



DX-Cartridge

Product Safety Information Sheet

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Precautionary statements (CLP)

P210 - Keep away from heat, hot surfaces, open flames, sparks. — No smoking.
P250 - Do not subject to shock, friction, grinding.
P280 - Wear eye protection.
P372 - Explosion risk in case of fire.
P370+P380+P375 - In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion.
P401 - Store in accordance with local regulations on explosives.

Extra phrases

Category of the pyrotechnic article: other pyrotechnic articles Cat. P1
(BAM EC-Type-Examination Certificate No. 0589.PYR.3800/12 or 0589.PYR.3804/12 respectively).

2.3. Other hazards

Other hazards which do not result in classification

This article contains hazardous substances or preparations not intended to be released under normal or reasonably foreseeable conditions of use. The dismantling of the article is prohibited!. Keep away from ignition sources (including static discharges).

This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII

This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

| Component | |
|-------------------------------|---|
| cellulose nitrate (9004-70-0) | This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII |
| glycerol trinitrate (55-63-0) | This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII |
| lead styphnate (15245-44-0) | This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII |
| barium nitrate (10022-31-8) | This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII |
| copper (7440-50-8) | This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII |
| zinc (7440-66-6) | This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII |
| diphenylamine (122-39-4) | This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII |
| tetrazene (109-27-3) | This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII |

The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605

| Component | |
|------------------------------|---|
| cellulose nitrate(9004-70-0) | The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 |

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| Component | |
|------------------------------|---|
| glycerol trinitrate(55-63-0) | The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 |
| lead styphnate(15245-44-0) | The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 |
| barium nitrate(10022-31-8) | The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 |
| copper(7440-50-8) | ED: not yet assessed |
| zinc(7440-66-6) | The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 |
| diphenylamine(122-39-4) | The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 |
| tetrazene(109-27-3) | The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 |

SECTION 3 Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixtures

Comments

max. net explosives weight each cartridge in mg:
 Caliber 6.8/11 (cal .27 short) white: 130; brown: 140; green: 160; yellow: 180; red: 230; titanium: 230; black: 260
 Caliber 6.8/18 (cal .27 long) green: 190; yellow: 220; blue: 300; red: 330; black: 410
 Caliber 6.3/10 (cal. 25) green 120; yellow: 190; red: 230; black: 250
 Caliber 5.5/16 (cal .22) grey: 105; brown: 120; green: 175; yellow: 210; red: 270
 Within the cartridges the explosive ingredients (gun powder and priming composition) are hermetically separated from the environment. They will be only opened with effort and under destruction of the article.
 Propellant powder: glycerol trinitrate containing nitrocellulose powder
 Mass per cartridge: essentially dependent on the required power (100-400 mg)
 Priming composition: SINOXID (initiating explosive) Mass per cartridge: 22-33 mg in the mean.
 Exposed propellant powder outside a cartridge is harmful if swallowed and highly flammable; without tamping no explosion risk.
 Packed safety cartridges don't represent a significant risk.
 In case of reaction no dangerous fragments or projectiles will be formed.
 Mechanical or thermal attempts to expose the primer composition lead to an immediate reaction of the dangerous ingredients.

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| Name | Product identifier | % | Classification according to Regulation (EC) No. 1272/2008 [CLP] |
|--|--|---------|--|
| cellulose nitrate | CAS-No. 9004-70-0 | 5 - 21 | Expl. 1.1, H201 |
| glycerol trinitrate substance with national workplace exposure limit(s) (GB); substance with a Community workplace exposure limit | CAS-No. 55-63-0 EC-No. 200-240-8 EC Index-No. 603-034-00-X | 2 - 10 | Unst. Expl., H200 Acute Tox. 2 (Oral), H300 Acute Tox. 1 (Dermal), H310 Acute Tox. 2 (Inhalation), H330 STOT RE 2, H373 Aquatic Chronic 2, H411 |
| lead styphnate substance listed as REACH Candidate | CAS-No. 15245-44-0 EC-No. 239-290-0 EC Index-No. 609-019-00-4 REACH-no 01-2119543737-30 | 0.1 - 3 | Unst. Expl., H200 Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Inhalation), H332 Repr. 1A, H360Df STOT RE 2, H373 Aquatic Acute 1, H400 Aquatic Chronic 1, H410 |
| barium nitrate substance with national workplace exposure limit(s) (GB); substance with a Community workplace exposure limit | CAS-No. 10022-31-8 EC-No. 233-020-5 EC Index-No. 056-002-00-7 | 0.1 - 3 | Ox. Sol. 2, H272 Acute Tox. 3 (Oral), H301 Acute Tox. 4 (Inhalation), H332 Eye Irrit. 2, H319 |
| copper substance with national workplace exposure limit(s) (GB) | CAS-No. 7440-50-8 EC-No. 231-159-6 | 0 - 2 | Aquatic Acute 1, H400 Aquatic Chronic 3, H412 |
| zinc | CAS-No. 7440-66-6 EC-No. 231-175-3 EC Index-No. 030-001-01-9 | 0 - 2 | Aquatic Acute 1, H400 Aquatic Chronic 1, H410 |
| diphenylamine substance with national workplace exposure limit(s) (GB) | CAS-No. 122-39-4 EC-No. 204-539-4 EC Index-No. 612-026-00-5 | 0.1 - 1 | Acute Tox. 3 (Oral), H301 Acute Tox. 3 (Dermal), H311 Acute Tox. 3 (Inhalation), H331 Eye Irrit. 2, H319 STOT RE 2, H373 Aquatic Acute 1, H400 Aquatic Chronic 1, H410 |
| tetrazene | CAS-No. 109-27-3 | 0 - 1 | Unst. Expl., H200 Eye Irrit. 2, H319 Aquatic Acute 1, H400 Aquatic Chronic 1, H410 |

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

SECTION 4 First aid measures

4.1. Description of first aid measures

| | |
|---------------------------------------|---|
| First-aid measures general | In all cases of doubt, or when symptoms persist, seek medical attention. |
| First-aid measures after inhalation | Allow affected person to breathe fresh air. Allow the victim to rest. |
| First-aid measures after skin contact | Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse. |
| First-aid measures after eye contact | Rinse immediately with plenty of water. Obtain medical attention if pain, blinking or redness persists. |
| First-aid measures after ingestion | Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention. |

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

| | |
|------------------|--|
| Symptoms/effects | Not expected to present a significant hazard under anticipated conditions of normal use. |
|------------------|--|

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

No additional information available

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SECTION 5 Firefighting measures

5.1. Extinguishing media

| | |
|--------------------------------|----------------------------------|
| Suitable extinguishing media | Dry powder. Water spray. |
| Unsuitable extinguishing media | Do not use a heavy water stream. |

5.2. Special hazards arising from the substance or mixture

| | |
|--|---|
| Hazardous decomposition products in case of fire | Carbon monoxide. Carbon dioxide (CO ₂). Nitrous gasses. |
|--|---|

5.3. Advice for firefighters

| | |
|--------------------------------|---|
| Firefighting instructions | Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire fighting water from entering the environment. |
| Protection during firefighting | Do not enter fire area without proper protective equipment, including respiratory protection. |

SECTION 6 Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

| | |
|------------------|---|
| General measures | Remove ignition sources. Use special care to avoid static electric charges. No open flames. No smoking. |
|------------------|---|

6.1.1. For non-emergency personnel

| | |
|----------------------|---------------------------------|
| Emergency procedures | Evacuate unnecessary personnel. |
|----------------------|---------------------------------|

6.1.2. For emergency responders

| | |
|----------------------|--|
| Protective equipment | Equip cleanup crew with proper protection. |
| Emergency procedures | Ventilate area. |

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

| | |
|-------------------------|--|
| Methods for cleaning up | Pick up loose cartridges only by hand. Exposed ingredients must be swept up carefully and phlegmatized in a water container, labelled according the regulations, wipe down with water the contaminated area. Store away from other materials. |
|-------------------------|--|

6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection". For further information refer to section 13.

SECTION 7 Handling and storage

7.1. Precautions for safe handling

| | |
|-----------------------------------|--|
| Additional hazards when processed | Hazardous waste due to potential risk of explosion. |
| Precautions for safe handling | Do not subject to grinding, shock, friction. Take precautionary measures against static discharge. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. |
| Hygiene measures | Do not eat, drink or smoke when using this product. Always wash hands after handling the product. |

7.2. Conditions for safe storage, including any incompatibilities

| | |
|------------------------------|---|
| Storage conditions | Keep only in the original container in a cool, well ventilated place away from : Direct sunlight, Heat sources. Store in a dry place. |
| Incompatible products | Strong bases. Strong acids. |
| Storage temperature | 5 – 25 °C |
| Information on mixed storage | Keep away from : Ignition sources. Do not store with: Store according to local legislation. |
| Storage area | Store away from heat. |

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7.3. Specific end use(s)

No additional information available

SECTION 8 Exposure controls/personal protection

8.1. Control parameters

8.1.1. National occupational exposure and biological limit values

| DX-Cartridge | |
|--|---|
| EU - Indicative Occupational Exposure Limit (IOEL) | |
| IOEL TWA | 0.095 mg/m ³ |
| IOEL TWA [ppm] | 0.01 ppm |
| IOEL STEL | 0.19 mg/m ³ |
| IOEL STEL [ppm] | 0.02 ppm |
| Notes | Skin |
| Regulatory reference | COMMISSION DIRECTIVE (EU) 2017/164 |
| United Kingdom - Occupational Exposure Limits | |
| WEL TWA (OEL TWA) [1] | 10 mg/m ³ |
| WEL TWA (OEL TWA) [2] | 0.01 ppm |
| WEL STEL (OEL STEL) | 20 mg/m ³ |
| WEL STEL (OEL STEL) [ppm] | 0.02 ppm |
| Remark (WEL) | Sk (Can be absorbed through the skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity) |
| Regulatory reference | EH40/2005 (Fourth edition, 2020). HSE |
| United Kingdom - Biological limit values | |
| BMGV | 15 µmol/mol creatinine Parameter: total nitroglycols - Medium: urine - Sampling time: At the end of the period of exposure |
| Regulatory reference | EH40/2005 (Fourth edition, 2020). HSE |
| glycerol trinitrate (55-63-0) | |
| EU - Indicative Occupational Exposure Limit (IOEL) | |
| IOEL TWA | 0.095 mg/m ³ |
| IOEL TWA [ppm] | 0.01 ppm |
| IOEL STEL | 0.19 mg/m ³ |
| IOEL STEL [ppm] | 0.02 ppm |
| United Kingdom - Occupational Exposure Limits | |
| WEL TWA (OEL TWA) [1] | 0.095 mg/m ³ |
| WEL TWA (OEL TWA) [2] | 0.01 ppm |
| WEL STEL (OEL STEL) | 0.19 mg/m ³ |
| WEL STEL (OEL STEL) [ppm] | 0.02 ppm |
| diphenylamine (122-39-4) | |
| United Kingdom - Occupational Exposure Limits | |
| Local name | Diphenylamine |
| WEL TWA (OEL TWA) [1] | 10 mg/m ³ |
| WEL STEL (OEL STEL) | 20 mg/m ³ |
| barium nitrate (10022-31-8) | |
| EU - Indicative Occupational Exposure Limit (IOEL) | |
| IOEL TWA | 0.5 mg/m ³ ((Ba)) |
| United Kingdom - Occupational Exposure Limits | |
| WEL TWA (OEL TWA) [1] | 0.5 mg/m ³ |
| copper (7440-50-8) | |
| United Kingdom - Occupational Exposure Limits | |
| Local name | Copper |
| WEL TWA (OEL TWA) [1] | 0.2 mg/m ³ fume (as Cu) |
| WEL STEL (OEL STEL) | 2 mg/m ³ |

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8.1.2. Recommended monitoring procedures

No additional information available

8.1.3. Air contaminants formed

No additional information available

8.1.4. DNEL and PNEC

No additional information available

8.1.5. Control banding

No additional information available

8.2. Exposure controls

8.2.1. Appropriate engineering controls

No additional information available

8.2.2. Personal protection equipment

Personal protective equipment

When using cartridge operated tools, sufficient ear protection must be worn.

Personal protective equipment symbol(s)



8.2.2.1. Eye and face protection

Eye protection

Safety glasses

8.2.2.2. Skin protection

Skin and body protection

When using cartridge operated tools, sufficient ear protection must be worn.

8.2.2.3. Respiratory protection

No additional information available

8.2.2.4. Thermal hazards

No additional information available

8.2.3. Environmental exposure controls

Other information

Do not eat, drink or smoke during use.

No additional information available

SECTION 9 Physical and chemical properties

9.1. Information on basic physical and chemical properties

| | |
|-----------------|-------------------------------------|
| Physical state | Solid |
| Colour | According to product specification. |
| Odour | Not available |
| Odour threshold | Not available |
| Melting point | Not available |
| Freezing point | Not available |
| Boiling point | Not available |

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| | |
|---|----------------------------|
| Flammability | Not available |
| Explosive properties | Fire or projection hazard. |
| Explosive limits | Not applicable |
| Lower explosive limit (LEL) | Not applicable |
| Upper explosive limit (UEL) | Not applicable |
| Flash point | Not applicable |
| Auto-ignition temperature | Not applicable |
| Decomposition temperature | Not available |
| pH | Not available |
| pH solution | Not available |
| Viscosity, kinematic | Not applicable |
| Solubility | Not available |
| Partition coefficient n-octanol/water (Log Kow) | Not available |
| Vapour pressure | Not available |
| Vapour pressure at 50 °C | Not available |
| Density | Not available |
| Relative density | Not available |
| Relative vapour density at 20 °C | Not applicable |
| Particle size | Not available |
| Particle size distribution | Not available |
| Particle shape | Not available |
| Particle aspect ratio | Not available |
| Particle aggregation state | Not available |
| Particle agglomeration state | Not available |
| Particle specific surface area | Not available |
| Particle dustiness | Not available |

9.2. Other information

9.2.1. Information with regard to physical hazard classes

No additional information available

9.2.2. Other safety characteristics

Additional information Not applicable. Article

SECTION 10 Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Not established.

10.4. Conditions to avoid

Direct sunlight. Extremely high or low temperatures. Heat. Sparks. Open flame. Overheating.

10.5. Incompatible materials

Strong acids. Strong bases.

10.6. Hazardous decomposition products

Carbon monoxide. Carbon dioxide. Nitrogen oxides. Metal oxides. Thermal decomposition can lead to the release of irritating gases and vapours.

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SECTION 11 Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

| | |
|-----------------------------|----------------|
| Acute toxicity (oral) | Not classified |
| Acute toxicity (dermal) | Not classified |
| Acute toxicity (inhalation) | Not classified |

| glycerol trinitrate (55-63-0) | |
|--------------------------------------|--|
| LD50 oral rat | 685 mg/kg bodyweight (Rat, Male / female, Experimental value, Oral, 14 day(s)) |
| LD50 oral | 685 mg/kg |
| LD50 dermal rat | > 9560 mg/kg bodyweight (Equivalent or similar to OECD 402, Rat, Male / female, Experimental value, Dermal) |
| ATE CLP (oral) | 5 mg/kg bodyweight |
| ATE CLP (dermal) | 5 mg/kg bodyweight |
| ATE CLP (gases) | 100 ppmv/4h |
| ATE CLP (vapours) | 0.5 mg/l/4h |
| ATE CLP (dust,mist) | 0.05 mg/l/4h |
| lead styphnate (15245-44-0) | |
| ATE CLP (oral) | 500 mg/kg bodyweight |
| ATE CLP (gases) | 4500 ppmv/4h |
| ATE CLP (vapours) | 11 mg/l/4h |
| ATE CLP (dust,mist) | 1.5 mg/l/4h |
| diphenylamine (122-39-4) | |
| LD50 oral rat | > 800 mg/kg bodyweight (Rat, Male, Experimental value, Oral) |
| ATE CLP (oral) | 100 mg/kg bodyweight |
| ATE CLP (dermal) | 300 mg/kg bodyweight |
| ATE CLP (gases) | 700 ppmv/4h |
| ATE CLP (vapours) | 3 mg/l/4h |
| ATE CLP (dust,mist) | 0.5 mg/l/4h |
| barium nitrate (10022-31-8) | |
| LD50 oral rat | 50 – 300 mg/kg bodyweight (OECD 423: Acute Oral Toxicity – Acute Toxic Class Method, Rat, Female, Experimental value, Oral, 14 day(s)) |
| LD50 oral | 355 mg/kg |
| LD50 dermal rat | > 2000 mg/kg bodyweight (OECD 402: Acute Dermal Toxicity, 24 h, Rat, Male / female, Experimental value, Dermal, 14 day(s)) |
| LC50 Inhalation - Rat | > 1.1 mg/l (OECD 403: Acute Inhalation Toxicity, 4 h, Rat, Male / female, Experimental value, Inhalation (aerosol), 14 day(s)) |
| ATE CLP (oral) | 50 mg/kg bodyweight |
| ATE CLP (gases) | 4500 ppmv/4h |
| ATE CLP (vapours) | 11 mg/l/4h |
| ATE CLP (dust,mist) | 1.5 mg/l/4h |
| zinc (7440-66-6) | |
| LD50 oral rat | > 2000 mg/kg bodyweight (OECD 401: Acute Oral Toxicity, Rat, Male / female, Experimental value, Oral, 14 day(s)) |

| | |
|-----------------------------------|--|
| Skin corrosion/irritation | Not classified |
| Additional information | Based on available data, the classification criteria are not met |
| Serious eye damage/irritation | Not classified |
| Additional information | Based on available data, the classification criteria are not met |
| Respiratory or skin sensitisation | Not classified |
| Additional information | Based on available data, the classification criteria are not met |
| Germ cell mutagenicity | Not classified |
| Additional information | Based on available data, the classification criteria are not met |
| Carcinogenicity | Not classified |
| Additional information | Based on available data, the classification criteria are not met |
| Reproductive toxicity | Not classified |
| Additional information | Based on available data, the classification criteria are not met |
| STOT-single exposure | Not classified |

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| | |
|------------------------|--|
| Additional information | Based on available data, the classification criteria are not met |
| STOT-repeated exposure | Not classified |
| Additional information | Based on available data, the classification criteria are not met |

| | |
|--------------------------------------|--|
| glycerol trinitrate (55-63-0) | |
| STOT-repeated exposure | May cause damage to organs through prolonged or repeated exposure. |

| | |
|------------------------------------|--|
| lead styphnate (15245-44-0) | |
| STOT-repeated exposure | May cause damage to organs through prolonged or repeated exposure. |

| | |
|---------------------------------|--|
| diphenylamine (122-39-4) | |
| STOT-repeated exposure | May cause damage to organs through prolonged or repeated exposure. |

| | |
|------------------------|--|
| Aspiration hazard | Not classified |
| Additional information | Based on available data, the classification criteria are not met |

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

No additional information available

11.2.2. Other information

| | |
|---|---|
| Potential adverse human health effects and symptoms | No additional information available, No harmful effects are to be expected if used properly. The contained ingredients can be harmful, but they are hermetically enclosed in the article and can not be released. The dismantling of the article is prohibited. |
|---|---|

SECTION 12 Ecological information

12.1. Toxicity

| | |
|---|--|
| Ecology - general | No harmful effects are to be expected if used properly. The contained ingredients can be harmful, but they are hermetically enclosed in the article and can not be released. The dismantling of the article is prohibited. |
| Hazardous to the aquatic environment, short-term (acute) | Not classified |
| Hazardous to the aquatic environment, long-term (chronic) | Not classified |

| | |
|--------------------------------------|--|
| glycerol trinitrate (55-63-0) | |
| LC50 - Fish [1] | 1.9 mg/l (ASTM E729-80, 96 h, Oncorhynchus mykiss, Flow-through system, Fresh water, Experimental value, Lethal) |
| NOEC chronic fish | 0.03 mg/l |

| | |
|------------------------------------|--------|
| lead styphnate (15245-44-0) | |
| EC50 - Crustacea [1] | 7 mg/l |

| | |
|---------------------------------|--|
| diphenylamine (122-39-4) | |
| EC50 - Crustacea [1] | 2 mg/l (OECD 202: Daphnia sp. Acute Immobilisation Test, 48 h, Daphnia magna, Fresh water, Experimental value, Locomotor effect) |
| ErC50 algae | 2.17 mg/l (OECD 201: Alga, Growth Inhibition Test, 72 h, Pseudokirchneriella subcapitata, Experimental value, GLP) |
| NOEC chronic algae | 0.0273 mg/l |

| | |
|------------------------------------|--|
| barium nitrate (10022-31-8) | |
| EC50 - Crustacea [1] | 9018 mg/l |
| EC50 72h - Algae [1] | > 45.6 mg/l (OECD 201: Alga, Growth Inhibition Test, Pseudokirchneriella subcapitata, Static system, Fresh water, Experimental value, Growth rate) |

| | |
|-----------------------------|-----------|
| tetrazene (109-27-3) | |
| EC50 - Crustacea [1] | 0.14 mg/l |

| | |
|---------------------------|---|
| copper (7440-50-8) | |
| LC50 - Fish [1] | 200 µg/l (96 h, Salmo gairdneri, Flow-through system, Fresh water, Weight of evidence, Lethal) |
| EC50 - Crustacea [1] | 109 – 798 µg/l (OECD 202: Daphnia sp. Acute Immobilisation Test, 48 h, Daphnia magna, Static system, Fresh water, Weight of evidence, Locomotor effect) |

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| | |
|---------------------------|---|
| copper (7440-50-8) | |
| EC50 72h - Algae [1] | 230 µg/l (OECD 201: Alga, Growth Inhibition Test, Pseudokirchneriella subcapitata, Static system, Fresh water, Weight of evidence, Growth rate) |
| zinc (7440-66-6) | |
| LC50 - Fish [1] | 0.169 mg/l (Other, 96 h, Oncorhynchus mykiss, Static system, Fresh water, Read-across, Zinc ion) |
| EC50 - Crustacea [1] | 416 µg/l (OECD 202: Daphnia sp. Acute Immobilisation Test, 48 h, Ceriodaphnia dubia, Static system, Fresh water, Experimental value) |
| ErC50 algae | 0.15 mg/l |

12.2. Persistence and degradability

| | |
|--------------------------------------|---|
| DX-Cartridge | |
| Persistence and degradability | Not established. |
| glycerol trinitrate (55-63-0) | |
| Persistence and degradability | Readily biodegradable in water. |
| Biochemical oxygen demand (BOD) | 53.6 g O ₂ /g substance |
| diphenylamine (122-39-4) | |
| Persistence and degradability | Not readily biodegradable in water. |
| ThOD | 2.39 g O ₂ /g substance |
| barium nitrate (10022-31-8) | |
| Persistence and degradability | Biodegradability: not applicable. |
| Chemical oxygen demand (COD) | Not applicable (inorganic) |
| ThOD | Not applicable (inorganic) |
| copper (7440-50-8) | |
| Persistence and degradability | Biodegradability in soil: not applicable. Biodegradability: not applicable. |
| Biochemical oxygen demand (BOD) | Not applicable |
| Chemical oxygen demand (COD) | Not applicable |
| ThOD | Not applicable |
| BOD (% of ThOD) | Not applicable |
| zinc (7440-66-6) | |
| Persistence and degradability | Biodegradability: not applicable. |
| Chemical oxygen demand (COD) | Not applicable (inorganic) |
| ThOD | Not applicable (inorganic) |

12.3. Bioaccumulative potential

| | |
|---|---|
| DX-Cartridge | |
| Bioaccumulative potential | Not established. |
| glycerol trinitrate (55-63-0) | |
| Bioaccumulative potential | Low potential for bioaccumulation (Log Kow < 4). |
| diphenylamine (122-39-4) | |
| BCF - Fish [1] | 51 – 253 (Cyprinus carpio, Literature study, Test duration: 8 weeks) |
| Partition coefficient n-octanol/water (Log Pow) | 3.71 – 3.84 (Weight of evidence approach, OECD 107: Partition Coefficient (n-octanol/water): Shake Flask Method, 20.2 °C) |
| Bioaccumulative potential | Low potential for bioaccumulation (BCF < 500). |
| barium nitrate (10022-31-8) | |
| Bioaccumulative potential | Not bioaccumulative. |
| copper (7440-50-8) | |
| Bioaccumulative potential | Bioaccumulation: not applicable. |
| zinc (7440-66-6) | |
| BCF - Fish [1] | 0.002 (40 day(s), Danio rerio, Semi-static system, Fresh water, Read-across) |
| Bioaccumulative potential | Low potential for bioaccumulation (BCF < 500). |

12.4. Mobility in soil

| | |
|--------------------------------------|---|
| glycerol trinitrate (55-63-0) | |
| Ecology - soil | Low potential for adsorption in soil. |
| diphenylamine (122-39-4) | |
| Surface tension | 71.8 mN/m (20 °C, 90 %, EU Method A.5: Surface tension) |





DX-Cartridge

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A safety data sheet is not required for this product under Article 31 of REACH. This Product Safety Information Sheet has been created on a voluntary basis

SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / RID

| ADR | IMDG | IATA | RID |
|--|--|---|--|
| 14.1. UN number or ID number | | | |
| UN 0323 | UN 0323 | UN 0323 | UN 0323 |
| 14.2. UN proper shipping name | | | |
| CARTRIDGES, POWER DEVICE | CARTRIDGES, POWER DEVICE | Cartridges, power device | CARTRIDGES, POWER DEVICE |
| Transport document description | | | |
| UN 0323 CARTRIDGES, POWER DEVICE, 1.4S, (E) | UN 0323 CARTRIDGES, POWER DEVICE, 1.4S | UN 0323 Cartridges, power device, 1.4S | UN 0323 CARTRIDGES, POWER DEVICE, 1.4S |
| 14.3. Transport hazard class(es) | | | |
| 1.4S | 1.4S | 1.4S | 1.4S |
|  |  |  |  |
| 14.4. Packing group | | | |
| Not applicable | Not applicable | Not applicable | Not applicable |
| 14.5. Environmental hazards | | | |
| Dangerous for the environment: No | Dangerous for the environment: No Marine pollutant: No | Dangerous for the environment: No | Dangerous for the environment: No |
| No supplementary information available | | | |

14.6. Special precautions for user

Overland transport

| | |
|--------------------------------|---------------|
| Classification code (ADR) | : 1.4S |
| Special provisions (ADR) | : 347 |
| Limited quantities (ADR) | : 0 |
| Packing instructions (ADR) | : P134, LP102 |
| Mixed packing provisions (ADR) | : MP23 |
| Transport category (ADR) | : 4 |
| Tunnel restriction code (ADR) | : E |

Transport by sea

| | |
|-----------------------------|---------------|
| Special provisions (IMDG) | : 347 |
| Limited quantities (IMDG) | : 0 |
| Packing instructions (IMDG) | : P134, LP102 |
| EmS-No. (Fire) | : F-B |
| EmS-No. (Spillage) | : S-X |
| Stowage category (IMDG) | : 01 |
| Stowage and handling (IMDG) | : SW1 |
| MFAG-No | : 114 |

Air transport

| | |
|---------------------------------|--------|
| PCA packing instructions (IATA) | : 134 |
| PCA max net quantity (IATA) | : 25kg |
| CAO packing instructions (IATA) | : 134 |
| Special provisions (IATA) | : A165 |

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Rail transport

Special provisions (RID) : 347
 Limited quantities (RID) : 0
 Packing instructions (RID) : P134, LP102

14.7. Maritime transport in bulk according to IMO instruments

Not applicable

SECTION 15 Regulatory information

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

15.1.1. EU-Regulations

Contains one substance (s) from the list of candidate substances of REACH in a concentration > 0,1%: Lead styphnate (EC 239-290-0, CAS 15245-44-0)

Category of the pyrotechnic article: other pyrotechnic articles Cat. P1

(BAM EC-Type-Examination Certificate No. 0589.PYR.3800/12 or 0589.PYR.3804/12 respectively)

Substances subject to Regulation (EU) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of hazardous chemicals: Lead compounds (15245-44-0), Diphenylamine (122-39-4)

Contains no substance subject to Regulation (EU) No 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants

15.1.2. National regulations

No additional information available

15.2. Chemical safety assessment

No chemical safety assessment has been carried out

SECTION 16 Other information

A safety data sheet is not required for this product under Article 31 of REACH. This Product Safety Information Sheet has been created on a voluntary basis

Indication of changes:

| Section | Changed item | Change | Comments |
|---------|--|----------|----------|
| | SDS EU format according to COMMISSION REGULATION (EU) 2020/878 | Added | |
| 3.2 | Product information | Modified | |

| Abbreviations and acronyms | |
|----------------------------|---|
| ADN | European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways |
| ADR | European Agreement concerning the International Carriage of Dangerous Goods by Road |
| ATE | Acute Toxicity Estimate |
| BCF | Bioconcentration factor |
| CLP | Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008 |
| DMEL | Derived Minimal Effect level |
| DNEL | Derived-No Effect Level |
| EC50 | Median effective concentration |
| IARC | International Agency for Research on Cancer |
| IATA | International Air Transport Association |
| IMDG | International Maritime Dangerous Goods |
| LC50 | Median lethal concentration |
| LD50 | Median lethal dose |
| LOAEL | Lowest Observed Adverse Effect Level |
| NOAEC | No-Observed Adverse Effect Concentration |
| NOAEL | No-Observed Adverse Effect Level |

DX-Cartridge

Product Safety Information Sheet

A safety data sheet is not required for this product under Article 31 of REACH. This Product Safety Information Sheet has been created on a voluntary basis

| Abbreviations and acronyms | |
|----------------------------|---|
| NOEC | No-Observed Effect Concentration |
| OECD | Organisation for Economic Co-operation and Development |
| PBT | Persistent Bioaccumulative Toxic |
| PNEC | Predicted No-Effect Concentration |
| REACH | Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006 |
| RID | Regulations concerning the International Carriage of Dangerous Goods by Rail |
| SDS | Safety Data Sheet |
| vPvB | Very Persistent and Very Bioaccumulative |

| Full text of H- and EUH-statements: | |
|-------------------------------------|--|
| Acute Tox. 1 (Dermal) | Acute toxicity (dermal), Category 1 |
| Acute Tox. 2 (Inhalation) | Acute toxicity (inhal.), Category 2 |
| Acute Tox. 2 (Oral) | Acute toxicity (oral), Category 2 |
| Acute Tox. 3 (Dermal) | Acute toxicity (dermal), Category 3 |
| Acute Tox. 3 (Inhalation) | Acute toxicity (inhal.), Category 3 |
| Acute Tox. 3 (Oral) | Acute toxicity (oral), Category 3 |
| Acute Tox. 4 (Inhalation) | Acute toxicity (inhal.), Category 4 |
| Acute Tox. 4 (Oral) | Acute toxicity (oral), Category 4 |
| Aquatic Acute 1 | Hazardous to the aquatic environment — Acute Hazard, Category 1 |
| Aquatic Chronic 1 | Hazardous to the aquatic environment — Chronic Hazard, Category 1 |
| Aquatic Chronic 2 | Hazardous to the aquatic environment — Chronic Hazard, Category 2 |
| Aquatic Chronic 3 | Hazardous to the aquatic environment — Chronic Hazard, Category 3 |
| Expl. 1.1 | Explosives, Division 1.1 |
| Expl. 1.4 | Explosives, Division 1.4 |
| Eye Irrit. 2 | Serious eye damage/eye irritation, Category 2 |
| Ox. Sol. 2 | Oxidising Solids, Category 2 |
| Repr. 1A | Reproductive toxicity, Category 1A |
| STOT RE 2 | Specific target organ toxicity — Repeated exposure, Category 2 |
| Unst. Expl. | Explosives, Unstable explosives |
| H200 | Unstable explosives. |
| H201 | Explosive; mass explosion hazard. |
| H204 | Fire or projection hazard. |
| H272 | May intensify fire; oxidiser. |
| H300 | Fatal if swallowed. |
| H301 | Toxic if swallowed. |
| H302 | Harmful if swallowed. |
| H310 | Fatal in contact with skin. |
| H311 | Toxic in contact with skin. |
| H319 | Causes serious eye irritation. |
| H330 | Fatal if inhaled. |
| H331 | Toxic if inhaled. |
| 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. |
| H411 | Toxic to aquatic life with long lasting effects. |
| H412 | Harmful to aquatic life with long lasting effects. |

| Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP] | | |
|--|------|-----------------|
| Expl. 1.4 | H204 | Expert judgment |

SDS_EU_Hilti