



**TOTAL**

# TOTAL E&P ITALIA

STUDIO DI IMPATTO AMBIENTALE  
CONCESSIONE MINERARIA GORGOGNONE  
PERFORAZIONE POZZO GG3

RISCONTRO ALLA NOTA MATT/CTVA - PROT. 03570 DEL 30/10/2017

Febb. 2018

Pagina 1 di 1

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## ALLEGATO 2.4 punto 38.1

### Schede di Sicurezza

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pH S.R.L.

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**SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING**

- |  |  |
|--|--|
| <b>1.1 Product identifier</b>  | <b>Explosive Cartridges or Explosive Pellets</b>               |
| GHS Product Identifier   | Explosive Cartridges or Explosive Pellets                      |
| Chemical Name  | Not applicable   |
| Trade name   | Explosive Cartridges or Explosive Pellets                      |
| CAS No.  | Mixture  |
| EINECS No.   | Mixture  |
| REACH Registration No.   | Not applicable   |
| <b>1.2 Relevant identified uses of the substance or mixture and uses advised against</b> |  |
| Identified use(s)  | As Directed by Manufacturer Only                               |
| Uses advised against   | Users are recommended to seek further advice.                  |
| <b>1.3 Details of the supplier of the safety data sheet</b>                              |  |
| Company Identification   | Owen Oil Tools LP  |
| Address  | 12001 County Road 1000 / P.O. Box 765 / Godley, TX 76044 USA   |
| Telephone  | (817) 551-0660   |
| E-Mail (competent person)  | <a href="mailto:info@ocsresponds.com">info@ocsresponds.com</a> |
| <b>1.4 Emergency telephone number – ChemTel Inc.</b>                                     |  |
| Emergency Phone No.  | (800) 255-3924 , (813) 248-0585                                |

**SPECIAL NOTICE – EXPLOSIVE MATERIALS****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 2: HAZARDS IDENTIFICATION**

- 2.1 Classification of the substance or mixture**
- 2.1.1 Regulation (EC) No. 1272/2008 (CLP) - Acute toxicity 3 ( Dermal, Oral) / 4 (Inhalation) , Skin Irritation 2, Eye Irritation 2, (3.1/3-4, 3.2/2, 3.3/2)**
- 2.1.2 Directive 67/548/EEC & Directive 1999/45/EC - CORROSIVE, HARMFUL**
- 2.2 Label elements**
- 2.2.1 Label elements According to Regulation (EC) No. 1272/2008 (CLP)**  
GHS Product Identifier (EU)

Hazard pictogram(s)		Signal word(s)	<b>DANGER</b>
Hazard statement(s)	H204: Fire or projection hazard. H301: Toxic if swallowed. H311: Toxic in contact with skin. H315: Causes skin irritation. H319: Causes serious eye irritation. H332: Harmful if inhaled.		
Precautionary statement(s)	P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P210: Keep away from heat, sparks, open flame, hot surfaces - No smoking. P240: Ground/bond container and receiving equipment. P250: Do not subject to grinding/shock/.../friction. P280: Wear protective gloves/protective clothing/eye protection/face protection. P261: Avoid breathing dust/fume/gas/mist/vapours/spray. P270: Do not eat, drink or smoke when using this product. P301 + P330 + P331: IF SWALLOWED: rinse mouth. Do NOT induce vomiting. P301 + P310: IF SWALLOWED: Immediately call a POISON CENTRE or doctor/physician. P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P305: IF IN EYES: Get immediate medical attention. P501: Dispose of contents/container to: Send to a licensed recycler, reclaimer or incinerator.		

- 2.2.2 Label elements According to Directive 67/548/EEC & Directive 1999/45/EC**

Hazard Symbol	
Risk Phrases	R2: Risk of explosion by shock, friction, fire or other sources of ignition. R20: Harmful by inhalation. R24/25: Toxic in contact with skin and if swallowed.
Safety Phrases	S2: Keep out of the reach of children. S13: Keep away from food, drink and animal feedingstuffs. S16: Keep away from sources of ignition - No smoking. S23: Do not breathe fumes. S24/25: Avoid contact with skin and eyes. S34: Avoid shock or friction. S35: This material and its container must be disposed of in a safe way. S36/39: Wear suitable protective clothing and eye/face protection. S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

# SAFETY DATA SHEET

Explosive Cartridges or Explosive Pellets, Class 1.4 Explosive

- 2.3 Other hazards** GHS Classification (USA): Hazardous under OSHA Hazard Communication Standard –HMIS: Health-3, Flammability-3 Reactivity – 3  
WHMIS Classification (Canada): Exempt under WHMIS.



- 2.4 Additional Information** None

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

### EC Classification No. 1272/2008/EC

Hazardous ingredient(s)	% W/W	CAS No.	EC No.	REACH Registration No.	Hazard pictogram(s) and Hazard statement(s)
Cyclotrimethylene-trinitramine (RDX)		121-82-4	204-500-1	NA	2.1/1, 3.1/3(oral), H201, H301
Cyclotetramethylene-tetranitramine (HMX)		2691-41-0	220-260-0	NA	2.1/1, 3.1/3(oral), H201, H301
Hexanitrostilbene (HNS)		20062-22-0		NA	2.1/1, 3.1/4(oral) ; H201, H302
2,6-bis(picrylamino)-3,5-dinitropyridine (PYX)		38082-89-2	NA	NA	2.1/1; H201
Nitroglycerin (Glycerol Trinitrate)		55-63-0	200-240-8	NA	2.1, 3.1/1 (dermal), 3.1/2(oral, inhalation), 3/9/2, 4.1/2 (chronic) ; H200, H300, H310, H330, H373, H411
Nitrocellulose		9004-70-0	None	NA	2.1/1; H201,

### EC Classification No. 67/548/EEC

Hazardous ingredient(s)	% W/W	CAS No.	EC No.	REACH Registration No.	Hazard pictogram(s) and Hazard statement(s)
Cyclotrimethylene-trinitramine (RDX)		121-82-4	204-500-1	NA	E, Xn, R2, R25
Cyclotetramethylene-tetranitramine (HMX)		2691-41-0	220-260-0	NA	E, Xn, R2, R25
Hexanitrostilbene (HNS)		20062-22-0	NA	NA	E, Xn, R2, R22
2,6-bis(picrylamino)-3,5-dinitropyridine (PYX)		38082-89-2	NA	NA	E; R2
Nitroglycerin (Glycerol Trinitrate)		55-63-0	200-240-8	NA	E+, T+, N: R3, R26/27/28, R33, R50/53
Nitrocellulose		9004-70-0	None	NA	E, R3

### 3.3 Additional Information

- For full text of H phrases see section 16. For full text of R phrases see section 16. Non-Hazardous ingredients are not listed and make up the balance of the product.

### SECTION 4: FIRST AID MEASURES

#### 4.1 Description of first aid measures

Inhalation	Remove patient from exposure. Keep patient at rest and give oxygen if breathing difficult. If symptoms develop, obtain medical attention. See Section 4.2 for blast injury information.
Skin Contact	Remove contaminated clothing immediately and drench affected skin with plenty of water, then wash with soap and water. If irritation (redness, rash, blistering) develops, get medical attention. See Section 4.2 for blast injury information.
Eye Contact	Remove any contact lenses. Irrigate with eyewash solution or clean water, holding the eyelids apart, for at least 15 minutes. Obtain immediate medical attention. If cardiac symptoms or flushing develop, seek medical attention.
Ingestion	May be toxic. If swallowed, seek medical advice immediately and show this SDS, container or label. Do not induce vomiting. Make victim drink plenty of water. Get immediate medical attention.

**4.2 Most important symptoms and effects, both acute and delayed**      **Acute:** Blast injuries may occur should product accidentally detonate or ignite. With all blast injuries, immediate medical treatment for trauma is essential for patient outcome. Blast trauma may take many forms, but will include skeletal and soft tissue injuries. These injuries may not be immediately apparent. **FOR ANY ACCIDENT INVOLVING DETONATION OR IGNITION OF PRODUCT, EMERGENCY TREATMENT IS REQUIRED.** **Delayed and chronic effects:** Cardiac and vascular effects, neurological effects, developmental impairment. Possible risk of impaired fertility.

**4.3 Indication of the immediate medical attention and special treatment needed**      Treat symptomatically. Exposure involving nitrated organics may require significant intervention to prevent circulatory collapse.

### SECTION 5: FIRE-FIGHTING MEASURES

**Explosive material. Flash Point = Not applicable. Explosive limit ranges = Not applicable.**

- 5.1 Extinguishing media**
- |                                |   |
|--------------------------------|---|
| Suitable Extinguishing Media   | Extinguish preferably with dry chemical, foam or water spray. |
| Unsuitable Extinguishing Media | None known.   |
- 5.2 Special hazards arising from the substance or mixture**      Explosion risk in case of fire. DO NOT fight fire when fire reaches explosives. Do not attempt to directly fight established or slow smoldering fires as an explosion is possible. In case of fire, evacuate area.
- 5.3 Advice for fire-fighters**      In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.

### SECTION 6: ACCIDENTAL RELEASE MEASURES

- 6.1 Personal precautions, protective equipment and emergency procedures**      Warn everybody – explosion hazard. Evacuate the area of non-essential personnel. Ensure full personal protection (including respiratory protection) during removal of spillages.
- 6.2 Environmental Precautions**      Ventilation recommended.

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- 6.3 Methods and material for containment and cleaning up** Warn everybody – explosion hazard. If safe to do so: Put on protective equipment before entering danger area. Transfer to a container for disposal or recovery.
- 6.4 Reference to other sections** See Also Section 7, 8, 13.
- 6.5 Additional Information** None

## SECTION 7: HANDLING AND STORAGE

- 7.1 Precautions for safe handling** Avoid inhalation of high concentrations of vapors. Keep away from oxidizing agents. Keep away from fire, sparks and heated surfaces - no smoking.
- 7.2 Conditions for safe storage, including any incompatibilities** Protect from sunlight. Store in a well-ventilated place. Do not use or store near heat or open flame. Do not store and transport with oxidizers etc.
- Storage Temperature** Consult the supplier.
- Storage Life** Consult the supplier.
- Incompatible materials** Oxidizing agents, flammable substances.
- 7.3 Specific end use(s)** Consult the supplier.

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

## 8.1 Control parameters

## 8.1.1 Occupational Exposure Limits (1)

SUBSTANCE.	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m <sup>3</sup> )	STEL (ppm)	STEL (mg/m <sup>3</sup> )	Note:
Cyclotrimethylene-trinitramine (RDX)	121-82-4	NE	0.5 mg/m <sup>3</sup> (skin)	NE	NE	ACGIH
Cyclotetramethylene-tetranitramine (HMX)	2691-41-0	NE	0.5 mg/m <sup>3</sup> (skin)	NE	NE	ACGIH
Nitroglycerin (Glycerol Trinitrate)	55-63-0	0.05 ppm (skin)	0.46 mg/m <sup>3</sup> (skin)	0.2 (2)	NE	ACGIH
Nitrocellulose	9004-70-0	NE	10mg/m <sup>3</sup>	NE	NE	ACGIH

(1) – Components not listed have no Occupational Exposure Limits within the US.

(2) – OSHA Ceiling Value (skin contact).





## 8.1.2 Biological limit value

Not Available.

## 8.1.3 PNECs and DNELs

PNECs and DNELs - Not available.

## 8.2.2 Personal protection equipment

	<b>Respirators</b>	Wear suitable respiratory protective equipment if exposure to levels above the occupational exposure limit is likely.
	<b>Eye Protection</b>	Safety spectacles.
	<b>Gloves</b>	Wear protective gloves.
	<b>Body protection</b>	Wear suitable protective clothing and gloves.
	<b>Engineering Controls</b>	Consult the supplier.
	<b>Other</b>	Consult the supplier.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

**9.1 Information on basic physical and chemical properties**

Appearance	Pellets or Cartridges	Color	Not available
Odor	None	Odor Threshold (ppm)	Not available
Melting Point (°C) / Freezing Point (°C)	Not available	Boiling point/boiling range (°C):	Not available
Flash Point (°C)	Explosive	Explosive limit ranges	Not available
Auto Ignition Temperature (°C)	Not available	Decomposition Temperature (°C)	Not available
Explosive properties	Explosive	Oxidizing properties	Not available
Flammability (solid, gas)	Not available	pH (Value)	Not available
Evaporation rate	Not available	Vapor Pressure (mm Hg)	Not available
Vapor Density (Air=1)	Not available	Density (g/ml)	Not available
Solubility (Water)	Not available	Solubility (Other)	Not available
Partition Coefficient (n-Octanol/water)	Not available	Viscosity (mPa.s)	Paste
<b>9.2 Other information</b>	<b>Volatile Organic Chemical (VOC) Content – Not available</b>		

## SECTION 10: STABILITY AND REACTIVITY

<b>10.1 Reactivity</b>	May react with incompatible materials. See Sections 7 and 10.
<b>10.2 Chemical stability</b>	Stable under normal conditions.
<b>10.3 Possibility of hazardous reactions</b>	Can react violently if in contact with - Oxidizing agents, Flammable Agents
<b>10.4 Conditions to avoid</b>	Avoid contact with heat and ignition sources. Avoid shock, impact, friction and rough handling. Risk of explosion by shock, friction, fire or other sources of ignition.
<b>10.5 Incompatible materials</b>	Can react violently if in contact with - Oxidizing agents, Flammable Agents
<b>10.6 Hazardous Decomposition Product(s)</b>	Carbon monoxide, Carbon dioxide, Nitrogen oxides, Metal fumes and oxides , . Thermal decomposition will evolve toxic, irritant and flammable vapors.

## SECTION 11: TOXICOLOGICAL INFORMATION

SUBSTANCE (3)	CAS No.	LD <sub>50</sub> (Oral, Rat)	LC <sub>50</sub> (Inhalation, Rat)	LD <sub>50</sub> (Dermal, Rat)
Cyclotrimethylene-trinitramine RDX)	121-82-4	59 mg/kg (mouse)	NE	NE
Cyclotetramethylene-tetranitramine (HMX)	2691-41-0	1500 mg/kg (mouse)	NE	NE
Nitroglycerin (Glycerol Trinitrate)	55-63-0	105 mg/kg	NE	29.2 mg/kg
Nitrocellulose	9004-70-0	> 5000 mg/kg	NE	NE
<b>(3)– Components not listed have no available acute toxicity data.</b>				

**11.1 Information on toxicological effects****11.1.2 Mixtures**

Acute toxicity	Toxic if swallowed. Ingestion may cause irritation of the gastrointestinal tract. May cause drowsiness or dizziness.
Irritation	May cause irritation.
Corrosivity	Not to be expected.
Repeated dose toxicity	Expected to be similar to single exposures. Cardiovascular disorders and methaemoglobinaemia may occur.
Carcinogenicity	No data.
Mutagenicity	No data.
Toxicity for reproduction	No data.

**11.2 Other information**      **None**

## SECTION 12: ECOLOGICAL INFORMATION

<b>12.1 Toxicity</b>	Harmful to aquatic life. Harmful to algae. <b>(SAFE AS GENERAL STATEMENT)</b>
<b>12.2 Persistence and degradability</b>	Moderately/partially biodegradable. Not persistent.
<b>12.3 Bioaccumulative potential</b>	Moderately/partially biodegradable.
<b>12.4 Mobility in soil</b>	The product has high mobility in soil.
<b>12.5 Results of PBT and vPvB assessment</b>	No data.
<b>12.6 Other adverse effects</b>	No data. Consult the supplier.

## SECTION 13: DISPOSAL CONSIDERATIONS

<b>13.1 Waste treatment methods</b>	Disposal should be in accordance with local, state or national legislation. Consult an accredited waste disposal contractor or the local authority for advice.
<b>13.2 Additional Information</b>	None

## SECTION 14: TRANSPORT INFORMATION

<b>Land transport (ADR/RID) (4)(5)</b> UN number 0352 / 0349 Proper Shipping Name Articles, Explosive, n.o.s. (0352) Articles, Explosive, n.o.s. (0349) Transport hazard class(es) 1.4D (0352) 1.4S (0349) Packing Group II Hazard label(s) EXPLOSIVE 1.4 Environmental hazards None Special precautions for user (4)	<b>Land transport (Within USA) (4)(5)</b> UN number 0352 / 0349 Proper Shipping Name Articles, Explosive, n.o.s. (0352) Articles, Explosive, n.o.s. (0349) Transport hazard class(es) 1.4D (0352) 1.4S (0349) Packing Group II Hazard label(s) EXPLOSIVE 1.4 Environmental hazards None Special precautions for user (4)
<b>Sea transport (IMDG) (4)(5)</b> UN number 0352 / 0349 Proper Shipping Name Articles, Explosive, n.o.s. (0352) Articles, Explosive, n.o.s. (0349) Transport hazard class(es) 1.4D (0352) 1.4S (0349) Packing Group II Marine Pollutant No Special precautions for user (4)	<b>Air transport (ICAO/IATA) (4)(5)</b> UN number 02352 / 0349 Proper Shipping Name Articles, Explosive, n.o.s. (0352) Articles, Explosive, n.o.s. (0349) Transport hazard class(es) 1.4D (0352) 1.4S (0349) Packing Group II Environmental hazards No Special precautions for user (4)

(4)– Consult with transport provider.

(5)– Check relevant regulations for Special Provisions.

**Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**



**SECTION 15: REGULATORY INFORMATION**
**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
**15.1.1 EU regulations**

Authorisations and/or restrictions on use      Consult the supplier.

European Union (EINECS/ELINCS)      All chemicals listed.

German WGK number      2

**15.1.2 National regulations**
**USA**

TSCA (Toxic Substance Control Act)      All chemicals listed.

SARA 311/312 - Hazard Categories      Acute Health, Fire, Reactive, Chronic Health (where nitroglycerin is present)

SARA 302 - Extremely Hazardous Substances      Listed - None.

SARA 313 - Toxic Chemicals      Listed. – Nitroglycerin (where present)

CERCLA (Comprehensive Environmental Response Compensation and Liability Act)      Listed. – Nitroglycerin (where present)

CAA (Clean Air Act 1990)      Listed – None.

CWA (Clean Water Act)      Listed – None.

State Right to Know Lists      Listed. – CA, FL, MA, NJ, PA, and RI.

Proposition 65 (California) - This product contains the following substance(s) known to the state of California to cause cancer and/or reproductive harm: None.

**Canada**

WHMIS Classification      Exempt under WHMIS.

Canada (DSL/NDSL)      Listed - DSL or NDSL

Canada Ingredient Disclosure List (CIDL)      Listed as required.

**15.2 Chemical Safety Assessment**      Explosive, Toxic (Oral), Harmful (Dermal/Inhalation), Eye/Skin Irritation

**15.3 Label elements (EU)**      See Section 2.

**SECTION 16: OTHER INFORMATION**

The following sections contain revisions or new statements: 1-16.

**Risk Phrases and Safety Phrases**

R2: Risk of explosion by shock, friction, fire or other sources of ignition.  
R3: Extreme risk of explosion by shock, friction, fire or other sources of ignition.  
R9: Explosive when mixed with combustible material.  
R20/21: Harmful by inhalation and in contact with skin.  
R22: Harmful if swallowed.  
R25: Toxic if swallowed.  
R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
R61: May cause harm to the unborn child.  
R62: Possible risk of impaired fertility.

S2: Keep out of the reach of children.  
S13: Keep away from food, drink and animal feedingstuffs.  
S16: Keep away from sources of ignition - No smoking.  
S23: Do not breathe fumes.  
S24/25: Avoid contact with skin and eyes.  
S34: Avoid shock or friction.  
S35: This material and its container must be disposed of in a safe way.  
S36/39: Wear suitable protective clothing and eye/face protection.  
S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

**Hazard statement(s) and Precautionary statement(s)**

H200: Unstable explosives.  
H201: Explosive; mass explosion hazard.  
H204: Fire or projection hazard.  
H272: May intensify fire; oxidizer.  
H301: Toxic if swallowed.  
H302: Harmful if swallowed.  
H312: Harmful in contact with skin.  
H315: Causes skin irritation.  
H319: Causes serious eye irritation.  
H332: Harmful if inhaled.  
H410: Very toxic to aquatic life with long lasting effects.

P201: Obtain special instructions before use.  
P202: Do not handle until all safety precautions have been read and understood.  
P210: Keep away from heat, sparks, open flame, hot surfaces - No smoking.  
P240: Ground/bond container and receiving equipment.  
P250: Do not subject to grinding/shock/...friction.  
P280: Wear protective gloves/protective clothing/eye protection/face protection.  
P261: Avoid breathing dust/fume/gas/mist/vapours/spray.  
P270: Do not eat, drink or smoke when using this product.  
P301 + P330 + P331: IF SWALLOWED: rinse mouth. Do NOT induce vomiting.  
P301 + P310: IF SWALLOWED: Immediately call a POISON CENTRE or doctor/physician.  
P302 + P352: IF ON SKIN: Wash with plenty of soap and water.  
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P305: IF IN EYES: Get immediate medical attention.  
P501: Dispose of contents/container to: Send to a licensed recycler, reclaimer or incinerator.

# SAFETY DATA SHEET

## Explosive Cartridges or Explosive Pellets, Class 1.4 Explosive

**LEGEND**

ACGI H	American Conference of Governmental Industrial Hygienists	NA	not applicable, not available
AICS	Australian Inventory of Chemical Substances	NIOSH	National Institute for Occupational Safety and Health
ANSI	American National Standards Institute	ND	not determined
atm	atmosphere (pressure unit)	NFPA	National Fire Prevention Association
BOD	biological oxygen demand	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OC	open cup
CC	closed cup	OSHA	Occupational Safety and Health Administration
CDTA	Chemical Drug and Trafficking Act	Part	partition
COC	Cleveland Open Cup	PEL	permissible exposure limits
COD	chemical oxygen demand	ppb	parts per billion
coeff.	coefficient	PPE	personal protective equipment
CFR	Code of Federal Regulations	ppm	parts per million
CPR	cardio-pulmonary resuscitation	psi	pounds per square inch
DEA	Drug Enforcement Agency	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	RQ	Reportable quantity
DSCL	Dangerous Substances Classification and Labeling	RTK	Right to Know
EEC	European Economic Community	SARA	Superfund Amendments and Reauthorization Act
FDA	Food and Drug Administration	STEL	short-term exposure limit
HMIS	Hazardous Materials Information System	SUSDP	Standard for the Uniform Scheduling of Drugs and Poisons (Australia)
IARC	International Agency for Research on Cancer	TCC	Tagliabue Closed Cup
IDLH	immediate danger to life or health	TDG	Transportation of Dangerous Goods
kg	kilogram	TPQ	threshold planning quantity
L	liter	TQ	threshold quantity
LC50	median lethal concentration	TSCA	Toxic Substances Control Act
LD50	median lethal dose	TWA	time-weighted average
LEL	lower explosive limit	UEL	upper explosive limit
mg	milligram	WES	Workplace Exposure Standard (New Zealand)
mL	milliliter	WHMIS	Workplace Hazardous Material Information System

**References:** RTECS, CAS Registry, EINECS/ESIS, *Casarett & Doull's Toxicology*, *Goldfrank's Toxicological Emergencies*, Manufacturer Information

**Training advice:** Consult the supplier.

**Additional Information:** Consult the supplier.

Information contained in this publication or as otherwise supplied to Users is believed to be accurate and is given in good faith, but it is for the Users to satisfy themselves of the suitability of the product for their own particular purpose. ChemTel Inc. gives no warranty as to the fitness of the product for any particular purpose and any implied warranty or condition (statutory or otherwise) is excluded except to the extent that exclusion is prevented by law. ChemTel Inc. accepts no liability for loss or damage (other than that arising from death or personal injury caused by defective product, if proved), resulting from reliance on this information. Freedom under Patents, Copyright and Designs cannot be assumed.

# Material Safety Data Sheet

RP-880 (P/N 188-7354) RDX EBW

MSDS No. 23

Date of Preparation: 07/07/05

Revision: 4

## Section 1 - Chemical Product and Company Identification

**Product/Chemical Name:** SECONDARY EXPLOSIVES DETONATOR  
**Chemical Formula:** N/A  
**CAS Number:** N/A  
**Other Designations:** EXPLODING BRIDGEWIRE (EBW) DETONATOR  
**General Use:** TO DETONATE EXPLOSIVES.  
**Manufacturer** Teledyne RISI, Inc. P.O. Box 359, Tracy, CA 95376, Phone (925) 456-9700, FAX (925) 456-9709 (Hours 8:00am PST to 4:30pm PST), Emergency Contact Number (800) 424-9300, (703) 527-3887 (INT'L).

### ☆☆☆☆☆ Emergency Overview ☆☆☆☆☆

## Section 2 - Composition / Information on Ingredients

Ingredient Name	CAS Number	% wt or % vol
TRIMETHYLENETRINITRAMINE (RDX) (0.660 g) TOTAL EXPLOSIVES: (0.660 g)	121824	.11%

**Trace Impurities:**

Ingredient	OSHA PEL		ACGIH TLV		NIOSH REL		NIOSH IDLH
	TWA	STEL	TWA	STEL	TWA	STEL	
RDX	1500 mg/m <sup>3</sup> (SKIN)	none estab.	none estab.	none estab.	none estab.	none estab.	none estab.
Second Ingredient	none estab.	none estab.	none estab.	none estab.	none estab.	none estab.	none estab.

**Toxicity Data:**

## Section 3 - Physical and Chemical Properties

<b>Physical State:</b> Powder and Pressed Pellet <b>Appearance and Odor:</b> White and Gray <b>Odor Threshold:</b> None <b>Vapor Pressure:</b> <b>Vapor Density (Air=1):</b> <b>Formula Weight:</b> <b>Density:</b> 1.82 gm/cc for RDX <b>Specific Gravity (H<sub>2</sub>O=1, at 4 °C):</b> 1.82 <b>pH:</b>	<b>Water Solubility:</b> 0 <b>Other Solubilities:</b> Acetone <b>Boiling Point:</b> <b>Freezing/Melting Point:</b> 202° for RDX <b>Viscosity:</b> <b>Refractive Index:</b> <b>Surface Tension:</b> <b>% Volatile:</b> <b>Evaporation Rate:</b>
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## Section 4 - Fire-Fighting Measures

**Flash Point:** N/A  
**Flash Point Method:**  
**Burning Rate:** Approx. 1,000 M/S (Detonation: 8300 M/S)  
**Autoignition Temperature:** 211 °C  
**LEL:** Possible Ignition from Loose Powder.  
**UEL:** Crystal Density  
**Flammability Classification:** Flammable Solid  
**Extinguishing Media:** Water Spray, Fire Extinguisher.  
**Unusual Fire or Explosion Hazards:** One of the most powerful high explosives. More shattering power than TNT.  
**Hazardous Combustion Products:** CO, CO<sub>2</sub>, NO  
**Fire-Fighting Instructions:** Do not release runoff from fire control methods to sewers or waterways.

**Fire-Fighting Equipment:** Because fire may produce toxic thermal decomposition products, wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in pressure-demand or positive-pressure mode.

### Section 5 - Stability and Reactivity

**Stability:** Product is stable at room temperature in closed containers under normal storage and handling conditions.

**Polymerization:** Hazardous polymerization cannot occur.

**Chemical Incompatibilities:** None known

**Conditions to Avoid:** High temperature, shock impact and confinement.

**Hazardous Decomposition Products:** Thermal oxidative decomposition of product can produce explosion. Explosion more likely if confined.

### Section 6 - Health Hazard Information

#### Potential Health Effects

**Primary Entry Routes:** Inhalation

**Target Organs:** Lungs

**Acute Effects**

**Inhalation:** Headache, weakness and fall in blood pressure. Over exposure to fumes may cause nausea.

**Eye:** None

**Skin:** None

**Ingestion:**

**Carcinogenicity:** IARC, NTP, and OSHA do not list product or chemical as a carcinogen.

**Medical Conditions Aggravated by Long-Term Exposure:** Fall in blood pressure.

**Chronic Effects:** Same

#### Emergency and First Aid Procedures

**Inhalation:** Remove affected person to well ventilated area.

**Eye Contact:** Wash with water

**Skin Contact:** Wash with water

**Ingestion:** Induce vomiting

*After first aid, get appropriate in-plant, paramedic, or community medical support.*

**Note to Physicians:**

**Special Precautions/Procedures:**

### Section 7 - Spill, Leak, and Disposal Procedures

**Spill /Leak Procedures:** Dispose of powder as explosive waste.

**Small Spills:** Same

**Large Spills:** Same

**Containment:** For large spills, dike far ahead of liquid spill for later disposal. Do not release into sewers or waterways.

**Cleanup:** Do not use acetone, use water as necessary.

**Regulatory Requirements:** Follow applicable OSHA regulations (29 CFR 1910.120).

**Disposal:** Contact your supplier or a licensed contractor for detailed recommendations. Follow applicable Federal, state, and local regulations.

**Disposal Regulatory Requirements:** As explosive waste, detonate in suitable chamber. Burn in unconfined area.

**Container Cleaning and Disposal:** Use water. Collect material in 50 micrometer mesh filter.

**Ecological Information:** None

#### EPA Regulations:

RCRA Hazardous Waste Number: Not listed (40 CFR 261.33)

RCRA Hazardous Waste Classification (40 CFR 261.??): Not classified

CERCLA Hazardous Substance (40 CFR 302.4) unlisted specific per RCRA, Sec. 3001; CWA, Sec. 311 (b)(4); CWA, Sec. 307(a), CAA, Sec. 112

CERCLA Reportable Quantity: None known

SARA 311/312 Codes: None known

SARA Toxic Chemical (40 CFR 372.65): Not listed

SARA EHS (Extremely Hazardous Substance) (40 CFR 355): Not listed.

#### OSHA Regulations:

Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-1-A): Not listed

OSHA Specifically Regulated Substance (29CFR 1910.109)

**State Regulations:** Same

### Section 8 - Exposure Controls / Personal Protection

**Engineering Controls:** Handle as an explosive item.

**Ventilation:** Provide general or local exhaust ventilation systems to maintain airborne concentrations below OSHA PELs (Sec. 2). Local exhaust ventilation is preferred because it prevents contaminant dispersion into the work area by controlling it at its source.

**Administrative Controls:** Maintain in approved storage magazine.

**Respiratory Protection:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, wear a MSHA/NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. For emergency or nonroutine operations (cleaning spills, reactor vessels, or storage tanks), wear an SCBA.

*Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres.* If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit-testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas.

**Protective Clothing/Equipment:** Wear chemically protective gloves, boots, aprons, and gauntlets to prevent prolonged or repeated skin contact. Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133). Contact lenses are not eye protective devices. Appropriate eye protection must be worn instead of, or in conjunction with contact lenses.

**Safety Stations:** Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

**Contaminated Equipment:** Separate contaminated work clothes from street clothes. Launder before reuse. Remove this material from your shoes and clean personal protective equipment.

**Comments:** Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

### Section 9 - Special Precautions and Comments

**Handling Precautions:** Handle as an explosive.

**Storage Requirements:** Store away from heat and open flame. Quantity limits of designated areas should be followed.

#### DOT Transportation Data (49 CFR 172.101):

**Shipping Name:** Detonator  
Electric

**Shipping Symbols:** Explosive

**Hazard Class:** 1.4B

**ID No.:** UN0255

**Packing Group:** II

**Label:** 1.4B

**Special Provisions (172.103):**

#### Packaging Authorizations

a) **Exceptions:** 173.63F/63G

b) **Non-bulk Packaging:** 173.62

c) **Bulk Packaging:** N/A

#### Quantity Limitations

a) **Passenger Aircraft, or Railcar:**  
Forbidden

b) **Cargo Aircraft Only:** 75 kg Max.

#### Vessel Stowage Requirements

a) **Vessel Stowage:** A

b) **Other:** 24E

**Prepared By:** B. MacDonald

**Revision Notes:** Address Update

**Disclaimer:** RISI Disclaimer

**Caution:** While EBW and EFI Initiators are inherently less susceptible to accidental detonation during handling and setup than devices containing primary explosives, electrical and electronic firing systems are sensitive to transient electrical energies, which could cause premature triggering or firing. The blasting area must be clear of personnel and equipment before the detonator leads are connected to any RISI Firing System. Only approved RISI Firing Systems should ever be used.

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

##### 1.1. Product identifier

High temperature resistant electric/electronic Detonator 1.4S

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

###### Use of the substance/mixture

igniter

###### Uses advised against

Do not use under Firedamp conditions.

##### 1.3. Details of the supplier of the safety data sheet

Company name:	DynaEnergetics GmbH & Co. KG	
Street:	Kaiserstraße 3	
Place:	53840 Troisdorf,	
Telephone:	+49 (0) 2241 1236666	Telefax: +49 (0) 2241 1238666
Internet:	www.dynaenergetics.com	
Responsible Department:	info@tge-consult.de info@dynaenergetics.com	

##### 1.4. Emergency telephone number:

Emergency medical information: Poison Information Center Mainz - Tel: +49 (6131) 19240

##### Further Information

Voluntary safety information following the Safety Data Sheet format according to Regulation (EC) No. 1907/2006 (REACH)

#### SECTION 2: Hazards identification

##### 2.1. Classification of the substance or mixture

###### Regulation (EC) No. 1272/2008

Hazard categories:

Explosive: Expl. 1.1

Acute toxicity: Acute Tox. 3

Acute toxicity: Acute Tox. 4

Skin corrosion/irritation: Skin Irrit. 2

Serious eye damage/eye irritation: Eye Irrit. 2

Hazard Statements:

Explosive; mass explosion hazard.

Toxic if swallowed.

Harmful in contact with skin or if inhaled.

Causes serious eye irritation.

Causes skin irritation.

##### 2.2. Label elements

###### Regulation (EC) No. 1272/2008

###### Hazard components for labelling

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

2,2',4,4',6,6'-hexanitrostilbene (HNS)

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

Signal word: Danger

Pictograms:





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**Hazard statements**

H201	Explosive; mass explosion hazard.
H301	Toxic if swallowed.
H312+H332	Harmful in contact with skin or if inhaled.
H319	Causes serious eye irritation.
H315	Causes skin irritation.

**Precautionary statements**

P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P234	Keep only in original container.
P281	Use personal protective equipment as required.
P372	Explosion risk in case of fire.
P373	Do NOT fight fire when fire reaches explosives.
P374	Fight fire with normal precautions from a reasonable distance.
P401	Store in accordance with local/regional/national/international regulations.

**Special labelling of certain mixtures**

Restricted to professional users.

**Additional advice on labelling**

Labelling according to Regulation (EC) No. 1272/2008 [CLP]: There is no requirement for the product to be specially labelled according to EC directives or the corresponding national laws.

**2.3. Other hazards**

This substance has been listed as SVHC (substance of very high concern) in the Candidate List according to Article 59 of REACH.: lead diazide; lead azide [&gt; 20 % phlegmatiser]

**SECTION 3: Composition/information on ingredients****3.2. Mixtures****Chemical characterization**

Instantaneous electric/electronic detonator, consisting of a steel or copper shell with a secondary charge of HNS,RDX or HMX; high temperature and high pressure resistant for use in oilfield applications.



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**Hazardous components**

CAS No	Chemical name			Quantity
	EC No	Index No	REACH No	
	Classification according to Regulation (EC) No. 1272/2008 [CLP]			
13424-46-9	lead diazide; lead azide [> 20 % phlegmatiser]			30 - < 35 %
	236-542-1	082-003-01-4		
	Expl. 1.1, Repr. 1A, Acute Tox. 4, Acute Tox. 4, STOT RE 2, Aquatic Acute 1, Aquatic Chronic 1; H201 H360Df H332 H302 H373 ** H400 H410			
2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)			- %
	220-260-0		01-2119964438-25	
	Expl. 1.1, Acute Tox. 4, Acute Tox. 4, Acute Tox. 4; H201 H302 H312 H332			
20062-22-0	2,2',4,4',6,6'-hexanitrostilbene (HNS)			- %
	243-494-5			
	Expl. 1.1, Acute Tox. 4, Acute Tox. 4, Acute Tox. 4; H201 H302 H312 H332			
121-82-4	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)			- %
	204-500-1		01-2119990795-17	
	Expl. 1.1, Acute Tox. 3, Skin Irrit. 2, Eye Irrit. 2; H201 H301 H315 H319			
7429-90-5	aluminium			- %
	231-072-3			
7440-50-8	Copper			- %
	231-159-6			

Full text of H and EUH statements: see section 16.

**Further Information**

This substance has been listed as SVHC (substance of very high concern) in the Candidate List according to Article 59 of REACH.: lead diazide; lead azide [&gt; 20 % phlegmatiser]

The product is classified as a device. Providing the Safety Data Sheet takes place on a voluntary basis for information purposes.

**SECTION 4: First aid measures**
**4.1. Description of first aid measures**
**General information**

In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).

**After inhalation**

In case of accident by inhalation: remove casualty to fresh air and keep at rest. In all cases of doubt, or when symptoms persist, seek medical advice.

**After contact with skin**

In case of skin contact, wash immediately with large quantities of water/polyethylene glycol 400 (Roticlean). If skin irritation or rash occurs: Get medical advice/attention.

**After contact with eyes**

Rinse immediately carefully and thoroughly with eye-bath or water. In case of troubles or persistent symptoms, consult an ophthalmologist.

**After ingestion**

Rinse mouth thoroughly with water. Induce vomiting when the affected person is not unconscious. Let water be drunken in little sips (dilution effect). In all cases of doubt, or when symptoms persist, seek medical advice.

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

No information available.

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

Treat symptomatically.

**SECTION 5: Firefighting measures****5.1. Extinguishing media****Suitable extinguishing media**

Co-ordinate fire-fighting measures to the fire surroundings.

**Unsuitable extinguishing media**

High power water jet.

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

Explosion risk in case of fire.

In case of a small fire where the actual explosive is not involved, carefully remove explosive to a safe distance.

However, if explosive is burning, evacuate area immediately. Do not fight fire.

**5.3. Advice for firefighters**

Wear a self-contained breathing apparatus and chemical protective clothing.

**Additional information**

Collect contaminated fire extinguishing water separately. Do not allow entering drains or surface water.

**SECTION 6: Accidental release measures****6.1. Personal precautions, protective equipment and emergency procedures**

Remove persons to safety.

Eliminate all ignition sources if safe to do so.

**6.2. Environmental precautions**

No special measures are necessary.

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

Take up mechanically.

Treat the recovered material as prescribed in the section on waste disposal.

Use only non-sparking tools.

**6.4. Reference to other sections**

refer to chapter 8

**SECTION 7: Handling and storage****7.1. Precautions for safe handling****Advice on safe handling**

Handle with care - avoid bumps, friction and impact.

**Advice on protection against fire and explosion**

Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Take precautionary measures against static discharges.

**Further information on handling**

Advices on general occupational hygiene refer to chapter 8

**7.2. Conditions for safe storage, including any incompatibilities****Requirements for storage rooms and vessels**

Keep packaging tightly closed and in a well-ventilated place. Protect against: UV-radiation/sunlight. Keep container dry. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Take precautionary measures against static discharges.

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**Advice on storage compatibility**

Explosives must be stored separately from all other classes. Please observe prohibitions for common storage within the storage classes for explosives.

**Further information on storage conditions**

Recommended storage temperature: (-) 40 - (+) 60 C° [ (-) 40 °F - (+) 140°F]

Protect against: moisture.

Relative room humidity (%): max. 65%

**7.3. Specific end use(s)**

refer to section 1.

**SECTION 8: Exposure controls/personal protection**
**8.1. Control parameters**
**Exposure limits (EH40)**

CAS No	Substance	ppm	mg/m <sup>3</sup>	fibres/ml	Category	Origin
7429-90-5	Aluminium metal, respirable dust	-	4	-	TWA (8 h)	WEL
		-	-	-	STEL (15 min)	WEL
7440-50-8	Copper, dusts and mists (as Cu)	-	1	-	TWA (8 h)	WEL
		-	2	-	STEL (15 min)	WEL
-	Lead other than lead alkyls	-	0.15	-	TWA (8 h)	CLAW
		-	-	-	STEL (15 min)	CLAW

**Additional advice on limit values**

General information:

Air limit values: (Dust, general) 10 mg/ m<sup>3</sup> ; E: Inhalable Dust fraction

Air limit values: (Dust, general ) 1,25 mg/ m<sup>3</sup> ; Respirable Dust fraction

**8.2. Exposure controls**

**Appropriate engineering controls**

When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

**Protective and hygiene measures**

Always close packaging after the removal of product. When using do not eat, drink or smoke. Wash hands before breaks and after work.

**Eye/face protection**

In the case of the formation of dust.:

Suitable eye protection: Dust protection goggles.

**Hand protection**

No special measures are necessary.

**Skin protection**

Protective clothing.

**Respiratory protection**

With correct and proper use, and under normal conditions, breathing protection is not required.

Respiratory protection necessary at:

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exceeding exposure limit values

Generation/formation of dust

Suitable respiratory protective equipment:

particulates filter device (DIN EN 143). Type : P2/3

The filter class must be suitable for the maximum contaminant concentration (gas/vapour/aerosol/particulates) that may arise when handling the product. If the concentration is exceeded, closed-circuit breathing apparatus must be used!

#### Environmental exposure controls

No special precautionary measures are necessary.

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

Physical state:	solid
Colour:	-
Odour:	odourless

#### Test method

pH-Value:	not applicable
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#### Changes in the physical state

Melting point:	204 °C RDX, 282 °C HMX, 320 °C HNS °
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Initial boiling point and boiling range:	not applicable
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Flash point:	not applicable
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Sustaining combustion:	No data available
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#### Explosive properties

Class: 1.4S

Lower explosion limits:	not applicable
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Upper explosion limits:	not applicable
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Ignition temperature:	not applicable
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#### Oxidizing properties

none

Vapour pressure:	not applicable
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Density:	not applicable
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Bulk density:	not applicable
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Water solubility:	not applicable
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#### Solubility in other solvents

not applicable

Viscosity / dynamic:	not applicable
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Viscosity / kinematic:	not applicable
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Solvent content:	0,0%
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#### 9.2. Other information

Solid content:	100%
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Deflagration point: 230°C RDX, 287°C HMX, 360°C HNS

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

No information available.

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**10.2. Chemical stability**

The product is chemically stable under recommended conditions of storage, use and temperature.

2,2',4,4',6,6'-hexanitrostilbene (HNS):

Temperature of decomposition in °C: > 315°C

lead diazide; lead azide [> 20 % phlegmatiser]:

Temperature of decomposition in °C: > 268°C (Explosion hazard. )

**10.3. Possibility of hazardous reactions**

The product is chemically stable under recommended conditions of storage, use and temperature.

**10.4. Conditions to avoid**

heat. > 60°C

**10.5. Incompatible materials**

Reducing agents, strong. Oxidizing agents. strong alkalis. Strong acid.

**10.6. Hazardous decomposition products**

Nitrogen oxides (NOx)

**SECTION 11: Toxicological information****11.1. Information on toxicological effects****Toxicokinetics, metabolism and distribution**

No data available

**Acute toxicity**

Toxic if swallowed.

Harmful in contact with skin or if inhaled.

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CAS No	Chemical name				
	Exposure routes	Method	Dose	Species	Source
13424-46-9	lead diazide; lead azide [> 20 % phlegmatiser]				
	oral	ATE	500 mg/kg		
	inhalative vapour	ATE	11 mg/l		
	inhalative aerosol	ATE	1,5 mg/l		
2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)				
	oral	LD50 mg/kg	1960 - 3240	Mouse.	ECHA dossier
	dermal	LD50	982 mg/kg	Rabbit.	ECHA dossier
	inhalative vapour	ATE	11 mg/l		
	inhalative aerosol	ATE	1,5 mg/l		
20062-22-0	2,2',4,4',6,6'-hexanitrostilbene (HNS)				
	oral	ATE	500 mg/kg		
	dermal	ATE	1100 mg/kg		
	inhalative vapour	ATE	11 mg/l		
	inhalative aerosol	ATE	1,5 mg/l		
121-82-4	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)				
	oral	LD50	100 mg/kg	Rat.	Gestis
7429-90-5	aluminium				
	inhalative (4 h) aerosol	LC50	0,888 mg/l	Rat.	ECHA Dossier
7440-50-8	Copper				
	inhalative (4 h) aerosol	LC50	>5,11 mg/l	Rat.	ECHA Dossier

**Irritation and corrosivity**

Causes serious eye irritation.

Causes skin irritation.

**Sensitising effects**

Based on available data, the classification criteria are not met.

Sensitising: negative.

The statement is derived from the properties of the components.

**STOT-single exposure**

Based on available data, the classification criteria are not met.

**Severe effects after repeated or prolonged exposure**

Based on available data, the classification criteria are not met.

**Carcinogenic/mutagenic/toxic effects for reproduction**

Based on available data, the classification criteria are not met.

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

In-vitro mutagenicity:

Result: negative.

2,2',4,4',6,6'-hexanitrostilbene (HNS):

In-vitro mutagenicity:

Method: Ames Test

Result: positive.

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

In-vitro mutagenicity: negative.

lead diazide; lead azide [&gt; 20 % phlegmatiser]:

Reproductive toxicity: Repr. Cat. 1

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**Aspiration hazard**

Based on available data, the classification criteria are not met.

**Specific effects in experiment on an animal**

No information available.

**SECTION 12: Ecological information**
**12.1. Toxicity**

CAS No	Chemical name					
	Aquatic toxicity	Method	Dose	[h]   [d]	Species	Source
2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)					
	Acute fish toxicity	LC50	> 15 mg/l	96 h	Pimephales promelas	ECHA dossier
	Acute algae toxicity	ErC50	>6,5 mg/l	96 h	Selenastrum capricornutum	ECHA dossier
	Acute crustacea toxicity	EC50	> 15 mg/l	48 h	Daphnia magna	ECHA dossier
121-82-4	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)					
	Acute fish toxicity	LC50	3,6 mg/l	96 h	Lepomis macrochirus	HSDB Toxnet
7440-50-8	Copper					
	Acute fish toxicity	LC50 mg/l	0,0087 -20	96 h		Gestis
	Acute algae toxicity	ErC50 mg/l	0,01 - 0,91	72 h		Gestis
	Acute crustacea toxicity	EC50 mg/l	0,0016 - 34	48 h		Gestis

**12.2. Persistence and degradability**

CAS No	Chemical name			
	Method	Value	d	Source
	Evaluation			
2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)			
	OECD 301B / ISO 9439 / EEC 92/69 annex V, C.4-C	2%	28	
	Not easily bio-degradable (according to OECD-criteria).			

**12.3. Bioaccumulative potential**

No indication of bioaccumulation potential.

**Partition coefficient n-octanol/water**

CAS No	Chemical name	Log Pow
2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0,165
20062-22-0	2,2',4,4',6,6'-hexanitrostilbene (HNS)	2,18
121-82-4	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0,86

**12.4. Mobility in soil**

No data available

**12.5. Results of PBT and vPvB assessment**

lead diazide; lead azide [> 20 % phlegmatiser];  
This substance is classified as PBT.

**12.6. Other adverse effects**

No data available

**Further information**

Do not allow to enter into surface water or drains.



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#### SECTION 13: Disposal considerations

##### 13.1. Waste treatment methods

###### Advice on disposal

Dispose of waste according to applicable legislation.

Consult the appropriate local waste disposal expert about waste disposal. According to EAKV, allocation of waste identity numbers/waste descriptions must be carried out in a specific way for every industry and process.

Control report for waste code/ waste marking according to EAKV:

###### Waste disposal number of waste from residues/unused products

 160403 WASTES NOT OTHERWISE SPECIFIED IN THE LIST; waste explosives; other waste explosives  
 Classified as hazardous waste.

###### Waste disposal number of used product

 160403 WASTES NOT OTHERWISE SPECIFIED IN THE LIST; waste explosives; other waste explosives  
 Classified as hazardous waste.

###### Waste disposal number of contaminated packaging

 150110 WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED; packaging (including separately collected municipal packaging waste); packaging containing residues of or contaminated by hazardous substances  
 Classified as hazardous waste.

###### Contaminated packaging

Emptied packaging must be disposed of as hazardous waste.

#### SECTION 14: Transport information

##### Land transport (ADR/RID)

<b>14.1. UN number:</b>	UN 0456
<b>14.2. UN proper shipping name:</b>	DETONATORS, ELECTRIC for blasting
<b>14.3. Transport hazard class(es):</b>	1
<b>14.4. Packing group:</b>	-
Hazard label:	1.4



Classification code:	1.4S
Special Provisions:	347
Limited quantity:	0
Excepted quantity:	E0
Transport category:	4
Tunnel restriction code:	E

##### Inland waterways transport (ADN)

<b>14.1. UN number:</b>	UN 0456
<b>14.2. UN proper shipping name:</b>	DETONATORS, ELECTRIC for blasting
<b>14.3. Transport hazard class(es):</b>	1
<b>14.4. Packing group:</b>	-
Hazard label:	1.4





## Safety Data Sheet

according to Regulation (EC) No 1907/2006

### High temperature resistant electric/electronic Detonator 1.4S

Print date: 04.03.2016

Product code:

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Classification code:	1.4S
Special Provisions:	347
Limited quantity:	0
Excepted quantity:	E0

**Marine transport (IMDG)**

<b>14.1. UN number:</b>	UN 0456
<b>14.2. UN proper shipping name:</b>	DETONATORS, ELECTRIC for blasting
<b>14.3. Transport hazard class(es):</b>	1.4 S
<b>14.4. Packing group:</b>	-
Hazard label:	1.4 S



Marine pollutant:	NO
Special Provisions:	347
Limited quantity:	0
Excepted quantity:	E0
EmS:	F-B, S-X

**Air transport (ICAO)**

<b>14.1. UN number:</b>	UN 0456
<b>14.2. UN proper shipping name:</b>	DETONATORS, ELECTRIC for blasting
<b>14.3. Transport hazard class(es):</b>	1.4S
<b>14.4. Packing group:</b>	-
Hazard label:	1.4S



Special Provisions:	A165 A802
Limited quantity Passenger:	Forbidden
Passenger LQ:	Forbidden
Excepted quantity:	E0
IATA-packing instructions - Passenger:	131
IATA-max. quantity - Passenger:	25 kg
IATA-packing instructions - Cargo:	131
IATA-max. quantity - Cargo:	100 kg

**14.5. Environmental hazards**

ENVIRONMENTALLY HAZARDOUS: no

**14.6. Special precautions for user**

refer to chapter 6-8

**14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**

No information available.

### SECTION 15: Regulatory information

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

2010/75/EU (VOC):	0%
2004/42/EC (VOC):	0g/L

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**High temperature resistant electric/electronic Detonator 1.4S**

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**Additional Information**

Regulatory information :

-Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH)

-1272/2008 (CLP)

-2012/18/CE (SEVESO III) Annex I, Part 1: P1a

-REACH 1907/2006 Appendix XVII: not applicable

Observe in addition any national regulations!

**National regulatory information**

Employment restrictions:

Observe restrictions to employment for juvenils according to the 'juvenile work protection guideline' (94/33/EC). Observe employment restrictions under the Maternity Protection Directive (92/85/EEC) for expectant or nursing mothers. Observe employment restrictions for women of child-bearing age.

Water contaminating class (D):

3 - highly water contaminating

**Additional information**

Contact and transport only for persons resp. under survey of persons with "Befähigungsschein § 20 Sprengstoffgesetz" (Concession of explosive law) applicable in Germany only.

**15.2. Chemical safety assessment**

Chemical safety assessments for substances in this mixture were not carried out.

**SECTION 16: Other information****Changes**

Rev. 1.0 27.09.2013

Rev. 1,1 24.06.2015 ; Changes in chapter: 1-16

Rev. 1,2 04.03.2016 ; Changes in chapter: 3

**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)

RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations

Concerning the International Transport of Dangerous Goods by Rail)

IMDG: International Maritime Code for Dangerous Goods

IATA: International Air Transport Association

IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)

ICAO: International Civil Aviation Organization

ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)

GHS: Globally Harmonized System of Classification and Labelling of Chemicals

GefStoffV: Gefahrstoffverordnung (Ordinance on Hazardous Substances, Germany)

LC50: Lethal concentration, 50 percent

LD50: Lethal dosis, 50 percent

NOAEL: No observed effect Level

DNEL: Derived No Effect Level

PNEC: predicted no effect concentration

**Relevant H and EUH statements (number and full text)**

H201 Explosive; mass explosion hazard.

H301 Toxic if swallowed.

H302 Harmful if swallowed.

H312 Harmful in contact with skin.

H312+H332 Harmful in contact with skin or if inhaled.

H315 Causes skin irritation.

H319 Causes serious eye irritation.

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**High temperature resistant electric/electronic Detonator 1.4S**

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H332	Harmful if inhaled.
H360Df	May damage the unborn child. Suspected of damaging fertility.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

**Further Information**

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.

*(The data for the hazardous ingredients were taken respectively from the last version of the sub-contractor's safety data sheet.)*

**Safety Data Sheet**

according to Regulation (EC) No 1907/2006

**Detonating Cord 1.4S**

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**SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1. Product Identifier**

Detonating Cord 1.4S

**Further trade names**

This MSDS covers the following products:

- Hexacord PT 150
- Hexacord T 150
- Octocord PT 165
- Octocord PT 170
- Octocord PT 185
- Octocord T 190
- Octoslim PT 185
- Octoslim T 190
- Octoslim 40 PT 185
- HNS Cord PT 250
- HNS Slim PT 250
- HNS Slim 40 T 250

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

detonating cord.

**Uses advised against**

Do not use under Firedamp conditions.

**1.3. Details of the supplier of the safety data sheet**

Company name:	DynaEnergetics GmbH & Co. KG	
Street:	Kaiserstraße 3	
Place:	53840 Troisdorf,	
Telephone:	+49 (0) 2241 1236666	Telefax: +49 (0) 2241 1238666
Internet:	www.dynaenergetics.com	
Responsible Department:	info@tge-consult.de info@dynaenergetics.com	

**1.4. Emergency telephone number:**

Emergency medical information: Poison Information Center Mainz - Tel: +49 (6131) 19240

**Further Information**

Voluntary safety information following the Safety Data Sheet format according to Regulation (EC) No. 1907/2006 (REACH)

**SECTION 2: Hazards identification****2.1. Classification of the substance or mixture****Regulation (EC) No. 1272/2008**

Hazard categories:

Explosive: Expl. 1.1

Acute toxicity: Acute Tox. 3

Acute toxicity: Acute Tox. 4

Acute toxicity: Acute Tox. 4

Skin corrosion/irritation: Skin Irrit. 2

Serious eye damage/eye irritation: Eye Irrit. 2

Hazard Statements:

Explosive; mass explosion hazard.

Toxic if swallowed.

Harmful in contact with skin or if inhaled.

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Causes skin irritation.  
Causes serious eye irritation.

**2.2. Label elements****Regulation (EC) No. 1272/2008****Hazard components for labelling**

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 (HNS)

**Signal word:** Danger**Pictograms:****Hazard statements**

H201	Explosive; mass explosion hazard.
H301	Toxic if swallowed.
H312+H332	Harmful in contact with skin or if inhaled.
H315	Causes skin irritation.
H319	Causes serious eye irritation.

**Precautionary statements**

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P234	Keep only in original container.
P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P370+P380	In case of fire: Evacuate area.
P372	Explosion risk in case of fire.
P373	Do NOT fight fire when fire reaches explosives.
P401	Store in accordance with local/regional/national/international regulations.

**Additional advice on labelling**

There is no requirement for the product to be specially labelled according to EC directives or the corresponding national laws.

**2.3. Other hazards**

Product does not contain listed SVHC substances > 0,1 % according to Regulation (EC) No. 1907/2006 Article 59 (REACH)

The product is classified as a device. Providing the Safety Data Sheet takes place on a voluntary basis for information purposes.

**SECTION 3: Composition/information on ingredients****3.2. Mixtures****Chemical characterization**

Detonating cords with plastic coating covering a textile braid with a secondary charge of HNS, RDX or HMX.

## Safety Data Sheet

according to Regulation (EC) No 1907/2006

### Detonating Cord 1.4S

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#### Hazardous components

CAS No	Chemical name			Quantity
	EC No	Index No	REACH No	
	Classification according to Regulation (EC) No. 1272/2008 [CLP]			
121-82-4	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)			- %
	204-500-1		01-2119990795-17	
	Expl. 1.1, Acute Tox. 3, Skin Irrit. 2, Eye Irrit. 2; H201 H301 H315 H319			
20062-22-0	2,2',4,4',6,6'-hexanitrostilbene (HNS)			- %
	243-494-5			
	Expl. 1.1, Acute Tox. 4, Acute Tox. 4, Acute Tox. 4; H201 H302 H312 H332			
2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)			- %
	220-260-0		01-2119964438-25	
	Expl. 1.1, Acute Tox. 4, Acute Tox. 4, Acute Tox. 4; H201 H302 H312 H332			

Full text of H and EUH statements: see section 16.

#### Further Information

Product does not contain listed SVHC substances > 0,1 % according to Regulation (EC) No. 1907/2006 Article 59 (REACH)

The product is classified as a device. Providing the Safety Data Sheet takes place on a voluntary basis for information purposes.

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

#### General information

In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).

#### After inhalation

In case of accident by inhalation: remove casualty to fresh air and keep at rest. In all cases of doubt, or when symptoms persist, seek medical advice.

#### After contact with skin

In case of skin contact, wash immediately with large quantities of water/polyethylene glycol 400 (Roticlean). If skin irritation or rash occurs: Get medical advice/attention.

#### After contact with eyes

Rinse immediately carefully and thoroughly with eye-bath or water. In case of troubles or persistent symptoms, consult an ophthalmologist.

#### After ingestion

Rinse mouth thoroughly with water. Induce vomiting when the affected person is not unconscious. Let water be drunk in little sips (dilution effect). In all cases of doubt, or when symptoms persist, seek medical advice.

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

No information available.

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

Treat symptomatically.

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

#### Suitable extinguishing media

Co-ordinate fire-fighting measures to the fire surroundings.

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**Unsuitable extinguishing media**

High power water jet.

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

Explosion risk in case of fire.

In case of a small fire where the actual explosive is not involved, carefully remove explosive to a safe distance. However, if explosive is burning, evacuate area immediately. Do not fight fire.

**5.3. Advice for firefighters**

Wear a self-contained breathing apparatus and chemical protective clothing.

**Additional information**

Collect contaminated fire extinguishing water separately. Do not allow entering drains or surface water.

**SECTION 6: Accidental release measures****6.1. Personal precautions, protective equipment and emergency procedures**

Remove persons to safety.

Eliminate all ignition sources if safe to do so.

**6.2. Environmental precautions**

No special measures are necessary.

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

Take up mechanically.

Treat the recovered material as prescribed in the section on waste disposal.

Use only non-sparking tools.

**6.4. Reference to other sections**

refer to chapter 8

**SECTION 7: Handling and storage****7.1. Precautions for safe handling****Advice on safe handling**

Handle with care - avoid bumps, friction and impact.

**Advice on protection against fire and explosion**

Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Take precautionary measures against static discharges.

**Further information on handling**

Advices on general occupational hygiene refer to chapter 8

**7.2. Conditions for safe storage, including any incompatibilities****Requirements for storage rooms and vessels**

Keep packaging tightly closed and in a well-ventilated place. Protect against: UV-radiation/sunlight. Keep container dry. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Take precautionary measures against static discharges.

**Advice on storage compatibility**

Explosives must be stored separately from all other classes. Please observe prohibitions for common storage within the storage classes for explosives.

**Further information on storage conditions**

Recommended storage temperature: (-) 40 - (+) 60 C° [ (-) 40 °F - (+) 140°F]

Protect against: Light. heat. moisture.

**7.3. Specific end use(s)**

refer to section 1.

**SECTION 8: Exposure controls/personal protection**

according to Regulation (EC) No 1907/2006

## Detonating Cord 1.4S

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### 8.1. Control parameters

#### Additional advice on limit values

General information:

 Air limit values: (Dust, general) 10 mg/ m<sup>3</sup> ; E: Inhalable Dust fraction

 Air limit values: (Dust, general ) 1,25 mg/ m<sup>3</sup> ; Respirable Dust fraction

### 8.2. Exposure controls



#### Appropriate engineering controls

When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

#### Protective and hygiene measures

Always close packaging after the removal of product. When using do not eat, drink or smoke. Wash hands before breaks and after work.

#### Eye/face protection

In the case of the formation of dust.:

Suitable eye protection: Dust protection goggles.

#### Hand protection

No special measures are necessary.

#### Skin protection

Protective clothing.

#### Respiratory protection

With correct and proper use, and under normal conditions, breathing protection is not required.

Respiratory protection necessary at:

exceeding exposure limit values

Generation/formation of dust

Suitable respiratory protective equipment:

particulates filter device (DIN EN 143). Type : P2/3

The filter class must be suitable for the maximum contaminant concentration (gas/vapour/aerosol/particulates) that may arise when handling the product. If the concentration is exceeded, closed-circuit breathing apparatus must be used!

#### Environmental exposure controls

No special precautionary measures are necessary.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Physical state:	solid
Colour:	-
Odour:	odourless

#### Test method

pH-Value:	not applicable
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#### Changes in the physical state

Melting point:	204 °C RDX, 282 °C HMX, 320 °C HNS °
Initial boiling point and boiling range:	not applicable
Flash point:	not applicable



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Print date: 04.03.2016

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**Explosive properties**

Class: 1.4S

Lower explosion limits:

not applicable

Upper explosion limits:

not applicable

Ignition temperature:

not applicable

**Oxidizing properties**

none

Vapour pressure:

not applicable

Density:

not applicable

Bulk density:

not applicable

Water solubility:

not applicable

**Solubility in other solvents**

not applicable

Viscosity / dynamic:

N/A

Viscosity / kinematic:

N/A

Solvent content:

0,0%

**9.2. Other information**

Solid content:

100%

Deflagration point: 230°C RDX, 287°C HMX, 360°C HNS

**SECTION 10: Stability and reactivity****10.1. Reactivity**

No information available.

**10.2. Chemical stability**

The product is chemically stable under recommended conditions of storage, use and temperature.

2,2',4,4',6,6'-hexanitrostilbene (HNS):

Temperature of decomposition in °C: &gt; 315°C

**10.3. Possibility of hazardous reactions**

The product is chemically stable under recommended conditions of storage, use and temperature.

**10.4. Conditions to avoid**

heat. &gt; 60°C

**10.5. Incompatible materials**

Reducing agents, strong. Oxidizing agents. strong alkalis. Strong acid.

**10.6. Hazardous decomposition products**Nitrogen oxides (NO<sub>x</sub>)**SECTION 11: Toxicological information****11.1. Information on toxicological effects****Toxicokinetics, metabolism and distribution**

No data available

**Acute toxicity**

Toxic if swallowed.

Harmful in contact with skin or if inhaled.

according to Regulation (EC) No 1907/2006

**Detonating Cord 1.4S**

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CAS No	Chemical name				
	Exposure routes	Method	Dose	Species	Source
121-82-4	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)				
	oral	LD50	100 mg/kg	Rat.	Gestis
20062-22-0	2,2',4,4',6,6'-hexanitrostilbene (HNS)				
	oral	ATE	500 mg/kg		
	dermal	ATE	1100 mg/kg		
	inhalative vapour	ATE	11 mg/l		
	inhalative aerosol	ATE	1,5 mg/l		
2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)				
	oral	LD50 mg/kg	1960 - 3240	Mouse.	ECHA dossier
	dermal	LD50	982 mg/kg	Rabbit.	ECHA dossier
	inhalative vapour	ATE	11 mg/l		
	inhalative aerosol	ATE	1,5 mg/l		

**Irritation and corrosivity**

Causes skin irritation.

Causes serious eye irritation.

**Sensitising effects**

Based on available data, the classification criteria are not met.

Sensitising: negative.

The statement is derived from the properties of the components.

**STOT-single exposure**

Based on available data, the classification criteria are not met.

**Severe effects after repeated or prolonged exposure**

Based on available data, the classification criteria are not met.

**Carcinogenic/mutagenic/toxic effects for reproduction**

Based on available data, the classification criteria are not met.

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

In-vitro mutagenicity:

Result: negative.

2,2',4,4',6,6'-hexanitrostilbene (HNS):

In-vitro mutagenicity:

Method: Ames Test

Result: positive.

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

In-vitro mutagenicity: negative.

**Aspiration hazard**

Based on available data, the classification criteria are not met.

**Specific effects in experiment on an animal**

No information available.

**SECTION 12: Ecological information**
**12.1. Toxicity**

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CAS No	Chemical name					
	Aquatic toxicity	Method	Dose	[h]   [d]	Species	Source
121-82-4	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)					
	Acute fish toxicity	LC50	3,6 mg/l	96 h	Lepomis macrochirus	HSDB Toxnet
2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)					
	Acute fish toxicity	LC50	> 15 mg/l	96 h	Pimephales promelas	ECHA dossier
	Acute algae toxicity	ErC50	>6,5 mg/l	96 h	Selenastrum capricornutum	ECHA dossier
	Acute crustacea toxicity	EC50	> 15 mg/l	48 h	Daphnia magna	ECHA dossier

#### 12.2. Persistence and degradability

CAS No	Chemical name			
	Method	Value	d	Source
	Evaluation			
2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)			
	OECD 301B / ISO 9439 / EEC 92/69 annex V, C.4-C	2%	28	
	Not easily bio-degradable (according to OECD-criteria).			

#### 12.3. Bioaccumulative potential

No indication of bioaccumulation potential.

#### Partition coefficient n-octanol/water

CAS No	Chemical name	Log Pow
121-82-4	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0,86
20062-22-0	2,2',4,4',6,6'-hexanitrostilbene (HNS)	2,18
2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.165

#### 12.4. Mobility in soil

No data available

#### 12.5. Results of PBT and vPvB assessment

The components in this formulation do not meet the criteria for classification as PBT or vPvB.

#### 12.6. Other adverse effects

No data available

#### Further information

Do not allow to enter into surface water or drains.

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

##### Advice on disposal

Dispose of waste according to applicable legislation.

Consult the appropriate local waste disposal expert about waste disposal. According to EAKV, allocation of waste identity numbers/waste descriptions must be carried out in a specific way for every industry and process.

Control report for waste code/ waste marking according to EAKV:

##### Waste disposal number of waste from residues/unused products

160403 WASTES NOT OTHERWISE SPECIFIED IN THE LIST; waste explosives; other waste explosives  
Classified as hazardous waste.

##### Waste disposal number of used product

160403 WASTES NOT OTHERWISE SPECIFIED IN THE LIST; waste explosives; other waste explosives  
Classified as hazardous waste.

##### Waste disposal number of contaminated packaging

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150110 WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED; packaging (including separately collected municipal packaging waste); packaging containing residues of or contaminated by hazardous substances Classified as hazardous waste.

#### Contaminated packaging

Emptied packaging must be disposed of as hazardous waste.

### SECTION 14: Transport information

#### Land transport (ADR/RID)

**14.1. UN number:** UN 0349  
**14.2. UN proper shipping name:** ARTICLES, EXPLOSIVE, N.O.S.  
**14.3. Transport hazard class(es):** 1  
**14.4. Packing group:** -  
 Hazard label: 1.4



Classification code: 1.4S  
 Special Provisions: 178 274  
 Limited quantity: 0  
 Excepted quantity: E0  
 Transport category: 4  
 Tunnel restriction code: E

#### Inland waterways transport (ADN)

**14.1. UN number:** UN 0349  
**14.2. UN proper shipping name:** ARTICLES, EXPLOSIVE, N.O.S.  
**14.3. Transport hazard class(es):** 1  
**14.4. Packing group:** -  
 Hazard label: 1.4



Classification code: 1.4S  
 Special Provisions: 178 274  
 Limited quantity: 0  
 Excepted quantity: E0

#### Marine transport (IMDG)

**14.1. UN number:** UN 0349  
**14.2. UN proper shipping name:** ARTICLES, EXPLOSIVE, N.O.S.  
**14.3. Transport hazard class(es):** 1.4 S  
**14.4. Packing group:** -  
 Hazard label: 1.4 S



Marine pollutant: NO  
 Special Provisions: 178, 274

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Limited quantity:	0
Excepted quantity:	E0
EmS:	F-B, S-X

**Air transport (ICAO)**

<b>14.1. UN number:</b>	UN 0349
<b>14.2. UN proper shipping name:</b>	ARTICLES, EXPLOSIVE, N.O.S.
<b>14.3. Transport hazard class(es):</b>	1.4S
<b>14.4. Packing group:</b>	-
Hazard label:	1.4S



Special Provisions:	A62 A802
Limited quantity Passenger:	Forbidden
Passenger LQ:	Forbidden
Excepted quantity:	E0
IATA-packing instructions - Passenger:	101
IATA-max. quantity - Passenger:	25 kg
IATA-packing instructions - Cargo:	101
IATA-max. quantity - Cargo:	100 kg

**14.5. Environmental hazards**

ENVIRONMENTALLY HAZARDOUS: no

**14.6. Special precautions for user**

refer to chapter 6-8

**14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**

No information available.

## SECTION 15: Regulatory information

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

2010/75/EU (VOC):	0%
2004/42/EC (VOC):	0 g/L

**Additional information**

Regulatory information :

- Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH)
- 1272/2008 (CLP)
- 2012/18/CE (SEVESO III) Annex I, Part 1: P1a
- REACH 1907/2006 Appendix XVII: not applicable

Observe in addition any national regulations!

**National regulatory information**

Employment restrictions:	Observe restrictions to employment for juvenils according to the 'juvenile work protection guideline' (94/33/EC). Observe employment restrictions under the Maternity Protection Directive (92/85/EEC) for expectant or nursing mothers.
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Water contaminating class (D):	3 - highly water contaminating
--------------------------------	--------------------------------

**Additional information**

Contact and transport only for persons resp. under survey of persons with "Befähigungsschein § 20 Sprengstoffgesetz" (Concession of explosive law) applicable in Germany only.

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**15.2. Chemical safety assessment**

Chemical safety assessments for substances in this mixture were not carried out.

**SECTION 16: Other information****Changes**

- Rev. 1.0 13.09.2013  
Rev. 1,1 24.06.2015 ; Changes in chapter: 1-16  
Rev. 1,2 04.03.2016 ; Changes in chapter: 3

**Abbreviations and acronyms**

ADR: Accord européen sur le transport des marchandises dangereuses par Route  
CAS Chemical Abstracts Service  
DNEL: Derived No Effect Level  
IARC: INTERNATIONAL AGENCY FOR RESEARCH ON CANCER  
International Carriage of Dangerous Goods by Road)  
IMDG: International Maritime Code for Dangerous Goods  
IATA: International Air Transport Association  
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)  
ICAO: International Civil Aviation Organization  
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)  
GHS: Globally Harmonized System of Classification and Labelling of Chemicals  
GefStoffV: Gefahrstoffverordnung (Ordinance on Hazardous Substances, Germany)  
LOAEL: Lowest observed adverse effect level  
LOAEC: Lowest observed adverse effect concentration  
LC50: Lethal concentration, 50 percent  
LD50: Lethal dose, 50 percent  
NOAEL: No observed adverse effect level  
NOAEC: No observed adverse effect level  
NTP: National Toxicology Program  
N/A: not applicable  
OSHA: Concerning the International Transport of Dangerous Goods by Rail)  
PNEC: predicted no effect concentration  
PBT: Persistent bioaccumulative toxic  
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail )  
SARA: Superfund Amendments and Reauthorization Act  
SVHC: substance of very high concern  
TRGS Technische Regeln für Gefahrstoffe  
TSCA: Toxic Substances Control Act  
VOC: Volatile Organic Compounds  
VwVwS: Verwaltungsvorschrift wassergefährdender Stoffe  
WGK: Wassergefährdungsklasse

**Relevant H and EUH statements (number and full text)**

H201	Explosive; mass explosion hazard.
H301	Toxic if swallowed.
H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H312+H332	Harmful in contact with skin or if inhaled.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.

**Further Information**

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product

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named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.

*(The data for the hazardous ingredients were taken respectively from the last version of the sub-contractor's safety data sheet.)*

**SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING**

- |            |  |   |   |
|------------|--|---|---|
| <b>1.1</b> | <b>Product identifier</b>  | <b>Cord, Detonating, Class 1.4 Explosive</b>                        |  |
|            | GHS Product Identifier   | <b>Cord, Detonating, Class 1.4 Explosive</b>                        |   |
|            | Chemical Name  | Not applicable  |   |
|            | Trade name   | <b>Detcord; Detonating Cord</b>                                     |   |
|            | CAS No.  | Mixture   |   |
|            | EINECS No.   | Mixture   |   |
|            | REACH Registration No.   | Not applicable  |   |
| <b>1.2</b> | <b>Relevant identified uses of the substance or mixture and uses advised against</b> |   |   |
|            | Identified use(s)  | As Directed by Manufacturer Only                                    |   |
|            | Uses advised against   | Users are recommended to seek further advice.                       |   |
| <b>1.3</b> | <b>Details of the supplier of the safety data sheet</b>                              |   |   |
|            | Company Identification   | <b>Owen Oil Tools LP</b>  |   |
|            | Address  | <b>12001 County Road 1000 / P.O. Box 765 / Godley, TX 76044 USA</b> |   |
|            | Telephone  | <b>(817) 551-0660</b>   |   |
|            | E-Mail (competent person)  | <a href="mailto:info@ocsresponds.com">info@ocsresponds.com</a>      |   |
| <b>1.4</b> | <b>Emergency telephone number – ChemTel Inc.</b>                                     |   |   |
|            | <b>Emergency Phone No. (800) 255-3924 , (813) 248-0585</b>                           |   |   |

**SPECIAL NOTICE – EXPLOSIVE MATERIALS****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 2: HAZARDS IDENTIFICATION

- 2.1 Classification of the substance or mixture**
- 2.1.1 Regulation (EC) No. 1272/2008 (CLP) - Acute toxicity 3 (Oral) / 4 (Dermal, Inhalation) , Skin Irritation 2, Eye Irritation 2, (3.1/3-4, 3.2/2, 3.3/2)**
- 2.1.2 Directive 67/548/EEC & Directive 1999/45/EC - CORROSIVE, HARMFUL**
- 2.2 Label elements**
- 2.2.1 Label elements According to Regulation (EC) No. 1272/2008 (CLP) GHS Product Identifier (EU)**

Hazard pictogram(s)		Signal word(s)	<b>DANGER</b>
Hazard statement(s)	<p>H204: Fire or projection hazard.</p> <p>H301: Toxic if swallowed.</p> <p>H312: Harmful in contact with skin.</p> <p>H315: Causes skin irritation.</p> <p>H319: Causes serious eye irritation.</p> <p>H332: Harmful if inhaled.</p>		
Precautionary statement(s)	<p>P201: Obtain special instructions before use.</p> <p>P202: Do not handle until all safety precautions have been read and understood.</p> <p>P210: Keep away from heat, sparks, open flame, hot surfaces - No smoking.</p> <p>P240: Ground/bond container and receiving equipment.</p> <p>P250: Do not subject to grinding/shock/.../friction.</p> <p>P280: Wear protective gloves/protective clothing/eye protection/face protection.</p> <p>P261: Avoid breathing dust/fume/gas/mist/vapours/spray.</p> <p>P270: Do not eat, drink or smoke when using this product.</p> <p>P301 + P330 + P331: IF SWALLOWED: rinse mouth. Do NOT induce vomiting.</p> <p>P301 + P310: IF SWALLOWED: Immediately call a POISON CENTRE or doctor/physician.</p> <p>P302 + P352: IF ON SKIN: Wash with plenty of soap and water.</p> <p>P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.</p> <p>P305: IF IN EYES: Get immediate medical attention.</p> <p>P501: Dispose of contents/container to: Send to a licensed recycler, reclaimor or incinerator.</p>		

- 2.2.2 Label elements According to Directive 67/548/EEC & Directive 1999/45/EC**

Hazard Symbol	
Risk Phrases	<p>R2: Risk of explosion by shock, friction, fire or other sources of ignition.</p> <p>R20/21: Harmful by inhalation and in contact with skin.</p> <p>R25: Toxic if swallowed.</p>
Safety Phrases	<p>S2: Keep out of the reach of children.</p> <p>S13: Keep away from food, drink and animal feedingstuffs.</p> <p>S16: Keep away from sources of ignition - No smoking.</p> <p>S23: Do not breathe fumes.</p> <p>S24/25: Avoid contact with skin and eyes.</p> <p>S34: Avoid shock or friction.</p> <p>S35: This material and its container must be disposed of in a safe way.</p> <p>S36/39: Wear suitable protective clothing and eye/face protection.</p> <p>S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).</p>

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**2.3 Other hazards** GHS Classification (USA): Hazardous under OSHA Hazard Communication Standard –HMIS: Health-3, Flammability-3 Reactivity – 3










WHMIS Classification (Canada): Exempt under WHMIS.









**2.4 Additional Information** None

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

### EC Classification No. 1272/2008/EC

Hazardous ingredient(s)	% W/W	CAS No.	EC No.	REACH Registration No.	Hazard pictogram(s) and Hazard statement(s)
Pentaerythritol Tetranitrate (PETN)		78-11-5	201-084-3	NA	 2.1; H200
Cyclotrimethylene-trinitramine (RDX)		121-82-4	204-500-1	NA	  2.1/1, 3.1/3(oral), H201, H301
Cyclotetramethylene-tetranitramine (HMX)		2691-41-0	220-260-0	NA	  2.1/1, 3.1/3(oral), H201, H301
Hexanitrostilbene (HNS)		20062-22-0		NA	 2.1/1, 3.1/4(oral); H201, H302
2,6-bis(picrylamino)-3,5-dinitropyridine (PYX)		38082-89-2	NA	NA	 2.1/1; H201

### EC Classification No. 67/548/EEC

Hazardous ingredient(s)	% W/W	CAS No.	EC No.	REACH Registration No.	Hazard pictogram(s) and Hazard statement(s)
Pentaerythritol Tetranitrate (PETN)		78-11-5	201-084-3	NA	 E+; R3
Cyclotrimethylene-trinitramine (RDX)		121-82-4	204-500-1	NA	  E, Xn, R2, R25
Cyclotetramethylene-tetranitramine (HMX)		2691-41-0	220-260-0	NA	  E, Xn, R2, R25
Hexanitrostilbene (HNS)		20062-22-0	NA	NA	  E, Xn, R2, R22
2,6-bis(picrylamino)-3,5-dinitropyridine (PYX)		38082-89-2	NA	NA	 E; R2

### 3.3 Additional Information

- For full text of H phrases see section 16. For full text of R phrases see section 16. Non-Hazardous ingredients are not listed and make up the balance of the product.

**SECTION 4: FIRST AID MEASURES**

**4.1 Description of first aid measures**

Inhalation	Remove patient from exposure. Keep patient at rest and give oxygen if breathing difficult. If symptoms develop, obtain medical attention. See Section 4.2 for blast injury information.
Skin Contact	Remove contaminated clothing immediately and drench affected skin with plenty of water, then wash with soap and water. If irritation (redness, rash, blistering) develops, get medical attention. See Section 4.2 for blast injury information.
Eye Contact	Remove any contact lenses. Irrigate with eyewash solution or clean water, holding the eyelids apart, for at least 15 minutes. Obtain immediate medical attention. If cardiac symptoms or flushing develop, seek medical attention.
Ingestion	May be toxic. If swallowed, seek medical advice immediately and show this SDS, container or label. Do not induce vomiting. Make victim drink plenty of water. Get immediate medical attention.

**4.2 Most important symptoms and effects, both acute and delayed** **Acute:** Blast injuries may occur should product accidentally detonate or ignite. With all blast injuries, immediate medical treatment for trauma is essential for patient outcome. Blast trauma may take many forms, but will include skeletal and soft tissue injuries. These injuries may not be immediately apparent. **FOR ANY ACCIDENT INVOLVING DETONATION OR IGNITION OF PRODUCT, EMERGENCY TREATMENT IS REQUIRED.** **Delayed and chronic effects:** Cardiac and vascular effects, neurological effects, developmental impairment. Possible risk of impaired fertility.

**4.3 Indication of the immediate medical attention and special treatment needed** Treat symptomatically. Exposure involving nitrated organics may require significant intervention to prevent circulatory collapse.

**SECTION 5: FIRE-FIGHTING MEASURES**

**Explosive material. Flash Point = Not applicable. Explosive limit ranges = Not applicable.**

- 5.1 Extinguishing media**
- |                                |   |
|--------------------------------|---|
| Suitable Extinguishing Media   | Extinguish preferably with dry chemical, foam or water spray. |
| Unsuitable Extinguishing Media | None known.   |
- 5.2 Special hazards arising from the substance or mixture** Explosion risk in case of fire. DO NOT fight fire when fire reaches explosives. Do not attempt to directly fight established or slow smoldering fires as an explosion is possible. In case of fire, evacuate area.
- 5.3 Advice for fire-fighters** In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.

**SECTION 6: ACCIDENTAL RELEASE MEASURES**

- 6.1 Personal precautions, protective equipment and emergency procedures** Warn everybody – explosion hazard. Evacuate the area of non-essential personnel. Ensure full personal protection (including respiratory protection) during removal of spillages.
- 6.2 Environmental Precautions** Ventilation recommended.

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- 6.3 Methods and material for containment and cleaning up** Warn everybody – explosion hazard. If safe to do so: Put on protective equipment before entering danger area. Transfer to a container for disposal or recovery.
- 6.4 Reference to other sections** See Also Section 7, 8, 13.
- 6.5 Additional Information** None

#### SECTION 7: HANDLING AND STORAGE

- 7.1 Precautions for safe handling** Avoid inhalation of high concentrations of vapors. Keep away from oxidizing agents. Keep away from fire, sparks and heated surfaces - no smoking.
- 7.2 Conditions for safe storage, including any incompatibilities** Protect from sunlight. Store in a well-ventilated place. Do not use or store near heat or open flame. Do not store and transport with oxidizers etc.
- Storage Temperature** Consult the supplier.
- Storage Life** Consult the supplier.
- Incompatible materials** Oxidizing agents, flammable substances.
- 7.3 Specific end use(s)** Consult the supplier.

#### SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

##### 8.1 Control parameters

###### 8.1.1 Occupational Exposure Limits (1)

SUBSTANCE.	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m <sup>3</sup> )	STEL (ppm)	STEL (mg/m <sup>3</sup> )	Note:
Pentaerythritol Tetranitrate (PETN)	78-11-5	NE	1.5 mg/m <sup>3</sup> (skin)	NE	NE	ACGIH
Cyclotrimethylene-trinitramine (RDX)	121-82-4	NE	0.5 mg/m <sup>3</sup> (skin)	NE	NE	ACGIH
Cyclotetramethylene-tetranitramine (HMX)	2691-41-0	NE	0.5 mg/m <sup>3</sup> (skin)	NE	NE	ACGIH

(1) – Components not listed have no Occupational Exposure Limits within the US.





###### 8.1.2 Biological limit value

Not Available.

###### 8.1.3 PNECs and DNELs

PNECs and DNELs - Not available.

###### 8.2.2 Personal protection equipment

	<b>Respirators</b>	Wear suitable respiratory protective equipment if exposure to levels above the occupational exposure limit is likely.
	<b>Eye Protection</b>	Safety spectacles.
	<b>Gloves</b>	Wear protective gloves.
	<b>Body protection</b>	Wear suitable protective clothing and gloves.
	<b>Engineering Controls</b>	Consult the supplier.
	<b>Other</b>	Consult the supplier.

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## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### 9.1 Information on basic physical and chemical properties

Appearance	Textile-wrapped Cord	Color	Not available
Odor	None	Odor Threshold (ppm)	Not available
Melting Point (°C) / Freezing Point (°C)	Not available	Boiling point/boiling range (°C):	Not available
Flash Point (°C)	Explosive	Explosive limit ranges	Not available
Auto Ignition Temperature (°C)	Not available	Decomposition Temperature (°C)	Not available
Explosive properties	Explosive	Oxidizing properties	Not available
Flammability (solid, gas)	Not available	pH (Value)	Not available
Evaporation rate	Not available	Vapor Pressure (mm Hg)	Not available
Vapor Density (Air=1)	Not available	Density (g/ml)	Not available
Solubility (Water)	Not available	Solubility (Other)	Not available
Partition Coefficient (n-Octanol/water)	Not available	Viscosity (mPa.s)	Paste

### 9.2 Other information

Volatile Organic Chemical (VOC) Content – Not available

## SECTION 10: STABILITY AND REACTIVITY

<b>10.1 Reactivity</b>	May react with incompatible materials. See Sections 7 and 10.
<b>10.2 Chemical stability</b>	Stable under normal conditions.
<b>10.3 Possibility of hazardous reactions</b>	Can react violently if in contact with - Oxidizing agents, Flammable Agents
<b>10.4 Conditions to avoid</b>	Avoid contact with heat and ignition sources. Avoid shock, impact, friction and rough handling. Risk of explosion by shock, friction, fire or other sources of ignition.
<b>10.5 Incompatible materials</b>	Can react violently if in contact with - Oxidizing agents, Flammable Agents
<b>10.6 Hazardous Decomposition Product(s)</b>	Carbon monoxide, Carbon dioxide, Nitrogen oxides, Metal fumes and oxides. Thermal decomposition will evolve toxic, irritant and flammable vapors.

## SECTION 11: TOXICOLOGICAL INFORMATION

SUBSTANCE (2)	CAS No.	LD <sub>50</sub> (Oral, Rat)	LC <sub>50</sub> (Inhalation, Rat)	LD <sub>50</sub> (Dermal, Rat)
Pentaerythritol Tetranitrate (PETN)	78-11-5	1660 mg/kg	NE	NE
Cyclotrimethylene-trinitramine RDX)	121-82-4	59 mg/kg (mouse)	NE	NE
Cyclotetramethylene-tetranitramine (HMX)	2691-41-0	1500 mg/kg (mouse)	NE	NE
(2)– Components not listed have no available acute toxicity data.				

### 11.1 Information on toxicological effects

#### 11.1.2 Mixtures

Acute toxicity	Toxic if swallowed. Ingestion may cause irritation of the gastrointestinal tract. May cause drowsiness or dizziness.
Irritation	May cause irritation.
Corrosivity	Not to be expected.
Repeated dose toxicity	Expected to be similar to single exposures. Cardiovascular disorders and methaemoglobinaemia may occur.
Carcinogenicity	No data.
Mutagenicity	No data.
Toxicity for reproduction	No data.

### 11.2 Other information

None

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### SECTION 12: ECOLOGICAL INFORMATION

<b>12.1 Toxicity</b>	Harmful to aquatic life. Harmful to algae. <b>(SAFE AS GENERAL STATEMENT)</b>
<b>12.2 Persistence and degradability</b>	Moderately/partially biodegradable. Not persistent.
<b>12.3 Bioaccumulative potential</b>	Moderately/partially biodegradable.
<b>12.4 Mobility in soil</b>	The product has high mobility in soil.
<b>12.5 Results of PBT and vPvB assessment</b>	No data.
<b>12.6 Other adverse effects</b>	No data. Consult the supplier.

### SECTION 13: DISPOSAL CONSIDERATIONS

<b>13.1 Waste treatment methods</b>	Disposal should be in accordance with local, state or national legislation. Consult an accredited waste disposal contractor or the local authority for advice.
<b>13.2 Additional Information</b>	None

### SECTION 14: TRANSPORT INFORMATION

<b>Land transport (ADR/RID) (3)(4)</b>		<b>Land transport (Within USA) (3)(4)</b>	
UN number	0289 / 0349	UN number	0289 / 0349
Proper Shipping Name		Proper Shipping Name	
	Cord, Detonating, Flexible (0289)		Cord, Detonating, Flexible (0289)
	Articles, Explosive, n.o.s. (0349)		Articles, Explosive, n.o.s. (0349)
Transport hazard class(es)	1.4D (0289)	Transport hazard class(es)	1.4D (0289)
	1.4S (0349)		1.4S (0349)
Packing Group	II	Packing Group	II
Hazard label(s)	EXPLOSIVE 1.4	Hazard label(s)	EXPLOSIVE 1.4
Environmental hazards	None	Environmental hazards	None
Special precautions for user	(3)	Special precautions for user	(3)
<b>Sea transport (IMDG) (3)(4)</b>		<b>Air transport (ICAO/IATA) (3) (4)</b>	
UN number	0289 / 0349	UN number	0289 / 0349
Proper Shipping Name		Proper Shipping Name	
	Cord, Detonating, Flexible (0289)		Cord, Detonating, Flexible (0289)
	Articles, Explosive, n.o.s. (0349)		Articles, Explosive, n.o.s. (0349)
Transport hazard class(es)	1.4D (0289)	Transport hazard class(es)	1.4D (0289)
	1.4S (0349)		1.4S (0349)
Packing Group	II	Packing Group	II
Marine Pollutant	No	Environmental hazards	No
Special precautions for user	(3)	Special precautions for user	(3)

(3)– Consult with transport provider.

(4)– Check relevant regulations for Special Provisions.

**SECTION 15: REGULATORY INFORMATION**
**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
**15.1.1 EU regulations**

Authorisations and/or restrictions on use      Consult the supplier.

European Union (EINECS/ELINCS)      All chemicals listed.

German WGK number      2

**15.1.2 National regulations**
**USA**

TSCA (Toxic Substance Control Act)      All chemicals listed.

SARA 311/312 - Hazard Categories      Acute Health, Fire, Reactive

SARA 302 - Extremely Hazardous Substances      Listed - None.

SARA 313 - Toxic Chemicals      Listed - None.

CERCLA (Comprehensive Environmental Response Compensation and Liability Act)      Listed - None.

CAA (Clean Air Act 1990)      Listed – None.

CWA (Clean Water Act)      Listed – None.

State Right to Know Lists      Listed. – CA, FL, MA, NJ, PA, and RI.

Proposition 65 (California) - This product contains the following substance(s) known to the state of California to cause cancer and/or reproductive harm: None.

**Canada**

WHMIS Classification      Exempt under WHMIS.

Canada (DSL/NDSL)      Listed - DSL or NDSL

Canada Ingredient Disclosure List (CIDL)      Listed as required.

**15.2 Chemical Safety Assessment**      Explosive, Toxic (Oral), Harmful (Dermal/Inhalation), Eye/Skin Irritation

**15.3 Label elements (EU)**      See Section 2.



**SECTION 16: OTHER INFORMATION**

The following sections contain revisions or new statements: 1-16.

**Risk Phrases and Safety Phrases**

R2: Risk of explosion by shock, friction, fire or other sources of ignition.  
R3: Extreme risk of explosion by shock, friction, fire or other sources of ignition.  
R9: Explosive when mixed with combustible material.  
R20/21: Harmful by inhalation and in contact with skin.  
R22: Harmful if swallowed.  
R25: Toxic if swallowed.  
R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
R61: May cause harm to the unborn child.  
R62: Possible risk of impaired fertility.

S2: Keep out of the reach of children.  
S13: Keep away from food, drink and animal feedingstuffs.  
S16: Keep away from sources of ignition - No smoking.  
S23: Do not breathe fumes.  
S24/25: Avoid contact with skin and eyes.  
S34: Avoid shock or friction.  
S35: This material and its container must be disposed of in a safe way.  
S36/39: Wear suitable protective clothing and eye/face protection.  
S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

**Hazard statement(s) and Precautionary statement(s)**

H200: Unstable explosives.  
H201: Explosive; mass explosion hazard.  
H204: Fire or projection hazard.  
H272: May intensify fire; oxidizer.  
H301: Toxic if swallowed.  
H302: Harmful if swallowed.  
H312: Harmful in contact with skin.  
H315: Causes skin irritation.  
H319: Causes serious eye irritation.  
H332: Harmful if inhaled.  
H410: Very toxic to aquatic life with long lasting effects.

P201: Obtain special instructions before use.  
P202: Do not handle until all safety precautions have been read and understood.  
P210: Keep away from heat, sparks, open flame, hot surfaces - No smoking.  
P240: Ground/bond container and receiving equipment.  
P250: Do not subject to grinding/shock/.../friction.  
P280: Wear protective gloves/protective clothing/eye protection/face protection.  
P261: Avoid breathing dust/fume/gas/mist/vapours/spray.  
P270: Do not eat, drink or smoke when using this product.  
P301 + P330 + P331: IF SWALLOWED: rinse mouth. Do NOT induce vomiting.  
P301 + P310: IF SWALLOWED: Immediately call a POISON CENTRE or doctor/physician.  
P302 + P352: IF ON SKIN: Wash with plenty of soap and water.  
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P305: IF IN EYES: Get immediate medical attention.  
P501: Dispose of contents/container to: Send to a licensed recycler, reclaimer or incinerator.

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**LEGEND**

ACGI	American Conference of Governmental Industrial Hygienists	NA	not applicable, not available
H			
AICS	Australian Inventory of Chemical Substances	NIOSH	National Institute for Occupational Safety and Health
			not determined
ANSI	American National Standards Institute	ND	not determined
atm	atmosphere (pressure unit)	NFPA	National Fire Prevention Association
BOD	biological oxygen demand	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OC	open cup
CC	closed cup	OSHA	Occupational Safety and Health Administration
CDTA	Chemical Drug and Trafficking Act	Part	partition
COC	Cleveland Open Cup	PEL	permissible exposure limits
COD	chemical oxygen demand	ppb	parts per billion
coeff.	coefficient	PPE	personal protective equipment
CFR	Code of Federal Regulations	ppm	parts per million
CPR	cardio-pulmonary resuscitation	psi	pounds per square inch
DEA	Drug Enforcement Agency	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	RQ	Reportable quantity
DSCL	Dangerous Substances Classification and Labeling	RTK	Right to Know
EEC	European Economic Community	SARA	Superfund Amendments and Reauthorization Act
FDA	Food and Drug Administration	STEL	short-term exposure limit
HMIS	Hazardous Materials Information System	SUSDP	Standard for the Uniform Scheduling of Drugs and Poisons (Australia)
			Tagliabue Closed Cup
IARC	International Agency for Research on Cancer	TCC	Transportation of Dangerous Goods
IDLH	immediate danger to life or health	TDG	Transportation of Dangerous Goods
kg	kilogram	TPQ	threshold planning quantity
L	liter	TQ	threshold quantity
LC50	median lethal concentration	TSCA	Toxic Substances Control Act
LD50	median lethal dose	TWA	time-weighted average
LEL	lower explosive limit	UEL	upper explosive limit
mg	milligram	WES	Workplace Exposure Standard (New Zealand)
mL	milliliter	WHMIS	Workplace Hazardous Material Information System

**References:** RTECS, CAS Registry, EINECS/ESIS, *Casarett & Doull's Toxicology*, *Goldfrank's Toxicological Emergencies*, Manufacturer Information

**Training advice:** Consult the supplier.

**Additional Information:** Consult the supplier.

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**SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1. Product Identifier**

Shaped Charge 1.4 D

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

Shaped Charge

**Uses advised against**

Do not use under Firedamp conditions.

**1.3. Details of the supplier of the safety data sheet**

Company name:	DynaEnergetics GmbH & Co. KG	
Street:	Kaiserstraße 3	
Place:	53840 Troisdorf,	
Telephone:	+49 (0) 2241 1236666	Telefax: +49 (0) 2241 1238666
Internet:	www.dynaenergetics.com	
Responsible Department:	info@tge-consult.de info@dynaenergetics.com	

**1.4. Emergency telephone number:**

Emergency medical information: Poison Information Center Mainz - Tel: +49 (6131) 19240

**Further Information**

Voluntary safety information following the Safety Data Sheet format according to Regulation (EC) No. 1907/2006 (REACH)

**SECTION 2: Hazards identification****2.1. Classification of the substance or mixture****Regulation (EC) No. 1272/2008**

Hazard categories:

Explosive: Expl. 1.1

Acute toxicity: Acute Tox. 3

Acute toxicity: Acute Tox. 4

Acute toxicity: Acute Tox. 4

Skin corrosion/irritation: Skin Irrit. 2

Serious eye damage/eye irritation: Eye Irrit. 2

Respiratory or skin sensitisation: Skin Sens. 1

Carcinogenicity: Carc. 2

Reproductive toxicity: Repr. 1A

Specific target organ toxicity - repeated exposure: STOT RE 1

Specific target organ toxicity - repeated exposure: STOT RE 2

Hazardous to the aquatic environment: Aquatic Acute 1

Hazardous to the aquatic environment: Aquatic Chronic 1

Hazard Statements:

Explosive; mass explosion hazard.

Toxic if swallowed.

Harmful in contact with skin or if inhaled.

Causes skin irritation.

May cause an allergic skin reaction.

Causes serious eye irritation.

Suspected of causing cancer.

May damage the unborn child.

Causes damage to organs through prolonged or repeated exposure.

May cause damage to organs through prolonged or repeated exposure.

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Very toxic to aquatic life with long lasting effects.

**2.2. Label elements****Regulation (EC) No. 1272/2008****Hazard components for labelling**

nickel powder  
perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)  
octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)  
lead

**Signal word:** Danger**Pictograms:****Hazard statements**

H201	Explosive; mass explosion hazard.
H301	Toxic if swallowed.
H312+H332	Harmful in contact with skin or if inhaled.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H351	Suspected of causing cancer.
H360D	May damage the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.

**Precautionary statements**

P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P234	Keep only in original container.
P281	Use personal protective equipment as required.
P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P370+P380	In case of fire: Evacuate area.
P372	Explosion risk in case of fire.
P373	Do NOT fight fire when fire reaches explosives.
P401	Store in accordance with local/regional/national/international regulations.

**Special labelling of certain mixtures**

Restricted to professional users.

**Additional advice on labelling**

Labelling according to Regulation (EC) No. 1272/2008 [CLP]: There is no requirement for the product to be specially labelled according to EC directives or the corresponding national laws.

**2.3. Other hazards**

The substances in the mixture do not meet the PBT/vPvB criteria according to REACH, annex XIII.

**SECTION 3: Composition/information on ingredients****3.2. Mixtures**

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**Chemical characterization**

Shaped charges are applied in oil and gas field to perforate the casing in bore holes, to allow oil or gas production. They consist of a metal case (zinc or steel) with compressed explosive (RDX, HMX or HNS) and a liner (pressed metal, powder or sheet).

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**Hazardous components**

CAS No	Chemical name			Quantity
	EC No	Index No	REACH No	
	Classification according to Regulation (EC) No. 1272/2008 [CLP]			
7440-02-0	nickel powder			- %
	231-111-4	028-002-01-4		
	Carc. 2, STOT RE 1, Skin Sens. 1, Aquatic Chronic 3; H351 H372 ** H317 H412			
121-82-4	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)			- %
	204-500-1		01-2119990795-17	
	Expl. 1.1, Acute Tox. 3, Skin Irrit. 2, Eye Irrit. 2; H201 H301 H315 H319			
20062-22-0	2,2',4,4',6,6'-hexanitrostilbene (HNS)			- %
	243-494-5			
	Expl. 1.1, Acute Tox. 4, Acute Tox. 4, Acute Tox. 4; H201 H302 H312 H332			
2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)			- %
	220-260-0		01-2119964438-25	
	Expl. 1.1, Acute Tox. 4, Acute Tox. 4, Acute Tox. 4; H201 H302 H312 H332			
7439-92-1	lead			- %
	231-100-4			
	Repr. 1A, Acute Tox. 4, Acute Tox. 4, STOT RE 2, Aquatic Acute 1, Aquatic Chronic 1; H360D H302 H332 H373 H400 H410			
7440-50-8	Copper			- %
	231-159-6			
	Aquatic Acute 1 (M-Factor = 100), Aquatic Chronic 1; H400 H410			
7440-33-7	tungsten			- %
	231-143-9			
7440-66-6	Zinc			- %
	231-175-3			
	Aquatic Acute 1, Aquatic Chronic 1; H400 H410			
7440-21-3	silicon			- %
	231-130-8			
7440-31-5	tin			- %
	231-141-8			
7439-95-4	Magnesium			- %
	231-104-6			
7440-36-0	antimony			- %
	231-146-5			
7440-22-4	Silver powder			- %
	231-131-3			

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Full text of H and EUH statements: see section 16.

**Further Information**

Product does not contain listed SVHC substances > 0,1 % according to Regulation (EC) No. 1907/2006 Article 59 (REACH)

The product is classified as a device. Providing the Safety Data Sheet takes place on a voluntary basis for information purposes.

**SECTION 4: First aid measures****4.1. Description of first aid measures****General information**

In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).

**After inhalation**

In case of accident by inhalation: remove casualty to fresh air and keep at rest. In all cases of doubt, or when symptoms persist, seek medical advice.

**After contact with skin**

In case of skin contact, wash immediately with large quantities of water/polyethylene glycol 400 (Roticlean). If skin irritation or rash occurs: Get medical advice/attention.

**After contact with eyes**

Rinse immediately carefully and thoroughly with eye-bath or water. In case of troubles or persistent symptoms, consult an ophthalmologist.

**After ingestion**

Rinse mouth thoroughly with water. Induce vomiting when the affected person is not unconscious. Let water be drunk in little sips (dilution effect). In all cases of doubt, or when symptoms persist, seek medical advice.

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

No information available.

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

Treat symptomatically.

**SECTION 5: Firefighting measures****5.1. Extinguishing media****Suitable extinguishing media**

Co-ordinate fire-fighting measures to the fire surroundings.

**Unsuitable extinguishing media**

High power water jet.

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

Explosion risk in case of fire.

In case of a small fire where the actual explosive is not involved, carefully remove explosive to a safe distance. However, if explosive is burning, evacuate area immediately. Do not fight fire.

**5.3. Advice for firefighters**

Wear a self-contained breathing apparatus and chemical protective clothing.

**Additional information**

Collect contaminated fire extinguishing water separately. Do not allow entering drains or surface water.

**SECTION 6: Accidental release measures****6.1. Personal precautions, protective equipment and emergency procedures**

Remove persons to safety.

Eliminate all ignition sources if safe to do so.



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**6.2. Environmental precautions**

No special measures are necessary.

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

Take up mechanically.

Treat the recovered material as prescribed in the section on waste disposal.

Use only non-sparking tools.

**6.4. Reference to other sections**

refer to chapter 8

**SECTION 7: Handling and storage****7.1. Precautions for safe handling****Advice on safe handling**

Handle with care - avoid bumps, friction and impact.

**Advice on protection against fire and explosion**

Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Take precautionary measures against static discharges.

**Further information on handling**

Advices on general occupational hygiene refer to chapter 8

**7.2. Conditions for safe storage, including any incompatibilities****Requirements for storage rooms and vessels**

Keep packaging tightly closed and in a well-ventilated place. Protect against: UV-radiation/sunlight. Keep container dry. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Take precautionary measures against static discharges.

**Advice on storage compatibility**

Explosives must be stored separately from all other classes. Please observe prohibitions for common storage within the storage classes for explosives.

**Further information on storage conditions**

Recommended storage temperature: (-) 40 - (+) 60 C° [(-) 40 °F - (+) 140°F]

Protect against: Light. heat. moisture.

**7.3. Specific end use(s)**

refer to section 1.

**SECTION 8: Exposure controls/personal protection****8.1. Control parameters**

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**Exposure limits (EH40)**

CAS No	Substance	ppm	mg/m <sup>3</sup>	fibres/ml	Category	Origin
-	Antimony and compounds except stibine (as Sb)	-	0.5	-	TWA (8 h)	WEL
-	-	-	-	-	STEL (15 min)	WEL
7440-50-8	Copper, dusts and mists (as Cu)	-	1	-	TWA (8 h)	WEL
-	-	-	2	-	STEL (15 min)	WEL
1309-48-4	Magnesium oxide (as Mg), inhalable dust	-	10	-	TWA (8 h)	WEL
-	-	-	-	-	STEL (15 min)	WEL
7440-21-3	Silicon, respirable dust	-	4	-	TWA (8 h)	WEL
-	-	-	-	-	STEL (15 min)	WEL
7440-22-4	Silver, metallic	-	0.1	-	TWA (8 h)	WEL
-	-	-	-	-	STEL (15 min)	WEL
-	Tin compounds, inorganic, except SnH <sub>4</sub> , (as Sn)	-	2	-	TWA (8 h)	WEL
-	-	-	4	-	STEL (15 min)	WEL
7440-33-7	Tungsten	-	5	-	TWA (8 h)	WEL
-	-	-	10	-	STEL (15 min)	WEL

**Additional advice on limit values**

General information:

 Air limit values: (Dust, general) 10 mg/ m<sup>3</sup> ; E: Inhalable Dust fraction

 Air limit values: (Dust, general ) 1,25 mg/ m<sup>3</sup> ; Respirable Dust fraction

**8.2. Exposure controls**

**Appropriate engineering controls**

When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

**Protective and hygiene measures**

Always close packaging after the removal of product. When using do not eat, drink or smoke. Wash hands before breaks and after work.

**Eye/face protection**

In the case of the formation of dust.:

Suitable eye protection: Dust protection goggles.

**Hand protection**

No special measures are necessary.

**Skin protection**

Protective clothing.

**Respiratory protection**

With correct and proper use, and under normal conditions, breathing protection is not required.

Respiratory protection necessary at:

exceeding exposure limit values

Generation/formation of dust

Suitable respiratory protective equipment:

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particulates filter device (DIN EN 143). Type : P2/3

The filter class must be suitable for the maximum contaminant concentration (gas/vapour/aerosol/particulates) that may arise when handling the product. If the concentration is exceeded, closed-circuit breathing apparatus must be used!

#### Environmental exposure controls

No special precautionary measures are necessary.

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

Physical state: solid  
 Colour: -  
 Odour: odourless

#### Test method

pH-Value: not applicable

#### Changes in the physical state

Melting point: 204 °C RDX, 282 °C HMX, 320 °C HNS °

Initial boiling point and boiling range: not applicable

Flash point: not applicable

#### Explosive properties

Class: 1.4D

Lower explosion limits: not applicable

Upper explosion limits: not applicable

Ignition temperature: not applicable

#### Oxidizing properties

none

Vapour pressure: not applicable

Density: not applicable

Bulk density: not applicable

Water solubility: not applicable

#### Solubility in other solvents

not applicable

Viscosity / dynamic: not applicable

Viscosity / kinematic: not applicable

Solvent content: 0,0%

#### 9.2. Other information

Solid content: 100%

Deflagration point [°C] 230 RDX, 287 HMX, 360 HNS

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

No information available.

#### 10.2. Chemical stability

The product is chemically stable under recommended conditions of storage, use and temperature.

2,2',4,4',6,6'-hexanitrostilbene (HNS):

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Temperature of decomposition in °C: &gt; 315°C

**10.3. Possibility of hazardous reactions**

The product is chemically stable under recommended conditions of storage, use and temperature.

**10.4. Conditions to avoid**

heat. &gt; 60°C

**10.5. Incompatible materials**

Reducing agents, strong. Oxidizing agents, strong. strong alkalis. Strong acid.

**10.6. Hazardous decomposition products**Nitrogen oxides (NO<sub>x</sub>)**SECTION 11: Toxicological information****11.1. Information on toxicological effects****Toxicokinetics, metabolism and distribution**

No data available

**Acute toxicity**

Toxic if swallowed.

Harmful in contact with skin or if inhaled.

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CAS No	Chemical name				
	Exposure routes	Method	Dose	Species	Source
7440-02-0	nickel powder				
	oral	LD50	>9000 mg/kg	Rat	ECHA Dossier
	inhalative (1 h) aerosol	LC50	>=10,2 mg/l	Rat	ECHA Dossier
121-82-4	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)				
	oral	LD50	100 mg/kg	Rat.	Gestis
20062-22-0	2,2',4,4',6,6'-hexanitrostilbene (HNS)				
	oral	ATE	500 mg/kg		
	dermal	ATE	1100 mg/kg		
	inhalative vapour	ATE	11 mg/l		
	inhalative aerosol	ATE	1,5 mg/l		
2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)				
	oral	LD50 mg/kg	1960 - 3240	Mouse.	ECHA dossier
	dermal	LD50	982 mg/kg	Rabbit.	ECHA dossier
	inhalative vapour	ATE	11 mg/l		
	inhalative aerosol	ATE	1,5 mg/l		
7439-92-1	lead				
	oral	ATE	500 mg/kg		
	inhalative vapour	ATE	11 mg/l		
	inhalative aerosol	ATE	1,5 mg/l		
7440-50-8	Copper				
	inhalative (4 h) aerosol	LC50	>5,11 mg/l	Rat.	ECHA Dossier
7440-33-7	tungsten				
	oral	LD50	>2000 mg/kg	Rat.	ECHA Dossier
	inhalative (4 h) aerosol	LC50	>5.4 mg/l	Rat.	ECHA Dossier
7440-21-3	silicon				
	oral	LD50	3160 mg/kg	Rat	MSDS extern
	inhalative (4 h) aerosol	LC50	>2,08 mg/l	Rat	ECHA
7440-22-4	Silver powder				
	oral	LD50	> 5110 mg/kg	Rat	ECHA

**Irritation and corrosivity**

Causes skin irritation.

Causes serious eye irritation.

**Sensitising effects**

May cause an allergic skin reaction. (nickel powder)

**STOT-single exposure**

Based on available data, the classification criteria are not met.

**Severe effects after repeated or prolonged exposure**

Causes damage to organs through prolonged or repeated exposure. (nickel powder)

May cause damage to organs through prolonged or repeated exposure. (lead)

**Carcinogenic/mutagenic/toxic effects for reproduction**

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Suspected of causing cancer. (nickel powder)  
May damage the unborn child. (lead)  
octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX):  
In-vitro mutagenicity:  
Result: negative.  
2,2',4,4',6,6'-hexanitrostilbene (HNS):  
In-vitro mutagenicity:  
Method: Ames Test  
Result: positive.  
perhydro-1,3,5-trinitro-1,3,5-triazine (RDX):  
In-vitro mutagenicity: negative.

**Aspiration hazard**

Based on available data, the classification criteria are not met.

**Specific effects in experiment on an animal**

No information available.

**SECTION 12: Ecological information**
**12.1. Toxicity**

CAS No	Chemical name	Method	Dose	[h]   [d]	Species	Source
7440-02-0	nickel powder					
	Acute algae toxicity	ErC50	0,148 mg/l	72 h	Pseudokirchneriella subcapitata	ECHA Dossier
	Acute crustacea toxicity	EC50	0,276 mg/l	48 h	Ceriodaphnia spec	ECHA Dossier
	Acute bacteria toxicity		(33 mg/l)	0,5 h	activated sludge	ECHA Dossier
121-82-4	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)					
	Acute fish toxicity	LC50	3,6 mg/l	96 h	Lepomis macrochirus	HSDB Toxnet
2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)					
	Acute fish toxicity	LC50	> 15 mg/l	96 h	Pimephales promelas	ECHA dossier
	Acute algae toxicity	ErC50	>6,5 mg/l	96 h	Selenastrum capricornutum	ECHA dossier
	Acute crustacea toxicity	EC50	> 15 mg/l	48 h	Daphnia magna	ECHA dossier
7440-50-8	Copper					
	Acute fish toxicity	LC50	0,0087 -20 mg/l	96 h		Gestis
	Acute algae toxicity	ErC50	0,01 - 0,91 mg/l	72 h		Gestis
	Acute crustacea toxicity	EC50	0,0016 - 34 mg/l	48 h		Gestis
7440-22-4	Silver powder					
	Acute fish toxicity	LC50	0,00807 mg/l	96 h	Pimephales promelas	GESTIS
	Acute algae toxicity	ErC50	0,00198 mg/l	96 h	Pseudokirchneriella subcapitata	GESTIS
	Acute crustacea toxicity	EC50	0,0015 mg/l	48 h	Daphnia magna	GESTIS

**12.2. Persistence and degradability**

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CAS No	Chemical name			
	Method	Value	d	Source
	Evaluation			
2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)			
	OECD 301B / ISO 9439 / EEC 92/69 annex V, C.4-C	2%	28	
	Not easily bio-degradable (according to OECD-criteria).			

#### 12.3. Bioaccumulative potential

No indication of bioaccumulation potential.

#### Partition coefficient n-octanol/water

CAS No	Chemical name	Log Pow
121-82-4	perhydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0,86
20062-22-0	2,2',4,4',6,6'-hexanitrostilbene (HNS)	2,18
2691-41-0	octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.165

#### 12.4. Mobility in soil

No data available

#### 12.5. Results of PBT and vPvB assessment

The components in this formulation do not meet the criteria for classification as PBT or vPvB.

#### 12.6. Other adverse effects

No data available

#### Further information

Do not allow to enter into surface water or drains.

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

##### **Advice on disposal**

Dispose of waste according to applicable legislation.

Consult the appropriate local waste disposal expert about waste disposal. According to EAKV, allocation of waste identity numbers/waste descriptions must be carried out in a specific way for every industry and process.

Control report for waste code/ waste marking according to EAKV:

##### **Waste disposal number of waste from residues/unused products**

160403 WASTES NOT OTHERWISE SPECIFIED IN THE LIST; waste explosives; other waste explosives  
Classified as hazardous waste.

##### **Waste disposal number of used product**

160403 WASTES NOT OTHERWISE SPECIFIED IN THE LIST; waste explosives; other waste explosives  
Classified as hazardous waste.

##### **Waste disposal number of contaminated packaging**

150110 WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED; packaging (including separately collected municipal packaging waste); packaging containing residues of or contaminated by hazardous substances  
Classified as hazardous waste.

##### **Contaminated packaging**

Emptied packaging must be disposed of as hazardous waste.

### SECTION 14: Transport information

#### **Land transport (ADR/RID)**

##### 14.1. UN number:

UN 0440



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**14.2. UN proper shipping name:** charges, shaped

**14.3. Transport hazard class(es):** 1

**14.4. Packing group:** -

Hazard label: 1.4



Classification code: 1.4D

Limited quantity: 0

Excepted quantity: E0

Transport category: 2

Tunnel restriction code: E

**Inland waterways transport (ADN)**

**14.1. UN number:** UN 0440

**14.2. UN proper shipping name:** charges, shaped

**14.3. Transport hazard class(es):** 1

**14.4. Packing group:** -

Hazard label: 1.4



Classification code: 1.4D

Limited quantity: 0

Excepted quantity: E0

**Marine transport (IMDG)**

**14.1. UN number:** UN 0440

**14.2. UN proper shipping name:** charges, shaped

**14.3. Transport hazard class(es):** 1.4 D

**14.4. Packing group:** -

Hazard label: 1.4 D



Marine pollutant: NO

Special Provisions: -

Limited quantity: 0

Excepted quantity: E0

EmS: F-B, S-X

**Air transport (ICAO)**

**14.1. UN number:** UN 0440

**14.2. UN proper shipping name:** charges, shaped

**14.3. Transport hazard class(es):** 1.4D

**14.4. Packing group:** -

Hazard label: 1.4D



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Special Provisions:	A1 A802	
Limited quantity Passenger:	Forbidden	
Passenger LQ:	Forbidden	
Excepted quantity:	E0	
IATA-packing instructions - Passenger:		Forbidden
IATA-max. quantity - Passenger:		Forbidden
IATA-packing instructions - Cargo:		137
IATA-max. quantity - Cargo:		75 kg

**14.5. Environmental hazards**

ENVIRONMENTALLY HAZARDOUS: no

**14.6. Special precautions for user**

refer to chapter 6-8

**14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**

No information available.

**SECTION 15: Regulatory information****15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture****EU regulatory information**

2010/75/EU (VOC):	0%
2004/42/EC (VOC):	0 g/L

**Additional Information**

Regulatory information :

- Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH)
  - 1272/2008 (CLP)
  - 2012/18/CE (SEVESO III) Annex I, Part 1: P1a
  - REACH 1907/2006 Appendix XVII: not applicable
- Observe in addition any national regulations!

**National regulatory information**

Employment restrictions: Observe restrictions to employment for juvenils according to the 'juvenile work protection guideline' (94/33/EC). Observe employment restrictions under the Maternity Protection Directive (92/85/EEC) for expectant or nursing mothers. Observe employment restrictions for women of child-bearing age.

Water contaminating class (D): 3 - highly water contaminating

**Additional information**

Contact and transport only for persons resp. under survey of persons with "Befähigungsschein § 20 Sprengstoffgesetz" (Concession of explosive law) applicable in Germany only.

**15.2. Chemical safety assessment**

Chemical safety assessments for substances in this mixture were not carried out.

**SECTION 16: Other information****Changes**

- Rev. 1.0 13.09.2013
- Rev. 1,1 23.06.2015 ; Changes in chapter: 1-16
- Rev. 1,2 04.03.2016 ; Changes in chapter: 3

**Abbreviations and acronyms**

- ADR: Accord européen sur le transport des marchandises dangereuses par Route
- CAS Chemical Abstracts Service
- DNEL: Derived No Effect Level

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IARC: INTERNATIONAL AGENCY FOR RESEARCH ON CANCER  
(International Carriage of Dangerous Goods by Road)  
IMDG: International Maritime Code for Dangerous Goods  
IATA: International Air Transport Association  
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)  
ICAO: International Civil Aviation Organization  
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)  
GHS: Globally Harmonized System of Classification and Labelling of Chemicals  
GefStoffV: Gefahrstoffverordnung (Ordinance on Hazardous Substances, Germany)  
LOAEL: Lowest observed adverse effect level  
LOAEC: Lowest observed adverse effect concentration  
LC50: Lethal concentration, 50 percent  
LD50: Lethal dose, 50 percent  
NOAEL: No observed adverse effect level  
NOAEC: No observed adverse effect level  
NTP: National Toxicology Program  
N/A: not applicable  
OSHA: Concerning the International Transport of Dangerous Goods by Rail)  
PNEC: predicted no effect concentration  
PBT: Persistent bioaccumulative toxic  
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail )  
SARA: Superfund Amendments and Reauthorization Act  
SVHC: substance of very high concern  
TRGS Technische Regeln für Gefahrstoffe  
TSCA: Toxic Substances Control Act  
VOC: Volatile Organic Compounds  
VwVwS: Verwaltungsvorschrift wassergefährdender Stoffe  
WGK: Wassergefährdungsklasse

**Relevant H and EUH statements (number and full text)**

H201	Explosive; mass explosion hazard.
H301	Toxic if swallowed.
H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H312+H332	Harmful in contact with skin or if inhaled.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H351	Suspected of causing cancer.
H360D	May damage the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.

**Further information**

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.

**Safety Data Sheet**

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*(The data for the hazardous ingredients were taken respectively from the last version of the sub-contractor's safety data sheet.)*

**SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING**

- |  |   |   |
|--|---|---|
| <b>1.1 Product identifier</b>  | <b>Shaped Charges, Explosive 1.4</b>  |  |
| GHS Product Identifier   | <b>Shaped Charges, Explosive 1.4</b>  |   |
| Chemical Name  | Not applicable  |   |
| Trade name   | <b>Casing cutters, Junk Shots, Linear Shaped Charges (LSC), Perforators, Severing Tools, Tubing Cutters, Split Shot<sup>®</sup> Cutters</b> |   |
| CAS No.  | Mixture   |   |
| EINECS No.   | Mixture   |   |
| REACH Registration No.   | Not applicable  |   |
| <b>1.2 Relevant identified uses of the substance or mixture and uses advised against</b> | <b>Identified use(s)</b>  |   |
|  | As Directed by Manufacturer Only  |   |
| Uses advised against   | Users are recommended to seek further advice.   |   |
| <b>1.3 Details of the supplier of the safety data sheet</b>                              | <b>Details of the supplier of the safety data sheet</b>   |   |
| Company Identification   | Owen Oil Tools LP   |   |
| Address  | 12001 County Road 1000 / P.O. Box 765 / Godley, TX 76044 USA  |   |
| Telephone  | (817) 551-0660  |   |
| E-Mail (competent person)  | <a href="mailto:info@ocsresponds.com">info@ocsresponds.com</a>  |   |
| <b>1.4 Emergency Telephone Number – ChemTel Inc.</b>                                     | <b>Emergency Phone No. (800) 255-3924 , (813) 248-0585</b>  |   |

**SPECIAL NOTICE – EXPLOSIVE MATERIALS****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 2: HAZARDS IDENTIFICATION

- 2.1 Classification of the substance or mixture**  
**2.1.1 Regulation (EC) No. 1272/2008 (CLP) - Acute toxicity 4, Skin Corrosion 1C, Eye Damage 1, STOT-single exposure 3 (3.1/4, 3.2/1C, 3.3/1, 3.8/3)**  
**2.1.2 Directive 67/548/EEC & Directive 1999/45/EC - CORROSIVE, HARMFUL**  
**2.2 Label elements**  
**2.2.1 Label elements According to Regulation (EC) No. 1272/2008 (CLP) GHS Product Identifier (EU)**

Hazard pictogram(s)



Signal word(s)

**DANGER**

Hazard statement(s)

H204: Fire or projection hazard.  
 H301: Toxic if swallowed.  
 H302: Harmful if swallowed.  
 H312: Harmful in contact with skin.  
 H315: Causes skin irritation.  
 H319: Causes serious eye irritation.  
 H332: Harmful if inhaled.  
 H360Df: May damage fertility or the unborn child. (LEAD SALTS)  
 H373: May cause damage to organs through prolonged or repeated exposure.  
 H410: Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201: Obtain special instructions before use.  
 P202: Do not handle until all safety precautions have been read and understood.  
 P210: Keep away from heat, sparks, open flame, hot surfaces - No smoking.  
 P240: Ground/bond container and receiving equipment.  
 P250: Do not subject to grinding/shock/.../friction.  
 P280: Wear protective gloves/protective clothing/eye protection/face protection.  
 P261: Avoid breathing dust/fume/gas/mist/vapours/spray.  
 P264: Wash (hands and exposed skin) thoroughly after handling.  
 P270: Do not eat, drink or smoke when using this product.  
 P271: Use only outdoors or in a well-ventilated area.  
 P301 + P330 + P331: IF SWALLOWED: rinse mouth. Do NOT induce vomiting.  
 P301 + P310: IF SWALLOWED: Immediately call a POISON CENTRE or doctor/physician.  
 P302 + P352: IF ON SKIN: Wash with plenty of soap and water.  
 P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
 P305: IF IN EYES: Get immediate medical attention.  
 P332 + P313: If skin irritation occurs: Get medical advice/attention.  
 P362: Take off contaminated clothing and wash before reuse.  
 P391: Collect spillage.  
 P501: Dispose of contents/container to: Send to a licensed recycler, reclaimer or incinerator.

- 2.2.2 Label elements According to Directive 67/548/EEC & Directive 1999/45/EC**

Hazard Symbol



Risk Phrases

R2: Risk of explosion by shock, friction, fire or other sources of ignition.  
 R20: Harmful by inhalation.  
 R25: Toxic if swallowed.  
 R33: Danger of cumulative effects.

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R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R61: May cause harm to the unborn child.

R62: Possible risk of impaired fertility.

**Safety Phrases**

S2: Keep out of the reach of children.  
 S13: Keep away from food, drink and animal feedingstuffs.  
 S16: Keep away from sources of ignition - No smoking.  
 S23: Do not breathe fumes.  
 S24/25: Avoid contact with skin and eyes.  
 S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.  
 S28: After contact with skin, wash immediately with plenty of soap and water.  
 S34: Avoid shock or friction.  
 S35: This material and its container must be disposed of in a safe way.  
 S36/39: Wear suitable protective clothing and eye/face protection.  
 S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).  
 S46: If swallowed, seek medical advice immediately and show this container or label.  
 S53: Avoid exposure - obtain special instructions before use.  
 S56: Dispose of this material and its container to hazardous or special waste collection point.  
 S60: This material and its container must be disposed of as hazardous waste.  
 S61: Avoid release to the environment. Refer to special instructions/Safety Data Sheets.






**2.3 Other hazards** **GHS Classification (USA): Hazardous under OSHA Hazard Communication Standard –HMIS: Health-2, Flammability-3 Reactivity – 3**

**WHMIS Classification (Canada): Exempt under WHMIS**

**2.4 Additional Information** **None**

### SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS








#### EC Classification No. 1272/2008/EC

Hazardous ingredient(s)	%W/W	CAS No.	EC No.	REACH Registration No.	Hazard pictogram(s) and Hazard statement(s)
Cyclotrimethylene-trinitramine (RDX)		121-82-4	204-500-1	NA	 2.1/1; H201
Cyclotetramethylene-tetranitramine (HMX)		2691-41-0	220-260-0	NA	  2.1/1, 3.1/3(oral), H201, H301
Hexanitrostilbene (HNS)		20062-22-0		NA	 2.1/1, 3.1/4(oral) ; H201, H302
2,6-bis(picrylamino)-3,5-dinitropyridine (PYX)		38082-89-2	NA	NA	 2.1/1; H201











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### Shaped Charges, Explosive 1.4





Desensitizing Wax		NA	NA	NA	None	None
Aluminum		7429-90-5	231-072-3	NA		2.12/2, 2.10/1
Corrosion Resistant Steel		NA	NA	NA	None	None
Iron		7439-89-6	231-096-4	NA	None	None
Graphite		7782-42-5	231-955-3	NA		3.3/3, 3.2/3; H319, H335
Copper		7440-50-8	231-159-6	NA		4.1/1; H410
Lead		7439-92-1	231-100-4	NA	  	3.7/1A, 3.1/4, 3.9/2, 4.1/1
Tungsten		7440-33-7	231-143-9	NA		3.2/2, 3.3/2
Zinc		7440-66-6	231-175-3	NA	None	

**EC Classification No. 67/548/EEC**

Hazardous ingredient(s)	%W/W	CAS No.	EC No.	REACH Registration No.	Hazard pictogram(s) and Risk (R) Phras(es)
Cyclotrimethylene-trinitramine (RDX)		121-82-4	204-500-1	NA	  E, Xn, R2, R22
Cyclotetramethylene-tetranitramine (HMX)		2691-41-0	220-260-0	NA	  E, Xn, R2, R25
Hexanitrostilbene (HNS)		20062-22-0	NA	NA	  E, Xn, R2, R22
2,6-bis(picrylamino)-3,5-dinitropyridine (PYX)		38082-89-2	NA	NA	 E; R2
Desensitizing Wax		NA	NA	NA	None
Aluminum		7429-90-5	231-072-3	NA	 F; R15, R17

## SAFETY DATA SHEET

### Shaped Charges, Explosive 1.4

Corrosion Resistant Steel		NA	NA	NA	None	None
Iron		7439-89-6	231-096-4	NA	None	None
Graphite		7782-42-5	231-955-3	NA		Xn; R36/37
Copper		7440-50-8	231-159-6	NA		R50/53
Lead		7439-92-1	231-100-4	NA		T, N, R33, R40, R48/20/22, R50/53, R62
Tungsten		7440-33-7	231-143-9	NA		F, Xi ; R11, R36/38
Zinc		7440-66-6	231-175-3	NA	None	None

### 3.3 Additional Information

- For full text of H phrases see section 16. For full text of R phrases see section 16. Non-Hazardous ingredients are not listed and make up the balance of the product.

## SECTION 4: FIRST AID MEASURES

### 4.1 Description of first aid measures

Inhalation	Remove patient from exposure. Keep patient at rest and give oxygen if breathing difficult. If symptoms develop, obtain medical attention. See Section 4.2 for blast injury information.
Skin Contact	Remove contaminated clothing immediately and drench affected skin with plenty of water, then wash with soap and water. If irritation (redness, rash, blistering) develops, get medical attention. See Section 4.2 for blast injury information.
Eye Contact	Particles may cause corneal injury Remove any contact lenses. Irrigate with eyewash solution or clean water, holding the eyelids apart, for at least 15 minutes. Obtain immediate medical attention.
Ingestion	May be toxic. If swallowed, seek medical advice immediately and show this container or label. Do not induce vomiting. Make victim drink plenty of water. Get immediate medical attention.

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

**Acute:** Blast injuries may occur should product accidentally detonate or ignite. With all blast injuries, immediate medical treatment for trauma is essential for patient outcome. Blast trauma may take many forms, but will include skeletal and soft tissue injuries. These injuries may not be immediately apparent. **FOR ANY ACCIDENT INVOLVING DETONATION OR IGNITION OF PRODUCT, EMERGENCY TREATMENT IS REQUIRED.**  
**Delayed and chronic effects:** Cardiac and vascular effects, neurological effects . Developmental impairment. Possible risk of impaired fertility.

- 4.3 Indication of the immediate medical attention and special treatment needed**      Treat symptomatically. Exposure involving nitrated organics may require significant intervention to prevent circulatory collapse.

**SECTION 5: FIRE-FIGHTING MEASURES**

**Explosive material. Flash Point = Not applicable. Explosive limit ranges = Not applicable.**

- 5.1 Extinguishing media**  
 Suitable Extinguishing Media      Extinguish preferably with dry chemical, foam or water spray.  
 Unsuitable Extinguishing Media      None known.
- 5.2 Special hazards arising from the substance or mixture**      Explosion risk in case of fire. DO NOT fight fire when fire reaches explosives. Do not attempt to directly fight established or slow smoldering fires as an explosion is possible. In case of fire, evacuate area.
- 5.3 Advice for fire-fighters**      In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.

**SECTION 6: ACCIDENTAL RELEASE MEASURES**

- 6.1 Personal precautions, protective equipment and emergency procedures**      Warn everybody – explosion hazard. Evacuate the area of non-essential personnel. Ensure full personal protection (including respiratory protection) during removal of spillages.
- 6.2 Environmental Precautions**      Ventilation recommended.
- 6.3 Methods and material for containment and cleaning up**      Warn everybody – explosion hazard. If safe to do so: Put on protective equipment before entering danger area. Transfer to a container for disposal or recovery.
- 6.4 Reference to other sections**      See Also Section 7, 8, 13.
- 6.5 Additional Information**      None

**SECTION 7: HANDLING AND STORAGE**

- 7.1 Precautions for safe handling**      Avoid inhalation of high concentrations of vapors. Keep away from oxidizing agents. Keep away from fire, sparks and heated surfaces - no smoking.
- 7.2 Conditions for safe storage, including any incompatibilities**      Protect from sunlight. Store in a well-ventilated place. Do not use or store near heat or open flame. Do not store and transport with oxidizers etc.
- Storage Temperature      Consult the supplier.  
 Storage Life      Consult the supplier.  
 Incompatible materials      Oxidizing agents, flammable substances.
- 7.3 Specific end use(s)**      Consult the supplier.

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

## 8.1 Control parameters

## 8.1.1 Occupational Exposure Limits (1)

SUBSTANCE.	CAS No.	LTEL (8 hr TWA ppm)	LTEL (8 hr TWA mg/m <sup>3</sup> )	STEL (ppm)	STEL (mg/m <sup>3</sup> )	Note:
Cyclotrimethylene-trinitramine (RDX)	121-82-4	NE	0.5 mg/m <sup>3</sup> Skin	NE	NE	ACGIH Levels
Cyclotetramethylene-tetranitramine (HMX)	2691-41-0	NE	0.5 mg/m <sup>3</sup> Skin	NE	NE	ACGIH Levels
Aluminum	7429-90-5	NE	10mg/ m <sup>3</sup>	NE	NE	ACGIH Levels
Copper	7440-50-8	NE	0.2mg/ m <sup>3</sup> / 1mg/ m <sup>3</sup> (2)	NE	NE	ACGIH Levels
Graphite	7782-42-5	NE	2 mg/ m <sup>3</sup>	NE	NE	ACGIH Levels
Lead	7439-92-1	NE	0.05mg/m <sup>3</sup> (Ceiling)	NE	NE	ACGIH Levels
Tungsten	7440-33-7	NE	5 mg/ m <sup>3</sup>	NE	10 mg/ m <sup>3</sup>	ACGIH Levels
(1) – Components not listed have no Occupational Exposure Limits within the US.						
(2) – 0.2 mg/m <sup>3</sup> as fumes, 1.0 mg/m <sup>3</sup> as dusts/mists .						





## 8.1.2 Biological limit value

Limit value type (country of origin)	SUBSTANCE.	CAS No.	Biological limit value	Note:
USA	None	None	None	None

## 8.1.3 PNECs and DNELs

PNECs and DNELs - Not available.

## 8.2.2 Personal protection equipment

	<b>Respirators</b>	Wear suitable respiratory protective equipment if exposure to levels above the occupational exposure limit is likely.
	<b>Eye Protection</b>	Safety spectacles.
	<b>Gloves</b>	Wear protective gloves.
	<b>Body protection</b>	Wear suitable protective clothing and gloves.
	<b>Engineering Controls</b>	Consult the supplier.
	<b>Other</b>	Consult the supplier.

### SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

**9.1 Information on basic physical and chemical properties**

Appearance	Solid Charge	Color	Gray
Odor	Mild / Slight	Odor Threshold (ppm)	Not available
Melting Point (°C) / Freezing Point (°C)	Not available	Boiling point/boiling range (°C):	Not available
Flash Point (°C)	Explosive	Explosive limit ranges	Not available
Auto Ignition Temperature (°C)	Not available	Decomposition Temperature (°C)	Not available
Explosive properties	Explosive	Oxidizing properties	Not available
Flammability (solid, gas)	Not available	pH (Value)	Not available
Evaporation rate	Not available	Vapor Pressure (mm Hg)	Not available
Vapor Density (Air=1)	Not available	Density (g/ml)	Not available
Solubility (Water)	Not available	Solubility (Other)	Not available
Partition Coefficient (n-Octanol/water)	Not available	Viscosity (mPa.s)	Paste

**9.2 Other information** Volatile Organic Chemical (VOC) Content – Not available.

### SECTION 10: STABILITY AND REACTIVITY

<b>10.1 Reactivity</b>	May react with incompatible materials. See Sections 7 and 10.
<b>10.2 Chemical stability</b>	Stable under normal conditions.
<b>10.3 Possibility of hazardous reactions</b>	Can react violently if in contact with - Oxidizing agents, Flammable Agents
<b>10.4 Conditions to avoid</b>	Avoid contact with heat and ignition sources. Avoid shock, impact, friction and rough handling. Risk of explosion by shock, friction, fire or other sources of ignition.
<b>10.5 Incompatible materials</b>	Can react violently if in contact with - Oxidizing agents, Flammable Agents
<b>10.6 Hazardous Decomposition Product(s)</b>	Carbon monoxide, Carbon dioxide, Nitrogen oxides, Metal fumes and oxides. Thermal decomposition will evolve toxic, irritant and flammable vapors.

### SECTION 11: TOXICOLOGICAL INFORMATION

SUBSTANCE (3)	CAS No.	LD <sub>50</sub> (Oral, Rat)	LC <sub>50</sub> (Inhalation, Rat)	LD50 (Dermal, Rat)
Cyclotrimethylene-trinitramine RDX)	121-82-4	59 mg/kg (mouse)	NE	NE
Cyclotetramethylene-tetranitramine (HMX)	2691-41-0	1500 mg/kg (mouse)	NE	NE
Iron	7439-89-6	30 g/kg	NE	NE
Sulfur	7704-34-9	NE	2,520 ppm/1 hour	NE

**(3) – Components not listed have no available acute toxicity data.**

**11.1 Information on toxicological effects**
**11.1.2 Mixtures**

Acute toxicity	<b>Toxic if swallowed. Ingestion may cause irritation of the gastrointestinal tract. May cause drowsiness or dizziness.</b>
Irritation	May cause irritation.
Corrosivity	Not to be expected.
Repeated dose toxicity	<b>Expected to be similar to single exposures. Repeat dose studies have shown the potential to cause neurotoxicity. Developmental impairment. Methaemoglobinaemia</b>
Carcinogenicity	No data.
Mutagenicity	No data.
Toxicity for reproduction	Adverse reproductive effects.

**11.2 Other information**      **None****SECTION 12: ECOLOGICAL INFORMATION**

<b>12.1 Toxicity</b>	Harmful to aquatic life. Harmful to algae. <b>(SAFE AS GENERAL STATEMENT)</b>
<b>12.2 Persistence and degradability</b>	Moderately/partially biodegradable. Not persistent.
<b>12.3 Bioaccumulative potential</b>	Moderately/partially biodegradable.
<b>12.4 Mobility in soil</b>	The product has high mobility in soil.
<b>12.5 Results of PBT and vPvB assessment</b>	No data.
<b>12.6 Other adverse effects</b>	No data. Consult the supplier.

**SECTION 13: DISPOSAL CONSIDERATIONS**

<b>13.1 Waste treatment methods</b>	Disposal should be in accordance with local, state or national legislation. Consult an accredited waste disposal contractor or the local authority for advice.
<b>13.2 Additional Information</b>	None

**SECTION 14: TRANSPORT INFORMATION****Land transport (ADR/RID) (5)(6)**

UN number(s)                      0349/0352/0440/0441  
 Proper Shipping Name(s)  
 Articles, explosive, n.o.s. (0349/0352)  
 Charges, shaped, without detonator (0440/0441)  
 Transport hazard class(es)    1.4D (0352/0440)  
    1.4S (0349/0441)  
 Packing Group                      II  
 Hazard label(s)                    EXPLOSIVE 1.4  
 Environmental hazards            None  
 Special precautions for user    (4)

**Land transport (Within USA) (5)(6)**

UN number(s)                      0349/0352/0440/0441  
 Proper Shipping Name(s)  
 Articles, explosive, n.o.s. (0349/0352)  
 Charges, shaped, without detonator (0440/0441)  
 Transport hazard class(es)    1.4D (0352/0440)  
    1.4S (0349/0441)  
 Packing Group                      II  
 Hazard label(s)                    EXPLOSIVE 1.4  
 Environmental hazards            None  
 Special precautions for user    (4)

**Sea transport (IMDG) (5)(6)**

UN number(s)                      0349/0352/0440/0441  
 Proper Shipping Name(s)  
 Articles, explosive, n.o.s. (0349/0352)  
 Charges, shaped, without detonator (0440/0441)  
 Transport hazard class(es)    1.4D (0352/0440)  
    1.4S (0349/0441)  
 Packing Group                      II  
 Marine Pollutant                  No  
 Special precautions for user    (4)

**Air transport (ICAO/IATA) (5)(6)**

UN number(s)                      0349/0352/0440/0441  
 Proper Shipping Name(s)  
 Articles, explosive, n.o.s. (0349/0352)  
 Charges, shaped, without detonator (0440/0441)  
 Transport hazard class(es)    1.4D (0352/0440)  
    1.4S (0349/0441)  
 Packing Group                      II  
 Environmental hazards            No  
 Special precautions for user    (4)

*(4) – Consult with supplier.**(5)– Consult with transport provider.*

(6)– Check relevant regulations for Special Provisions.

## SECTION 15: REGULATORY INFORMATION

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture****15.1.1 EU regulations**

Authorisations and/or restrictions on use Consult the supplier.

European Union (EINECS/ELINCS) All chemicals listed.

German WGK number 2

**15.1.2 National regulations****USA**

TSCA (Toxic Substance Control Act) All chemicals listed.

SARA 311/312 - Hazard Categories Acute Health, Chronic Health, Fire, Reactive

SARA 302 - Extremely Hazardous Substances Listed - None

SARA 313 - Toxic Chemicals Listed - None

CERCLA (Comprehensive Environmental Response Compensation and Liability Act) Listed - None

CAA (Clean Air Act 1990) Listed - None

CWA (Clean Water Act) Listed - None

State Right to Know Lists Listed - CA, FL, MA, NJ, PA, and RI.

Proposition 65 (California) - This product contains the following substance(s) known to the state of California to cause cancer and/or reproductive harm: Lead.

**Canada**

WHMIS Classification Exempt under WHMIS.

Canada (DSL/NDSL) Listed - DSL or NDSL

Canada Ingredient Disclosure List (CIDL) Listed as required.

**15.2 Chemical Safety Assessment** Explosive, Toxic (Oral), Harmful (Dermal/Inhalation), Eye/Skin Irritation

## SECTION 16: OTHER INFORMATION

The following sections contain revisions or new statements: 1-16.

**LEGEND**

ACGI	American Conference of Governmental Industrial Hygienists	NA	not applicable, not available
AICS	Australian Inventory of Chemical Substances	NIOSH	National Institute for Occupational Safety and Health
ANSI	American National Standards Institute	ND	not determined
atm	atmosphere (pressure unit)	NFPA	National Fire Prevention Association
BOD	biological oxygen demand	NTP	National Toxicology Program
CAS	Chemical Abstracts Service	OC	open cup
CC	closed cup	OSHA	Occupational Safety and Health Administration
CDTA	Chemical Drug and Trafficking Act	Part	partition

# SAFETY DATA SHEET

## Shaped Charges, Explosive 1.4

COC	Cleveland Open Cup	PEL	permissible exposure limits
COD	chemical oxygen demand	ppb	parts per billion
coeff.	coefficient	PPE	personal protective equipment
CFR	Code of Federal Regulations	ppm	parts per million
CPR	cardio-pulmonary resuscitation	psi	pounds per square inch
DEA	Drug Enforcement Agency	RCRA	Resource Conservation and Recovery Act
DOT	Department of Transportation	RQ	Reportable quantity
DSCL	Dangerous Substances Classification and Labeling	RTK	Right to Know
EEC	European Economic Community	SARA	Superfund Amendments and Reauthorization Act
FDA	Food and Drug Administration	STEL	short-term exposure limit
HMIS	Hazardous Materials Information System	SUSDP	Standard for the Uniform Scheduling of Drugs and Poisons (Australia)
IARC	International Agency for Research on Cancer	TCC	Tagliabue Closed Cup
IDLH	immediate danger to life or health	TDG	Transportation of Dangerous Goods
kg	kilogram	TPQ	threshold planning quantity
L	liter	TQ	threshold quantity
LC50	median lethal concentration	TSCA	Toxic Substances Control Act
LD50	median lethal dose	TWA	time-weighted average
LEL	lower explosive limit	UEL	upper explosive limit
mg	milligram	WES	Workplace Exposure Standard (New Zealand)
mL	milliliter	WHMIS	Workplace Hazardous Material Information System

**References:** RTECS, CAS Registry, EINECS/ESIS, *Casarett & Doull's Toxicology*, *Goldfrank's Toxicological Emergencies*, Manufacturer information

### Risk Phrases and Safety Phrases

R2: Risk of explosion by shock, friction, fire or other sources of ignition.  
 R3: Extreme risk of explosion by shock, friction, fire or other sources of ignition.  
 R9: Explosive when mixed with combustible material.  
 R20/21: Harmful by inhalation and in contact with skin.  
 R22: Harmful if swallowed.  
 R25: Toxic if swallowed.  
 R50/53: Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.  
 R61: May cause harm to the unborn child.  
 R62: Possible risk of impaired fertility.  
 S2: Keep out of the reach of children.  
 S13: Keep away from food, drink and animal feedingstuffs.  
 S16: Keep away from sources of ignition - No smoking.  
 S23: Do not breathe fumes.  
 S24/25: Avoid contact with skin and eyes.  
 S34: Avoid shock or friction.  
 S35: This material and its container must be disposed of in a safe way.  
 S36/39: Wear suitable protective clothing and eye/face protection.  
 S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

### Hazard statement(s) and Precautionary statement(s)

H200: Unstable explosives.  
 H201: Explosive; mass explosion hazard.  
 H204: Fire or projection hazard.  
 H272: May intensify fire; oxidizer.  
 H301: Toxic if swallowed.  
 H302: Harmful if swallowed.  
 H312: Harmful in contact with skin.  
 H315: Causes skin irritation.  
 H319: Causes serious eye irritation.  
 H332: Harmful if inhaled.  
 H410: Very toxic to aquatic life with long lasting effects.  
 P201: Obtain special instructions before use.



P202: Do not handle until all safety precautions have been read and understood.  
P210: Keep away from heat, sparks, open flame, hot surfaces - No smoking.  
P240: Ground/bond container and receiving equipment.  
P250: Do not subject to grinding/shock/.../friction.  
P280: Wear protective gloves/protective clothing/eye protection/face protection.  
P261: Avoid breathing dust/fume/gas/mist/vapours/spray.  
P270: Do not eat, drink or smoke when using this product.  
P301 + P330 + P331: IF SWALLOWED: rinse mouth. Do NOT induce vomiting.  
P301 + P310: IF SWALLOWED: Immediately call a POISON CENTRE or doctor/physician.  
P302 + P352: IF ON SKIN: Wash with plenty of soap and water.  
P305 + P351 + P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P305: IF IN EYES: Get immediate medical attention.  
P501: Dispose of contents/container to: Send to a licensed recycler, reclaimer or incinerator.

**Training advice:** None

**Additional information:** None

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