

**SAFETY DATA SHEET****Firex A**

The safety data sheet is in accordance with Commission Regulation (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

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

Date issued 28.05.2015

Revision date 03.07.2018

**1.1. Product identifier**

Product name Firex A

Product definition Electric detonator

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

Use of the substance / preparation Borehole detonators for initiation of industrial explosives. Restricted to professional users.

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

Company name OY FORCIT AB

Postal address P.O.Box 19

Postcode 10901

City Hanko

Country Finland

Telephone number +358 (0)207 440 400

Email [forcit@forcit.fi](mailto:forcit@forcit.fi)

**1.4. Emergency telephone number**

Emergency telephone Description: National poison information center / National helpdesk: countrywise telephone number.

**SECTION 2: Hazards identification****2.1. Classification of substance or mixture**

Classification according to Regulation (EC) No 1272/2008 [CLP / GHS]	Expl. 1.1; H201
	Carc. 2; H351
	Repr. 1A; H360Df
	STOT RE 2; H373
	Aquatic Acute 1; H400
	Aquatic Chronic 2; H411

## 2.2. Label elements

### Hazard pictograms (CLP)



Signal word	Danger
Hazard statements	H201 Explosive; mass explosion hazard. H351 Suspected of causing cancer. 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. H411 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. P250 Do not subject to grinding/shock/friction. 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. P401 Store in dry and well ventilated areas, in temperatures from -30°C to +40°C. P501 Dispose of contents/container in accordance with corresponding local regulations for disposal of packages and explosives.
Other label information (CLP)	Explosives are labeled and packaged in accordance with the requirements for explosives only.

## 2.3. Other hazards

PBT / vPvB	For results of PBT and vPvB assessment, see point 12.5.
Hazard description, general	Risk of explosion, an uncontrolled explosion may cause great physical damage. The hazardous substances are enclosed in a metal case that cannot be disassembled. These substances can be released only by detonation in the form of post-detonation reaction products.
Other hazards	Not determined.

## SECTION 3: Composition / information on ingredients

### 3.2. Mixtures

Substance	Identification	Classification	Contents
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Pentaerythritol tetranitrate	CAS No.: 78-11-5 EC No.: 201-084-3 Index No.: 603-035-00-5 REACH Reg. No.: 01-2119557827-23	Unst. Expl.; H200	≤ 21 %
Lead tetroxide	CAS No.: 1314-41-6 EC No.: 215-235-6 Index No.: 082-001-00-6 REACH Reg. No.: 01-2119517589-27	Repr. 1A; H360Df Carc. 2; H351 Acute tox. 4; H332 Acute tox. 4; H302 STOT RE 2; H373 Aquatic Acute 1; H400; M-factor 10 Aquatic Chronic 1; H410; M-factor 1	≤ 8 %
Ferosilikochrom			≤ 8 %
Lead azide	CAS No.: 13424-46-9 EC No.: 236-542-1 Index No.: 082-003-00-7 REACH Reg. No.: 01-2119475503-38	Unst. Expl.; H200 Repr. 1A; H360Df Acute tox. 4; H332 Acute tox. 4; H302 STOT RE 2; H373 Aquatic Acute 1; H400; M-factor 1 Aquatic Chronic 1; H410; M-factor 1	≤ 2 %
Lead dioxide	CAS No.: 1309-60-0 EC No.: 215-174-5 Index No.: 082-001-00-6	Repr. 1A; H360Df; Acute tox. 4; H332; Acute tox. 4; H302; STOT RE 2; H373; Aquatic Acute 1; H400; Aquatic Chronic 1; H410; Ox. Sol. 3; H272;	≤ 0,4 %
Antimony (III) sulphide	CAS No.: 1345-04-6 EC No.: 215-713-4	Acute tox. 4; H332 Acute tox. 4; H302	≤ 0,2 %
Lead picrate	CAS No.: 111802-21-2 Index No.: 082-001-00-6	Unst. Expl.; H200 Acute tox. 4; H302, H332 Repr. 1A; H360Df STOT RE 2; H373 Aquatic Acute 1; H400 Aquatic Chronic 1; H410	0,1 - 0,2 %
Nitrocellulose	CAS No.: 9004-70-0 Index No.: 603-037-00-6	Expl. 1.1; H201	≤ 0,1 %
Description of the mixture	The assembled electric detonator contains also various other components, such as plastic tube, plug and other plastic components. These components do not contain dangerous substances.		
Remarks, substance	Pentaerythritol tetranitrate (penthrite, PETN)		

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

#### General

In the assembled detonator, the mixture is enclosed in a metal case that cannot be disassembled. If used in accordance with section 1.2, the exposition is not possible. The exposition can occur only in case of detonation in the form of post-detonation

	reaction products. Detonation may cause burns and injuries. In case of any suspicion, seek medical advice.
Inhalation	Remove victim to fresh air, keep warm and at rest in a position comfortable for breathing. Get medical attention if any discomfort continues.
Skin contact	In case of detonation, there is a risk of burns, general injuries and injuries caused by splinters. Get medical advice/attention.
Eye contact	In case of detonation, there is a risk of general injuries and injuries caused by splinters. Get medical advice/attention.
Ingestion	Rinse mouth thoroughly. Get medical attention.

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

General symptoms and effects	In case of inhalation of post-detonation reaction products, an irritation of respiratory system and a headache may occur. In case of detonation, injuries, burns.
Acute symptoms and effects	None known.
Delayed symptoms and effects	In case of inhalation of post-detonation reaction products, symptoms do not necessarily appear immediately. Patients should therefore be kept under medical observation for at least 48 hours.

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

Medical treatment	Not determined.
Other information	If any health troubles appear or in case of doubt, please contact a doctor and provide the information from this safety sheet.

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

Suitable extinguishing media	DO NOT fight fire when fire reaches explosives. Explosion risk in case of fire. Fire in the product cannot be extinguished with any fire-fighting equipment as it is explosive material.
Improper extinguishing media	Not stated.

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

Fire and explosion hazards	If a building containing the product is on fire, a high risk of explosion is involved. Perform an urgent evacuation of the building and its surroundings. Notify the Integrated Rescue System. Don't inhale the gasses of the fire because they contain heavy metals (lead). The combustion residues and contaminated extinguishing liquids must be disposed of according to valid regulations.
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### 5.3. Advice for firefighters

Fire fighting procedures	DO NOT fight fire when fire reaches explosives. Fight adjacent fire with all available means to prevent fire from reaching the product.
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Special protective equipment for firefighters      During the fire of the product, keep a safe distance. Use suitable breathing protection (isolation device), or self-contained breathing apparatus.

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

General measures      The measures to be taken in case of accidental leakage (e.g. traffic accident) depend on the scale of the accident and an expert opinion of a specialist.  
Warn away trespassers. Eliminate all ignition sources if safe to do so. Evacuate the area due to possible explosion.

Personal protection measures      Use appropriate means suitable for work to prevent contact with skin and eyes. For personal protection, see section 8.

### 6.2. Environmental precautions

Environmental precautionary measures      Do not allow the mixture to enter into sewer, water system (underground water, surface water) or soil.

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

Clean up      Pick up the spilled product mechanically using non-sparking tools. Collect the product in approved and properly labeled containers.  
Disposal of damaged product may be performed only by an authorized person.  
Disposal of the contaminated material must be in accordance with Section 13.

### 6.4. Reference to other sections

Other instructions      Fire-fighting, see Section 5.  
Personal protection, see Section 8.2.  
Safe handling, see Section 7.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Handling      Handle the products with increased care. Keep away from heat/sparks/open flame and hot surfaces. Protect from electrostatic discharge. No smoking.

### 7.2. Conditions for safe storage, including any incompatibilities

Storage      Store in a dry place. Store in a closed container. Store locked up. Store in a well ventilated place in temperatures from -30°C to +40°C. Keep the package closed tightly.  
Do not store together with drugs, foodstuffs, drinks and forage. Do not store together with other explosives.

### 7.3. Specific end use(s)

Specific use(s)      Borehole detonators for initiation of industrial explosives.

## SECTION 8: Exposure controls / personal protection

### 8.1. Control parameters

Substance	Identification	Value	TWA Year
Lead tetroxide	CAS No.: 1314-41-6	Country of origin: EU TWA (8h) : 100 µg/m <sup>3</sup> Source: SCOEL Recommendations 2002 Comments: (As Pb)	
Lead azide	CAS No.: 13424-46-9	Country of origin: Czech Republic TWA (8h) : 0,05 mg/m <sup>3</sup> Comments: (as Pb) Country of origin: Czech Republic Limit value type: STEL TWA (8h) : 0,2 mg/m <sup>3</sup> Comments: (As Pb) Country of origin: United Kingdom / Australia TWA (8h) : 0,15 mg/m <sup>3</sup> Comments: (As Pb) Country of origin: New Zealand / South Africa TWA (8h) : 0,1 mg/m <sup>3</sup> Comments: (As Pb)	
Antimony (III) sulphide	CAS No.: 1345-04-6	Country of origin: United Kingdom Limit value type: TWA TWA (8h) : 0,5 mg/m <sup>3</sup> Comments: (As Sb)	

## DNEL / PNEC

### PNEC

Route of exposure: Freshwater

Value: 0,0065 mg/l

Comments: (Lead tetroxide)

Route of exposure: Saltwater

Value: 0,0034 mg/l

Comments: (Lead tetroxide)

Route of exposure: Freshwater sediments

Value: 174 mg/kg

Comments: dwt

Comments: (Lead tetroxide)

Route of exposure: Saltwater sediments

Value: 164 mg/kg

Comments: dwt

Comments: (Lead tetroxide)

Route of exposure: Soil

Value: 147 mg/kg

Comments: dwt

Comments: (Lead tetroxide)

Route of exposure: Sewage treatment plant STP

Value: 0,1 mg/l  
 Comments: (Lead tetroxide)

## 8.2. Exposure controls

### Safety signs



### Precautionary measures to prevent exposure

Appropriate engineering controls      Follow the usual basic precautions for handling explosives. Avoid inhaling of gases after the detonation.

### Eye / face protection

Suitable eye protection      Use protective glasses if needed.

### Hand protection

Skin- / hand protection, long term contact      Under normal conditions not required.  
 Gloves are recommended for prolonged use.

Hand protection, comments      Wash hands with warm water and soap before breaks and after work. Treat skin by suitable reparation means.

### Skin protection

Suitable protective clothing      Use clothes suitable for work that do not accumulate the static charge.

### Respiratory protection

Tasks needing respiratory protection      After detonation use the dust filter.

### Thermal hazards

Thermal hazards      Not stated.

### Hygiene / environmental

Specific hygiene measures      When using the product do not eat, drink or smoke. Wash hands by warm water and soap before breaks and after work.

### Appropriate environmental exposure control

Environmental exposure controls      Not necessary, if the product is used in accordance with section 1.2.

## SECTION 9: Physical and chemical properties

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

Physical state	Solid.
Odour	Odourless.
Odour limit	Comments: Not available.
pH	Status: In delivery state Comments: Not available.
Melting point / melting range	Value: 142 °C Comments: (PETN)
Boiling point / boiling range	Comments: Not available.
Flash point	Comments: Not available.
Evaporation rate	Comments: Not available.
Flammability (solid, gas)	The mixture is flammable.
Explosion limit	Comments: Not available.
Vapour pressure	Comments: Not available.
Vapour density	Comments: Not available.
Specific gravity	Comments: Not available.
Solubility	Medium: Water Comments: Insoluble  Medium: Fat Comments: Insoluble
Partition coefficient: n-octanol/water	Comments: Not available.
Spontaneous combustability	Value: 190 °C Comments: (PETN)
Decomposition temperature	Comments: Not available.
Viscosity	Comments: Not available.
Explosive properties	Velocity of detonation: 8400 m/s (PETN).
Oxidising properties	Not available.

## 9.2. Other information

### Other physical and chemical properties

Comments Not determined.

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

Reactivity The product is stable if used according to Section 1.2 and stored according to Section 7.2.

### 10.2. Chemical stability

Stability The product is stable if used according to Section 1.2 and if stored according to Section



7.2.

### 10.3. Possibility of hazardous reactions

Possibility of hazardous reactions	May detonate if heated to temperature above 100 °C. May malfunction upon long-term exposure of Al-shell to acidic environment.
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### 10.4. Conditions to avoid

Conditions to avoid	May detonate with impact or friction. May detonate if exposed to open fire, radiant heat, high frequency or electrostatic energy.
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### 10.5. Incompatible materials

Materials to avoid	Acids and alkalis.
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### 10.6. Hazardous decomposition products

Hazardous decomposition products	Detonation gasses containing lead, NOx.
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## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Substance	Pentaerythritol tetranitrate
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Acute toxicity	<b>Type of toxicity:</b> Acute <b>Effect tested:</b> LD50 <b>Route of exposure:</b> Oral <b>Value:</b> 1660 mg/kg <b>Animal test species:</b> Rat
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Substance	Lead tetroxide
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Acute toxicity	<b>Type of toxicity:</b> Acute <b>Effect tested:</b> LD50 <b>Route of exposure:</b> Oral <b>Value:</b> > 10000 mg/kg <b>Animal test species:</b> Rat
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Substance	Lead azide
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Acute toxicity	<b>Type of toxicity:</b> Chronic <b>Effect tested:</b> LD0 <b>Route of exposure:</b> Oral <b>Duration:</b> 14 week(s) <b>Value:</b> 3920 mg/kg <b>Animal test species:</b> Rat
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Substance	Lead dioxide
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Acute toxicity	<b>Type of toxicity:</b> Acute <b>Effect tested:</b> LD50 <b>Route of exposure:</b> Oral <b>Value:</b> 220 mg/kg <b>Animal test species:</b> Rat
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Substance	Antimony (III) sulphide
Acute toxicity	<p><b>Type of toxicity:</b> Acute  <b>Effect tested:</b> LD50  <b>Route of exposure:</b> Oral  <b>Value:</b> &gt; 2000 mg/kg  <b>Animal test species:</b> Rat Rat or rabbit</p> <p><b>Type of toxicity:</b> Acute  <b>Effect tested:</b> LD50  <b>Route of exposure:</b> Dermal  <b>Value:</b> &gt; 2000 mg/kg  <b>Animal test species:</b> Rat or rabbit</p>
Other toxicological data	The product is not classified as acutely toxic. There is no toxicological data available about the product as such.

### Other information regarding health hazards

Assessment of skin corrosion / irritation, classification	The product is not classified as irritant or corrosive to skin.
Assessment of eye damage or irritation, classification	The product is not classified as damaging or irritating to eyes.
General respiratory or skin sensitisation	The product is not classified as a respiratory or skin sensitiser.
Mutagenicity	The product is not classified as a mutagen.
Carcinogenicity, other information	Suspected of causing cancer. Category 2.
Reproductive toxicity	May damage the unborn child. Suspected of damaging fertility Category 1A.
Assessment of specific target organ SE, classification	The product is not classified as toxic to specific target organs at a single exposure.
Assessment of specific target organ toxicity RE, classification	Classified as toxic. Category 2. May cause damage to organs through prolonged or repeated exposure.
Assessment of aspiration hazard, classification	The product is not classified as an aspiration hazard.

### Symptoms of exposure

Other information	<p>Lead and its compounds are partly deposited inside body, especially bones. After long-term and high exposition, a chronic lead poisoning disease may develop, which is exhibited by failure of hemoglobin production, encephalopathy and also by paralysis of peripheral nerves. Lead and its compounds are known for their bioaccumulative effect and lead to irreversible health damage. Further lead and its compounds may damage unborn child and reproduction capability of humans.</p> <p>It is necessary to take this information into account in considering the possibility of acquiring lead-poisoning disease by long term exposition (e.g. at work).</p>
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## SECTION 12: Ecological information

### 12.1. Toxicity

Substance	Lead tetroxide
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Acute aquatic, fish	<b>Value:</b> 0,1 mg/l <b>Test duration:</b> 96 h <b>Method:</b> LC50
Substance	Lead dioxide
Acute aquatic, fish	<b>Value:</b> 0,14 mg/l <b>Test duration:</b> 96 h <b>Species:</b> S.gairdnerii <b>Method:</b> LC50
Substance	Lead tetroxide
Acute aquatic, algae	<b>Value:</b> 0,05 mg/l <b>Test duration:</b> 72 h <b>Method:</b> IC50
Substance	Lead dioxide
Acute aquatic, algae	<b>Value:</b> 0,45 - 3,7 mg/l <b>Test duration:</b> 72 h <b>Species:</b> M.aeruginosa <b>Method:</b> IC50
Substance	Lead tetroxide
Acute aquatic, Daphnia	<b>Value:</b> 0,98 mg/l <b>Test duration:</b> 48 h <b>Method:</b> EC50
Substance	Lead dioxide
Acute aquatic, Daphnia	<b>Value:</b> 2,5 mg/l <b>Test duration:</b> 48 h <b>Species:</b> Daphnia <b>Method:</b> EC50
Ecotoxicity	The mixture is classified as acute toxic, category 1, and chronic toxic, category 2, in terms of its effect on the aquatic environment. Very toxic to aquatic life. Toxic to aquatic life with long lasting effects.

## 12.2. Persistence and degradability

Persistence and degradability, comments	No data available.
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## 12.3. Bioaccumulative potential

Bioaccumulative potential	PETN: Octanol/Water partition coefficient: 2,4 Bioconcentration factor (BCF): 17
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## 12.4. Mobility in soil

Mobility	PETN: Log Koc value 2,81
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## 12.5. Results of PBT and vPvB assessment

PBT assessment results	Not Classified as PBT/vPvB by current EU criteria.
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## 12.6. Other adverse effects

Other adverse effects, comments Not stated.

Environmental details, summation On basis of its components, the product is very toxic to aquatic life with long-lasting effects.

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

Specify the appropriate methods of disposal Dispose in accordance with corresponding regulations. Disposal of defect or damaged product is performed in accordance with instruction from manufacturer or in accordance with local regulation. Disposal may be performed only by an authorized person. Contaminated packages are disposed in accordance with corresponding local regulations for disposal of packages and explosives. Empty packages are handed over to company authorized to recycle packages.

## SECTION 14: Transport information

### 14.1. UN number

ADR / RID / ADN 0255

IMDG 0255

ICAO / IATA 0255

Comments Even UN number 0456 (1.4S) or 0030 (1.1B) can be used depending on the packaging.

### 14.2. UN proper shipping name

ADR / RID / ADN DETONATORS, ELECTRIC

IMDG DETONATORS, ELECTRIC

ICAO / IATA DETONATORS, ELECTRIC

### 14.3. Transport hazard class(es)

ADR / RID / ADN 1.4B

IMDG 1.4B

ICAO / IATA 1.4B

Comments Even hazard class 1.4S (UN number 0456) or 1.1B (UN number 0030) can be used.

### 14.4. Packing group

Comments Not determined.

### 14.5. Environmental hazards

Comments Not determined.

### 14.6. Special precautions for user

Special safety precautions for user	Not determined.
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## 14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

### Additional information

Additional information	Not applicable.
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### IMDG / ICAO / IATA Other information

EmS	F-B, S-X
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## SECTION 15: Regulatory information

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

Restriction of chemicals according to Annex XVII (REACH)	Contains no REACH substances with Annex XVII restrictions.
Legislation and regulations	Contains a substance on the REACH candidate list in concentration $\geq 0,1$ % or with lower specific limit: Lead azide (CAS 13424-46-9), Lead tetroxide (CAS 1314-41-6), Lead dioxide CAS 1309-60-0), Lead picrate (CAS 111802-21-2). Contains no REACH Annex XIV substances.

### 15.2. Chemical safety assessment

Chemical safety assessment performed	No
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## SECTION 16: Other information

List of relevant H-phrases (Section 2 and 3)	H200 Unstable explosives. H201 Explosive; mass explosion hazard. H272 May intensify fire; oxidiser. H302 Harmful if swallowed. H332 Harmful if inhaled. H351 Suspected of causing cancer 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.
Classification according to Regulation (EC) No 1272/2008 [CLP / GHS]	Expl. 1.1; H201 Carc. 2; H351 Repr. 1A; H360Df STOT RE 2; H373 Aquatic Acute 1; H400 Aquatic Chronic 2; H411
CLP classification, notes	The classification is based on the calculation method in accordance with Regulation (EC) No 1272/2008 [CLP / GHS]. The classification Expl. 1.1 is derived on the basis of test data.

	<p>Specific concentration limits:</p> <p>Lead tetroxide, CAS: 1314-41-6 (C ≥ 0,5 %) STOT RE 2, H373 (C ≥ 2,5 %) Repr. 2, H361f</p> <p>Lead dioxide, CAS: 1309-60-0 (C ≥ 0,5 %) STOT RE 2, H373 (C ≥ 2,5 %) Repr. 2, H361f</p>
Training advice	Training for handling and use of explosives and detonators.
Recommended restrictions on use	Restricted to professional users.
Key literature references and sources for data	SDS by product manufacturer (5.2.2018)
Abbreviations and acronyms used	<p>EC50: Effective concentration: concentration which kills or immobilises 50 % of exposed organisms</p> <p>IC50: Inhibitory concentration: concentration which reduces a biological function by 50 %</p> <p>LD50: Lethal dose 50 % (median lethal dose): dose which kills 50 % of exposed organisms</p> <p>LDL0: Lowest lethal dose: lowest dose at which lethal effects on test organisms are observed</p> <p>PNEC: Predicted No-Effect Concentration</p> <p>TWA: Time-weighted average</p>
Information added, deleted or revised	Composition of the product changed.
Last update date	21.06.2018
Version	3
Comments	The information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be constructed as guaranteeing any specific property of the product.