- **1.1 Product identifier**
- **Trade name: Detonating Cord, Specialty (Oil Field) (1.4D)**
- **Article number: 1121**
- **Other product identifiers:**
 - 8/40 RDX NYLON LS
 - 8/40 HMX NYLON LS
 - 8/40 RDX NYLON RIBBON LS
 - 8/40 HMX NYLON RIBBON LS
 - 17/80 RDX NYLON
 - 10/50 HMX LOPRO NYLON LS
 - 17/80 RDX NYLON LS
 - 13/60 HMX NYLON LS
 - 17/80 RDX NYLON XHV LS
 - 13/60 HMX HI-TEMP LOW PROFILE LS
 - 17/80 PETN Plastic
 - 13/60 HMX HI-TEMP LS
 - 21/100 PETN Plastic
 - 17/80 HMX NYLON LS
 - 17/80 HNS LS
 - 17/80 HMX HI-TEMP LS
 - 17/80 HMX NYLON XHV LS
 - 17/80 HMX EXPOSED
- **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
- **Application of the substance / the mixture**
Explosive product.
Commercial blasting applications
- **1.3 Details of the supplier of the Safety Data Sheet**
- **Manufacturer/Supplier:**
 - Dyno Nobel Inc.
 - 2795 East Cottonwood Parkway, Suite 500
 - Salt Lake City, Utah 84121
 - Phone: 801-364-4800
 - Fax: 801-321-6703
 - E-Mail: dnna.hse@am.dynonobel.com
- **1.4 Emergency telephone number:**
 - CHEMTREC
 - 1-800-424-9300 (US/Canada)
 - +01 703-527-3887 (International)

SECTION 2: Hazards identification

- **2.1 Classification of the substance or mixture**
- **Classification according to Regulation (EC) No 1272/2008**
Classifications listed also are applicable to the OSHA GHS Hazard Communication Standard (29CFR1910.1200).

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exploding bomb

Expl. 1.4 H204 Fire or projection hazard.

• **Classification according to Directive 67/548/EEC or Directive 1999/45/EC**

R5: Heating may cause an explosion.

• **Information concerning particular hazards for human and environment:**

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

• **Classification system:**

The classification is according to the latest editions of the EU-lists, and extended by company and literature data.

The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

• **Additional information:**

There are no other hazards not otherwise classified that have been identified.

0 percent of the mixture consists of component(s) of unknown toxicity

• **2.2 Label elements**

• **Labelling according to Regulation (EC) No 1272/2008**

The product is additionally classified and labelled according to the Globally Harmonized System within the United States (GHS).

The product is classified and labelled according to the CLP regulation.

• **Hazard pictograms**



GHS01

• **Signal word** Warning

• **Hazard statements**

H204 Fire or projection hazard.

• **Precautionary statements**

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P250 Do not subject to grinding/shock/friction.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P240 Ground/bond container and receiving equipment.

P373 DO NOT fight fire when fire reaches explosives.

P370+P380 In case of fire: Evacuate area.

P372 Explosion risk in case of fire.

P401 Store in accordance with local/regional/national/international regulations.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

• **Hazard description:**

• **WHMIS-symbols:** Explosive products are not classified under WHMIS.

• **NFPA ratings (scale 0 - 4)** Not available.

• **HMIS-ratings (scale 0 - 4)** Not available

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· **HMIS Long Term Health Hazard Substances**

None of the ingredients are listed.

· **2.3 Other hazards**

· **Results of PBT and vPvB assessment**

· **PBT:** Not applicable.

· **vPvB:** Not applicable.

· **Explosive Product Notice**

PREVENTION OF ACCIDENTS IN THE USE OF EXPLOSIVES - The prevention of accidents in the use of explosives is a result of careful planning and observance of the best known practices. The explosives user must remember that he is dealing with a powerful force and that various devices and methods have been developed to assist him in directing this force. He should realize that this force, if misdirected, may either kill or injure both him and his fellow workers.

WARNING - All explosives are dangerous and must be carefully handled and used following approved safety procedures either by or under the direction of competent, experienced persons in accordance with all applicable federal, state, and local laws, regulations, or ordinances. If you have any questions or doubts as to how to use any explosive product, DO NOT USE IT before consulting with your supervisor, or the manufacturer, if you do not have a supervisor. If your supervisor has any questions or doubts, he should consult the manufacturer before use.

SECTION 3: Composition/information on ingredients

· **3.2 Mixtures**

· **Description:**

Mixture of substances listed below with nonhazardous additions.












Product will consist of flexible white or colored cord. Coloration will determine the explosive present.

White - Pentaerythritol tetranitrate (PETN - CAS 78-11-5) and/or Cyclotetramethylene tetranitramine (HMX - 2691-41-0)

Pink - Cyclotrimethylene trinitramine (RDX - 121-82-4)

Yellow - Hexanitrostilbene (HNS - 20062-22-0)

· **Dangerous components:**

CAS: 78-11-5 EINECS: 201-084-3 Index number: 603-035-00-5	pentaerythritol tetranitrate (PETN)  E R3 -----  Unst. Expl., H200
CAS: 121-82-4 EINECS: 204-500-1	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)  T R25;  E R2 -----  Expl. 1.1, H201  Acute Tox. 3, H301
CAS: 2691-41-0 EINECS: 220-260-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)  T R24;  Xn R22;  E R2 -----  Expl. 1.1, H201  Acute Tox. 3, H301; Acute Tox. 3, H311

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




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CAS: 20062-22-0 EINECS: 243-494-5	2,2',4,4',6,6'-hexanitrostilbene  T R25;  E R2  Expl. 1.1, H201  Acute Tox. 3, H301
CAS: 126-73-8 EINECS: 204-800-2 Index number: 015-014-00-2	tributyl phosphate  Xn R22-40;  Xi R38 Carc. Cat. 3  Carc. 2, H351  Acute Tox. 4, H302;  Skin Irrit. 2, H315
CAS: 1336-21-6 EINECS: 215-647-6 Index number: 007-001-01-2	ammonia, aqueous solution  C R34;  N R50  Skin Corr. 1B, H314  Aquatic Acute 1, H400

Additional information:

For the listed ingredients, the identity and exact percentages are being withheld as a trade secret.
For the wording of the listed risk phrases refer to section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

• **General information:** No special measures required.

After inhalation:

Unlikely route of exposure.

Supply fresh air; consult doctor in case of complaints.

After skin contact:

Generally the product does not irritate the skin.

Wash with soap and water.

If skin irritation is experienced, consult a doctor.

After eye contact:

Remove contact lenses if worn.

Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.

After swallowing:

Unlikely route of exposure.

Do not induce vomiting; call for medical help immediately.

• **4.2 Most important symptoms and effects, both acute and delayed** Blast injury if mishandled.

• **Hazards** Danger of blast or crush-type injuries.

• **4.3 Indication of any immediate medical attention and special treatment needed**

Product may produce physical injury if mishandled. Treatment of these injuries should be based on the blast and compression effects.

SECTION 5: Firefighting measures

5.1 Extinguishing media

• **Suitable extinguishing agents:** DO NOT fight fire when fire reaches explosives.

• **For safety reasons unsuitable extinguishing agents:** None.

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- **5.2 Special hazards arising from the substance or mixture**
DO NOT ATTEMPT TO FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions. Can explode or detonate under fire conditions. Burning material may produce toxic vapors. It is recommended that users of explosives material be familiar with the Institute of Makers of Explosives Safety Library publications.
Product may explode if burned in confined space. Individual cartridges may explode. Mass explosion of many cartridges at once is unlikely.
- **5.3 Advice for firefighters**
- **Protective equipment:**
Wear self-contained respiratory protective device.
Wear fully protective suit.
- **Additional information**
Eliminate all ignition sources if safe to do so.
Flammability Classification: (defined by 29 CFR 1910.1200) Explosive. Can explode under fire conditions. Individual devices will randomly explode. Will not mass explode if multiple devices are involved. Burning material may produce toxic and irritating vapors. In unusual cases, shrapnel may be thrown from exploding devices under containment. See 2008 Emergency response Guidebook for further information.

SECTION 6: Accidental release measures

- **6.1 Personal precautions, protective equipment and emergency procedures**
Remove persons from danger area.
Ensure adequate ventilation
Wear protective clothing.
Protect from heat.
Evacuate area.
Isolate area and prevent access.
- **6.2 Environmental precautions:** No special measures required.
- **6.3 Methods and material for containment and cleaning up:**
Pick up mechanically.
Send for recovery or disposal in suitable receptacles.
Dispose unusable material as waste according to item 13.
- **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

SECTION 7: Handling and storage

- **7.1 Precautions for safe handling**
Handle with care. Avoid jolting, friction and impact.
Use only in well ventilated areas.
Do not subject to grinding/shock/friction.
- **Information about fire - and explosion protection:**
Protect from heat.
Emergency cooling must be available in case of nearby fire.

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- **7.2 Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**
Store in a cool location.
Avoid storage near extreme heat, ignition sources or open flame.
- **Information about storage in one common storage facility:** Store away from foodstuffs.
- **Further information about storage conditions:**
Store in cool, dry conditions in well sealed receptacles.
Keep away from heat.
- **7.3 Specific end use(s)** No further relevant information available.

SECTION 8: Exposure controls/personal protection

- **Additional information about design of technical facilities:** No further data; see item 7.
- **8.1 Control parameters**

· **Ingredients with limit values that require monitoring at the workplace:**

121-82-4 perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)

REL (USA)	Short-term value: 3 mg/m ³ Long-term value: 1,5 mg/m ³ Skin
-----------	---

TLV (USA)	Long-term value: 0,5 mg/m ³ Skin
-----------	--

EL (Canada)	Long-term value: 0,5 mg/m ³ Skin
-------------	--

EV (Canada)	Long-term value: 0,5 mg/m ³ Skin
-------------	--

126-73-8 tributyl phosphate

PEL (USA)	Long-term value: 5 mg/m ³
-----------	--------------------------------------

REL (USA)	Long-term value: 2,5 mg/m ³ , 0,2 ppm
-----------	--

TLV (USA)	Long-term value: 5* mg/m ³ BEI-A, *inhalable fraction and vapor
-----------	---

EL (Canada)	Long-term value: 0,2 ppm
-------------	--------------------------

EV (Canada)	Long-term value: 2,2 mg/m ³ , 0,2 ppm
-------------	--

- **DNELs** No further relevant information available.
- **PNECs** No further relevant information available.

· **Ingredients with biological limit values:**

126-73-8 tributyl phosphate

BEI (USA)	70 % of baseline Medium: red blood cells Time: discretionary Parameter: Cholinesterase activity (nonspecific)
-----------	--

- **Additional information:** The lists valid during the making were used as basis.

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- **8.2 Exposure controls**
- **Personal protective equipment:**
- **General protective and hygienic measures:**
The usual precautionary measures are to be adhered to when handling chemicals.
Keep away from foodstuffs, beverages and feed.
Wash hands before breaks and at the end of work.
- **Respiratory protection:**
Not required under normal conditions of use.
Respiratory protection may be required after product use.
- **Protection of hands:**



Protective gloves

Wear gloves for the protection against mechanical hazards according to NIOSH or EN 388.

- **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
- **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
- **Eye protection:**



Safety glasses

Face protection

- **Body protection:** Protective work clothing
- **Limitation and supervision of exposure into the environment**
No further relevant information available.
- **Risk management measures**
Organizational measures should be in place for all activities involving this product.

SECTION 9: Physical and chemical properties

- **9.1 Information on basic physical and chemical properties**
- **General Information**
- **Appearance:**

Form:	Solid material
Colour:	According to product specification
- **Odour:** Odourless
- **Odour threshold:** Not determined.
- **pH-value:** Not applicable.

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- **Change in condition**
 - Melting point/Melting range:** Not Determined.
 - Boiling point/Boiling range:** Undetermined.
- **Flash point:** Not applicable.
- **Flammability (solid, gaseous):** Fire or projection hazard.
- **Auto/Self-ignition temperature:** Not determined.
- **Decomposition temperature:** Not determined.
- **Self-igniting:** Product is not self-igniting.
- **Danger of explosion:** Heating may cause an explosion.
- **Explosion limits:**
 - Lower:** Not determined.
 - Upper:** Not determined.
- **Vapour pressure:** Not applicable.
- **Density:** Not determined.
- **Relative density** Not determined.
- **Vapour density** Not applicable.
- **Evaporation rate** Not applicable.
- **Solubility in / Miscibility with water:** Variable, dependent upon product composition and packaging.
- **Partition coefficient (n-octanol/water):** Not determined.
- **Viscosity:**
 - Dynamic:** Not applicable.
 - Kinematic:** Not applicable.
- **9.2 Other information** No further relevant information available.

SECTION 10: Stability and reactivity

- **10.1 Reactivity**
- **10.2 Chemical stability**
- **Thermal decomposition / conditions to be avoided:**
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- **10.3 Possibility of hazardous reactions**
Danger of explosion.
Toxic fumes may be released if heated above the decomposition point.
- **10.4 Conditions to avoid** No further relevant information available.
- **10.5 Incompatible materials:** No further relevant information available.
- **10.6 Hazardous decomposition products:**
Carbon monoxide and carbon dioxide
Nitrogen oxides

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Hydrocarbons

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SECTION 11: Toxicological information

· 11.1 Information on toxicological effects

· Acute toxicity:

· LD/LC50 values relevant for classification:

126-73-8 tributyl phosphate

Oral	LD50	3000 mg/kg (rat)
------	------	------------------

· Primary irritant effect:

· on the skin:

Not a skin irritant in unused form. Vapors/particles from used product are possibly irritating to skin.

· on the eye:

Not an eye irritant in unused form. Vapors/particles from used product are possibly irritating to eyes.

· Sensitisation: No sensitising effects known.

· Subacute to chronic toxicity: No further relevant information available.

· Acute effects (acute toxicity, irritation and corrosivity): Danger of blast or crush-type injuries.

· Repeated dose toxicity: No further relevant information available.

SECTION 12: Ecological information

· 12.1 Toxicity

· Aquatic toxicity: No further relevant information available.

· 12.2 Persistence and degradability No further relevant information available.

· 12.3 Bioaccumulative potential No further relevant information available.

· 12.4 Mobility in soil No further relevant information available.

· Additional ecological information:

· General notes:

Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water

Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

· 12.5 Results of PBT and vPvB assessment

· PBT: Not applicable.

· vPvB: Not applicable.

· 12.6 Other adverse effects No further relevant information available.

SECTION 13: Disposal considerations

· 13.1 Waste treatment methods

· Recommendation

Must not be disposed together with household garbage. Do not allow product to reach sewage system.

Damaged materials pose a danger to anyone in the immediate area; consult experts for disposal of damaged products.

The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage

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and disposal for hazardous and nonhazardous wastes. Residual materials should be treated as hazardous.

- **Uncleaned packaging:**
- **Recommendation:** Disposal must be made according to official regulations.
- **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

SECTION 14: Transport information

- **14.1 UN-Number**
- **DOT, ADR, IMDG, IATA** UN0289
- **14.2 UN proper shipping name**
- **DOT, IMDG, IATA** CORD, DETONATING, FLEXIBLE
- **ADR** 0289 CORD, DETONATING, FLEXIBLE
- **14.3 Transport hazard class(es)**

- **DOT**



- **Class** 1.4
- **Label** 1.4

- **ADR, IMDG, IATA**



- **Class** 1.4
- **Label** 1.4D
- **14.4 Packing group**
- **DOT, ADR, IMDG, IATA** II
- **14.5 Environmental hazards:**
- **Marine pollutant:** No
- **Special marking (IATA):** Prohibited from Transport in Passenger Aircraft.



Cargo Aircraft Only.

- **14.6 Special precautions for user** Not applicable.
- **EMS Number:** F-B,S-X
- **14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.

- **Transport/Additional information:**

- **ADR**
- **Limited quantities (LQ)** 0

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- **Excepted quantities (EQ)**

Code: E0

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- **Tunnel restriction code**

Not permitted as Excepted Quantity

- **UN "Model Regulation":**

2(E)

UN0289, CORD, DETONATING, FLEXIBLE, 1.4D, II

SECTION 15: Regulatory information

- **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
- **United States (USA)**
- **SARA**

- **Section 355 (extremely hazardous substances):**

None of the ingredients are listed.

- **Section 313 (Specific toxic chemical listings):**

None of the ingredients are listed.

- **TSCA (Toxic Substances Control Act):**

All ingredients are listed.

- **Proposition 65 (California):**

- **Chemicals known to cause cancer:**

None of the ingredients is listed.

- **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients are listed.

- **Chemicals known to cause reproductive toxicity for males:**

None of the ingredients are listed.

- **Chemicals known to cause developmental toxicity:**

None of the ingredients are listed.

- **Carcinogenic Categories**

- **EPA (Environmental Protection Agency)**

121-82-4 perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)

C

2691-41-0 octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)

D

- **IARC (International Agency for Research on Cancer)**

None of the ingredients are listed.

- **TLV (Threshold Limit Value established by ACGIH)**

121-82-4 perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)

A4

- **NIOSH-Ca (National Institute for Occupational Safety and Health)**

None of the ingredients are listed.

- **Canada**

- **Canadian Domestic Substances List (DSL)**

Some components are listed on the NDSL.

All ingredients are listed.

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· **Canadian Ingredient Disclosure list (limit 0.1%)**

None of the ingredients are listed.

· **Canadian Ingredient Disclosure list (limit 1%)**

126-73-8 tributyl phosphate

· **Other regulations, limitations and prohibitive regulations**

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

· **Substances of very high concern (SVHC) according to REACH, Article 57**

None of the ingredients are listed.

· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

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· **Relevant phrases**

H200 Unstable explosives.

H201 Explosive; mass explosion hazard.

H301 Toxic if swallowed.

H302 Harmful if swallowed.

H311 Toxic in contact with skin.

H314 Causes severe skin burns and eye damage.

H315 Causes skin irritation.

H351 Suspected of causing cancer.

H400 Very toxic to aquatic life.

R2 Risk of explosion by shock, friction, fire or other sources of ignition.

R22 Harmful if swallowed.

R24 Toxic in contact with skin.

R25 Toxic if swallowed.

R3 Extreme risk of explosion by shock, friction, fire or other sources of ignition.

R34 Causes burns.

R38 Irritating to skin.

R40 Limited evidence of a carcinogenic effect.

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R50 Very toxic to aquatic organisms.

• **Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
 IMDG: International Maritime Code for Dangerous Goods
 DOT: US Department of Transportation
 IATA: International Air Transport Association
 GHS: Globally Harmonised System of Classification and Labelling of Chemicals
 ACGIH: American Conference of Governmental Industrial Hygienists
 EINECS: European Inventory of Existing Commercial Chemical Substances
 ELINCS: European List of Notified Chemical Substances
 CAS: Chemical Abstracts Service (division of the American Chemical Society)
 NFPA: National Fire Protection Association (USA)
 HMIS: Hazardous Materials Identification System (USA)
 WHMIS: Workplace Hazardous Materials Information System (Canada)
 DNEL: Derived No-Effect Level (REACH)
 PNEC: Predicted No-Effect Concentration (REACH)
 LC50: Lethal concentration, 50 percent
 LD50: Lethal dose, 50 percent
 Expl. 1.1: Explosives, Division 1.1
 Expl. 1.4: Explosives, Division 1.4
 Unst. Expl.: Explosives, Unstable explosives
 Acute Tox. 3: Acute toxicity, Hazard Category 3
 Acute Tox. 4: Acute toxicity, Hazard Category 4
 Skin Corr. 1B: Skin corrosion/irritation, Hazard Category 1B
 Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2
 Carc. 2: Carcinogenicity, Hazard Category 2
 Aquatic Acute 1: Hazardous to the aquatic environment - AcuteHazard, Category 1

• **Sources**

SDS Prepared by:

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Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and
OSHA GHS

Printing date 01.11.2018

Revision: 01.11.2018

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

- **1.1 Product identifier**
- **Trade name: Detonating Cord, Specialty (Oil Field) (Class 1.4S)**
- **Article number:** 1121
- **Other product identifiers:**
 - 8/40 RDX NYLON LS
 - 8/40 HMX NYLON LS
 - 8/40 RDX NYLON RIBBON LS
 - 8/40 HMX NYLON RIBBON LS
 - 17/80 RDX NYLON
 - 10/50 HMX LOPRO NYLON LS
 - 17/80 RDX NYLON LS
 - 13/60 HMX NYLON LS
 - 17/80 RDX NYLON XHV LS
 - 13/60 HMX HI-TEMP LOW PROFILE LS
 - 17/80 PETN Plastic
 - 13/60 HMX HI-TEMP LS
 - 21/100 PETN Plastic
 - 17/80 HMX NYLON LS
 - 17/80 HNS LS
 - 17/80 HMX HI-TEMP LS
 - 17/80 HMX NYLON XHV LS
 - 17/80 HMX EXPOSED
- **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
- **Application of the substance / the mixture**
Explosive product.
Commercial blasting applications
- **1.3 Details of the supplier of the Safety Data Sheet**
- **Manufacturer/Supplier:**
 - Dyno Nobel Inc.
 - 2795 East Cottonwood Parkway, Suite 500
 - Salt Lake City, Utah 84121
 - Phone: 801-364-4800
 - Fax: 801-321-6703
 - E-Mail: dnna.hse@am.dynonobel.com
- **1.4 Emergency telephone number:**
 - CHEMTREC
 - 1-800-424-9300 (US/Canada)
 - +01 703-527-3887 (International)

SECTION 2: Hazards identification

- **2.1 Classification of the substance or mixture**
- **Classification according to Regulation (EC) No 1272/2008**
Classifications listed also are applicable to the OSHA GHS Hazard Communication Standard (29CFR1910.1200).

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exploding bomb

Expl. 1.4 H204 Fire or projection hazard.

• **Classification according to Directive 67/548/EEC or Directive 1999/45/EC**

R5: Heating may cause an explosion.

• **Information concerning particular hazards for human and environment:**

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

• **Classification system:**

The classification is according to the latest editions of the EU-lists, and extended by company and literature data.

The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

• **Additional information:**

There are no other hazards not otherwise classified that have been identified.

0 percent of the mixture consists of component(s) of unknown toxicity

• **2.2 Label elements**

• **Labelling according to Regulation (EC) No 1272/2008**

The product is additionally classified and labelled according to the Globally Harmonized System within the United States (GHS).

The product is classified and labelled according to the CLP regulation.

• **Hazard pictograms**



GHS01

• **Signal word** Warning

• **Hazard statements**

H204 Fire or projection hazard.

• **Precautionary statements**

P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P250 Do not subject to grinding/shock/friction.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P240 Ground/bond container and receiving equipment.

P373 DO NOT fight fire when fire reaches explosives.

P370+P380 In case of fire: Evacuate area.

P372 Explosion risk in case of fire.

P401 Store in accordance with local/regional/national/international regulations.

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

• **Hazard description:**

• **WHMIS-symbols:** Explosive products are not classified under WHMIS.

• **NFPA ratings (scale 0 - 4)** Not available.

• **HMIS-ratings (scale 0 - 4)** Not available

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· **HMIS Long Term Health Hazard Substances**

None of the ingredients are listed.

· **2.3 Other hazards**

· **Results of PBT and vPvB assessment**

· **PBT:** Not applicable.

· **vPvB:** Not applicable.

· **Explosive Product Notice**

PREVENTION OF ACCIDENTS IN THE USE OF EXPLOSIVES - The prevention of accidents in the use of explosives is a result of careful planning and observance of the best known practices. The explosives user must remember that he is dealing with a powerful force and that various devices and methods have been developed to assist him in directing this force. He should realize that this force, if misdirected, may either kill or injure both him and his fellow workers.

WARNING - All explosives are dangerous and must be carefully handled and used following approved safety procedures either by or under the direction of competent, experienced persons in accordance with all applicable federal, state, and local laws, regulations, or ordinances. If you have any questions or doubts as to how to use any explosive product, DO NOT USE IT before consulting with your supervisor, or the manufacturer, if you do not have a supervisor. If your supervisor has any questions or doubts, he should consult the manufacturer before use.

SECTION 3: Composition/information on ingredients

· **3.2 Mixtures**

· **Description:**

Mixture of substances listed below with nonhazardous additions.












Product will consist of flexible white or colored cord. Coloration will determine the explosive present.

White - Pentaerythritol tetranitrate (PETN - CAS 78-11-5) and/or Cyclotetramethylene tetranitramine (HMX - 2691-41-0)

Pink - Cyclotrimethylene trinitramine (RDX - 121-82-4)

Yellow - Hexanitrostilbene (HNS - 20062-22-0)

· **Dangerous components:**

CAS: 78-11-5 EINECS: 201-084-3 Index number: 603-035-00-5	pentaerythritol tetranitrate (PETN)  E R3 -----  Unst. Expl., H200
CAS: 121-82-4 EINECS: 204-500-1	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)  T R25;  E R2 -----  Expl. 1.1, H201  Acute Tox. 3, H301
CAS: 2691-41-0 EINECS: 220-260-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)  T R24;  Xn R22;  E R2 -----  Expl. 1.1, H201  Acute Tox. 3, H301; Acute Tox. 3, H311

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CAS: 20062-22-0 EINECS: 243-494-5	2,2',4,4',6,6'-hexanitrostilbene  T R25;  E R2 -----  Expl. 1.1, H201  Acute Tox. 3, H301
CAS: 126-73-8 EINECS: 204-800-2 Index number: 015-014-00-2	tributyl phosphate  Xn R22-40;  Xi R38 Carc. Cat. 3 -----  Carc. 2, H351  Acute Tox. 4, H302; Skin Irrit. 2, H315
CAS: 1336-21-6 EINECS: 215-647-6 Index number: 007-001-01-2	ammonia, aqueous solution  C R34;  N R50 -----  Skin Corr. 1B, H314  Aquatic Acute 1, H400

Additional information:

For the listed ingredients, the identity and exact percentages are being withheld as a trade secret.
For the wording of the listed risk phrases refer to section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

• **General information:** No special measures required.

• **After inhalation:**

Unlikely route of exposure.

Supply fresh air; consult doctor in case of complaints.

• **After skin contact:**

Generally the product does not irritate the skin.

Wash with soap and water.

If skin irritation is experienced, consult a doctor.

• **After eye contact:**

Remove contact lenses if worn.

Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.

• **After swallowing:**

Unlikely route of exposure.

Do not induce vomiting; call for medical help immediately.

• **4.2 Most important symptoms and effects, both acute and delayed** Blast injury if mishandled.

• **Hazards** Danger of blast or crush-type injuries.

• **4.3 Indication of any immediate medical attention and special treatment needed**

Product may produce physical injury if mishandled. Treatment of these injuries should be based on the blast and compression effects.

SECTION 5: Firefighting measures

5.1 Extinguishing media

• **Suitable extinguishing agents:** DO NOT fight fire when fire reaches explosives.

• **For safety reasons unsuitable extinguishing agents:** None.

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• **5.2 Special hazards arising from the substance or mixture**

DO NOT ATTEMPT TO FIGHT FIRES INVOLVING EXPLOSIVE MATERIALS. Evacuate all personnel to a predetermined safe location, no less than 2,500 feet in all directions. Can explode or detonate under fire conditions. Burning material may produce toxic vapors. It is recommended that users of explosives material be familiar with the Institute of Makers of Explosives Safety Library publications.

Product may explode if burned in confined space. Individual cartridges may explode. Mass explosion of many cartridges at once is unlikely.

• **5.3 Advice for firefighters**

• **Protective equipment:**

Wear self-contained respiratory protective device.

Wear fully protective suit.

• **Additional information**

Eliminate all ignition sources if safe to do so.

Flammability Classification: (defined by 29 CFR 1910.1200) Explosive. Can explode under fire conditions. Individual devices will randomly explode. Will not mass explode if multiple devices are involved. Burning material may produce toxic and irritating vapors. In unusual cases, shrapnel may be thrown from exploding devices under containment. See 2008 Emergency response Guidebook for further information.

SECTION 6: Accidental release measures

• **6.1 Personal precautions, protective equipment and emergency procedures**

Remove persons from danger area.

Ensure adequate ventilation

Wear protective clothing.

Protect from heat.

Evacuate area.

Isolate area and prevent access.

• **6.2 Environmental precautions:** No special measures required.

• **6.3 Methods and material for containment and cleaning up:**

Pick up mechanically.

Send for recovery or disposal in suitable receptacles.

Dispose unusable material as waste according to item 13.

• **6.4 Reference to other sections**

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information.

SECTION 7: Handling and storage

• **7.1 Precautions for safe handling**

Handle with care. Avoid jolting, friction and impact.

Use only in well ventilated areas.

Do not subject to grinding/shock/friction.

• **Information about fire - and explosion protection:**

Protect from heat.

Emergency cooling must be available in case of nearby fire.

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- **7.2 Conditions for safe storage, including any incompatibilities**
- **Storage:**
- **Requirements to be met by storerooms and receptacles:**
Store in a cool location.
Avoid storage near extreme heat, ignition sources or open flame.
- **Information about storage in one common storage facility:** Store away from foodstuffs.
- **Further information about storage conditions:**
Store in cool, dry conditions in well sealed receptacles.
Keep away from heat.
- **7.3 Specific end use(s)** No further relevant information available.

SECTION 8: Exposure controls/personal protection

- **Additional information about design of technical facilities:** No further data; see item 7.
- **8.1 Control parameters**

Ingredients with limit values that require monitoring at the workplace:

121-82-4 perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)

REL (USA)	Short-term value: 3 mg/m ³ Long-term value: 1,5 mg/m ³ Skin
TLV (USA)	Long-term value: 0,5 mg/m ³ Skin
EL (Canada)	Long-term value: 0,5 mg/m ³ Skin
EV (Canada)	Long-term value: 0,5 mg/m ³ Skin

126-73-8 tributyl phosphate

PEL (USA)	Long-term value: 5 mg/m ³
REL (USA)	Long-term value: 2,5 mg/m ³ , 0,2 ppm
TLV (USA)	Long-term value: 5* mg/m ³ BEI-A, *inhalable fraction and vapor
EL (Canada)	Long-term value: 0,2 ppm
EV (Canada)	Long-term value: 2,2 mg/m ³ , 0,2 ppm

- **DNELs** No further relevant information available.
- **PNECs** No further relevant information available.

Ingredients with biological limit values:

126-73-8 tributyl phosphate

BEI (USA)	70 % of baseline Medium: red blood cells Time: discretionary Parameter: Cholinesterase activity (nonspecific)
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- **Additional information:** The lists valid during the making were used as basis.

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- **8.2 Exposure controls**
- **Personal protective equipment:**
- **General protective and hygienic measures:**
The usual precautionary measures are to be adhered to when handling chemicals.
Keep away from foodstuffs, beverages and feed.
Wash hands before breaks and at the end of work.
- **Respiratory protection:**
Not required under normal conditions of use.
Respiratory protection may be required after product use.
- **Protection of hands:**



Protective gloves

Wear gloves for the protection against mechanical hazards according to NIOSH or EN 388.

- **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
- **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
- **Eye protection:**



Safety glasses

Face protection

- **Body protection:** Protective work clothing
- **Limitation and supervision of exposure into the environment**
No further relevant information available.
- **Risk management measures**
Organizational measures should be in place for all activities involving this product.

SECTION 9: Physical and chemical properties

- **9.1 Information on basic physical and chemical properties**
- **General Information**
- **Appearance:**

Form:	Solid material
Colour:	According to product specification
- **Odour:** Odourless
- **Odour threshold:** Not determined.
- **pH-value:** Not applicable.

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- **Change in condition**
 - Melting point/Melting range:** Not Determined.
 - Boiling point/Boiling range:** Undetermined.
- **Flash point:** Not applicable.
- **Flammability (solid, gaseous):** Fire or projection hazard.
- **Auto/Self-ignition temperature:** Not determined.
- **Decomposition temperature:** Not determined.
- **Self-igniting:** Product is not self-igniting.
- **Danger of explosion:** Heating may cause an explosion.
- **Explosion limits:**
 - Lower:** Not determined.
 - Upper:** Not determined.
- **Vapour pressure:** Not applicable.
- **Density:** Not determined.
- **Relative density** Not determined.
- **Vapour density** Not applicable.
- **Evaporation rate** Not applicable.
- **Solubility in / Miscibility with water:** Variable, dependent upon product composition and packaging.
- **Partition coefficient (n-octanol/water):** Not determined.
- **Viscosity:**
 - Dynamic:** Not applicable.
 - Kinematic:** Not applicable.
- **9.2 Other information** No further relevant information available.

SECTION 10: Stability and reactivity

- **10.1 Reactivity**
- **10.2 Chemical stability**
- **Thermal decomposition / conditions to be avoided:**
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- **10.3 Possibility of hazardous reactions**
Danger of explosion.
Toxic fumes may be released if heated above the decomposition point.
- **10.4 Conditions to avoid** No further relevant information available.
- **10.5 Incompatible materials:** No further relevant information available.
- **10.6 Hazardous decomposition products:**
Carbon monoxide and carbon dioxide
Nitrogen oxides

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Hydrocarbons

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SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity:

LD/LC50 values relevant for classification:

126-73-8 tributyl phosphate

Oral	LD50	3000 mg/kg (rat)
------	------	------------------

Primary irritant effect:

on the skin:

Not a skin irritant in unused form. Vapors/particles from used product are possibly irritating to skin.

on the eye:

Not an eye irritant in unused form. Vapors/particles from used product are possibly irritating to eyes.

• **Sensitisation:** No sensitising effects known.

• **Subacute to chronic toxicity:** No further relevant information available.

• **Acute effects (acute toxicity, irritation and corrosivity):** Danger of blast or crush-type injuries.

• **Repeated dose toxicity:** No further relevant information available.

SECTION 12: Ecological information

12.1 Toxicity

• **Aquatic toxicity:** No further relevant information available.

• **12.2 Persistence and degradability** No further relevant information available.

• **12.3 Bioaccumulative potential** No further relevant information available.

• **12.4 Mobility in soil** No further relevant information available.

Additional ecological information:

General notes:

Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water

Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

12.5 Results of PBT and vPvB assessment

• **PBT:** Not applicable.

• **vPvB:** Not applicable.

• **12.6 Other adverse effects** No further relevant information available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Recommendation

Must not be disposed together with household garbage. Do not allow product to reach sewage system.

Damaged materials pose a danger to anyone in the immediate area; consult experts for disposal of damaged products.

The user of this material has the responsibility to dispose of unused material, residues and containers in compliance with all relevant local, state and federal laws and regulations regarding treatment, storage

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and disposal for hazardous and nonhazardous wastes. Residual materials should be treated as hazardous.

- **Uncleaned packaging:**
- **Recommendation:** Disposal must be made according to official regulations.
- **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

SECTION 14: Transport information

- | | |
|---|--|
| · 14.1 UN-Number | UN0349 |
| · DOT, ADR, IMDG, IATA | Proper Shipping Name should reflect actual explosive present. All possible shipping names are included for convenience. |
| · 14.2 UN proper shipping name | ARTICLES, EXPLOSIVE, N.O.S. (CONTAINS PERHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE – RDX)
ARTICLES, EXPLOSIVE, N.O.S. (CONTAINS OCTAHYDRO-1,3,5,7-TETRANITRO-1,3,5,7-TETRAZOCINE – HMX)
ARTICLES, EXPLOSIVE, N.O.S. (CONTAINS 2,2',4,4',6,6'-HEXANITROSTILBENE – HNS) |
| · DOT, IMDG, IATA | 0349 ARTICLES, EXPLOSIVE, N.O.S. (CONTAINS PERHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE – RDX)
0349 ARTICLES, EXPLOSIVE, N.O.S. (CONTAINS OCTAHYDRO-1,3,5,7-TETRANITRO-1,3,5,7-TETRAZOCINE – HMX)
0349 ARTICLES, EXPLOSIVE, N.O.S. (CONTAINS 2,2',4,4',6,6'-HEXANITROSTILBENE – HNS) |
| · ADR | |
| · 14.3 Transport hazard class(es) | |
| · DOT | |
|  | |
| · Class | 1.4 |
| · Label | 1.4 |
| | |
| · ADR, IMDG, IATA | |
|  | |
| · Class | 1.4 |
| · Label | 1.4S |
| · 14.4 Packing group | |
| · DOT, ADR, IMDG, IATA | II |
| · 14.5 Environmental hazards: | |
| · Marine pollutant: | No |

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- **14.6 Special precautions for user** Not applicable.
- **EMS Number:** F-B,S-X
- **14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code** Not applicable.
- **Transport/Additional information:**

-
- **ADR**
 - **Limited quantities (LQ)** 0
 - **Excepted quantities (EQ)** Code: E0
Not permitted as Excepted Quantity
 - **UN "Model Regulation":** UN0349, ARTICLES, EXPLOSIVE, N.O.S., 1.4S, II

SECTION 15: Regulatory information

- **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
- **United States (USA)**
- **SARA**

· **Section 355 (extremely hazardous substances):**

None of the ingredients are listed.

· **Section 313 (Specific toxic chemical listings):**

None of the ingredients are listed.

· **TSCA (Toxic Substances Control Act):**

All ingredients are listed.

· **Proposition 65 (California):**

· **Chemicals known to cause cancer:**

None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients are listed.

· **Chemicals known to cause reproductive toxicity for males:**

None of the ingredients are listed.

· **Chemicals known to cause developmental toxicity:**

None of the ingredients are listed.

· **Carcinogenic Categories**

· **EPA (Environmental Protection Agency)**

121-82-4 perhydro-1,3,5-trinitro-1,3,5-triazine (RDX) C

2691-41-0 octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX) D

· **IARC (International Agency for Research on Cancer)**

None of the ingredients are listed.

· **TLV (Threshold Limit Value established by ACGIH)**

121-82-4 perhydro-1,3,5-trinitro-1,3,5-triazine (RDX) A4

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· **NIOSH-Ca (National Institute for Occupational Safety and Health)**

None of the ingredients are listed.

· **Canada**

· **Canadian Domestic Substances List (DSL)**

Some components are listed on the NDSL.

All ingredients are listed.

· **Canadian Ingredient Disclosure list (limit 0.1%)**

None of the ingredients are listed.

· **Canadian Ingredient Disclosure list (limit 1%)**

126-73-8 tributyl phosphate

· **Other regulations, limitations and prohibitive regulations**

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

· **Substances of very high concern (SVHC) according to REACH, Article 57**

None of the ingredients are listed.

· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

SECTION 16: Other information

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· **Relevant phrases**

H200 Unstable explosives.

H201 Explosive; mass explosion hazard.

H301 Toxic if swallowed.

H302 Harmful if swallowed.

H311 Toxic in contact with skin.

H314 Causes severe skin burns and eye damage.

H315 Causes skin irritation.

H351 Suspected of causing cancer.

H400 Very toxic to aquatic life.

R2 Risk of explosion by shock, friction, fire or other sources of ignition.

R22 Harmful if swallowed.

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Groundbreaking Performance

Safety Data Sheet

according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and
OSHA GHS

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Trade name: Detonating Cord, Specialty (Oil Field) (Class 1.4S)

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- R24 Toxic in contact with skin.
- R25 Toxic if swallowed.
- R3 Extreme risk of explosion by shock, friction, fire or other sources of ignition.
- R34 Causes burns.
- R38 Irritating to skin.
- R40 Limited evidence of a carcinogenic effect.
- R50 Very toxic to aquatic organisms.

• **Abbreviations and acronyms:**

- ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
- IMDG: International Maritime Code for Dangerous Goods
- DOT: US Department of Transportation
- IATA: International Air Transport Association
- GHS: Globally Harmonised System of Classification and Labelling of Chemicals
- ACGIH: American Conference of Governmental Industrial Hygienists
- EINECS: European Inventory of Existing Commercial Chemical Substances
- ELINCS: European List of Notified Chemical Substances
- CAS: Chemical Abstracts Service (division of the American Chemical Society)
- NFPA: National Fire Protection Association (USA)
- HMIS: Hazardous Materials Identification System (USA)
- WHMIS: Workplace Hazardous Materials Information System (Canada)
- DNEL: Derived No-Effect Level (REACH)
- PNEC: Predicted No-Effect Concentration (REACH)
- LC50: Lethal concentration, 50 percent
- LD50: Lethal dose, 50 percent
- Expl. 1.1: Explosives, Division 1.1
- Expl. 1.4: Explosives, Division 1.4
- Unst. Expl.: Explosives, Unstable explosives
- Acute Tox. 3: Acute toxicity, Hazard Category 3
- Acute Tox. 4: Acute toxicity, Hazard Category 4
- Skin Corr. 1B: Skin corrosion/irritation, Hazard Category 1B
- Skin Irrit. 2: Skin corrosion/irritation, Hazard Category 2
- Carc. 2: Carcinogenicity, Hazard Category 2
- Aquatic Acute 1: Hazardous to the aquatic environment - AcuteHazard, Category 1

• **Sources**

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