1. identification of the substance/preparation and of the company/undertaking

Date issued: 25.03.2008
Revision: 15.05.2008
Product name: DYNOTEX
Synonyms: Dynotex 1 (white/orange), Dynotex 2 (yellow), Dynotex 3 (blue), Dynotex 4 (Larvikit)
Article no.: Intern no.: 081-06.eng.02_N
Declaration no.: PRN 200847, 200846, 200845 and 200844 for respectively Dynotex 1, 2, 3, og 4
Product group: Tube charge based on nitroglycol-bearing powder formula.
Company name: Dyno Nobel AS (Orica Mining Services)
Postal address: Postboks 94
Postcode: 1300
Place name: Sandvika
Country: NORWAY
Tel: 22 31 70 00
Fax: 22 31 78 56
E-mail: johan.svaerd@orica.com
Prepared by: National Institute of Technology as, Norway v/ Monica Rustad

2. hazards identification

Classification: E; R2
Hazard description:
Fire and explosion:
Risk of explosion by shock, friction, fire or other sources of ignition.
Risk of explosion, an uncontrolled explosion may cause great physical damage.

Health:
The product is not classified as hazardous to health.
Nitroglycol (ethylene dinitrate) represents the most sudden danger of poisoning. The health risks will amplify with intake of alcohol.

At explosion, toxic gases of NO, NO2 and CO, CO2 are evolved, posing a potential risk when inhaled, and irritating the respiratory system

Environment:
The product is not classified as harmful to the environment.

3. composition/information on ingredients

<table>
<thead>
<tr>
<th>Component name</th>
<th>Identification</th>
<th>Labelling/classification</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene dinitrate</td>
<td>CAS no.: 628-96-6 EC no.: 211-063-0 Index no.: 603-032-00-9</td>
<td>T+,E; R2,R26/27/28,R33</td>
<td>5 - 12 %</td>
</tr>
<tr>
<td>Ammonium nitrate</td>
<td>CAS no.: 6484-52-2 EC no.: 229-347-8</td>
<td>O; R8, R9</td>
<td>80 - 94 %</td>
</tr>
<tr>
<td>Sodium nitrate</td>
<td>CAS no.: 7631-99-4 EC no.: 231-554-3</td>
<td>Xn, O; R22, R36, R8</td>
<td>80 - 94 %</td>
</tr>
<tr>
<td>Sodium chloride</td>
<td>CAS no.: 7647-14-5 EC no.: 231-598-3</td>
<td></td>
<td>80 - 94 %</td>
</tr>
</tbody>
</table>

Column headings:
CAS no. = Chemical Abstracts Service; EU (Einecs or Elincs number) = European inventory of Existing Commercial Chemical Substances; Ingredient name = Name as specified in the substance list (substances that are not included in the substance list must be translated, if possible). Contents given in: %, %wt/wt, %vol/wt, %vol/vol, mg/m3, ppb, ppm, weight%, vol%
4. first-aid measures

**General**
If in doubt, get medical advice. The mentioned first aid action is for exposure to the contents in the product.

**Inhalation**
Fresh air and rest.

In case of unconsciousness, loosen tight fitting clothing. If respiratory problems, provide artificial respiration or oxygen. Seek medical advice. Be aware that symptoms of lung oedema (shortness of breath) may develop up to 24 hours after exposure. Immediately call an ambulance.

**Skin contact**
Remove contaminated clothing. Wash the skin immediately with soap and water. Contact physician if symptoms appear.

**Eye contact**
Immediately flush with plenty of water for up to 15 minutes. Remove any contact lenses and open eyes wide apart. Contact physician if irritation persists.

**Ingestion**
Induce vomiting, if person is conscious. Get medical attention.

5. fire-fighting measures

**Suitable extinguishing media**
Extinguish surrounding fires with suitable extinguisher

**Improper extinguishing media**
Do not fight fires involving explosives, risk of explosion. Fire in explosives can not be extinguished with any fire fighter equipment. Fire fighting should be limited to preventing spread of other fires.

**Fire and explosion hazards**
Risk of explosion by shock, friction, fire or other sources of ignition. Explosion or fire may create toxic vapours such as: Nitrogen oxides. Carbon oxides. Ammonia.

**Personal protective equipment**
Use fresh air equipment when the product is involved in fire. In case of evacuation, an approved protection mask should be used. See also sect. 8.

**Other Information**
Evacuate all personnel to a predetermined safe location. Notify authorities in accordance with emergency response procedures. If possible without risk, immediately remove containers close to the fire.

6. accidental release measures

**Personal precautions**
Use protection equipment as given in section 8. Avoid contact with skin or inhalation of spillage, dust or vapour.

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

**Methods for cleaning**
Explosive with intact packaging may be put in containers by hand. Make sure there are no igniters in the cartridges containing explosive. Sweep up explosive residues with non-sparking tools and remove. The product is hazardous waste and should be transferred to a closable, labelled salvage container for disposal by an appropriate method(See sect. 13)

**Other instructions**

7. handling and storage

**Handling**
Only to be handled by authorized personnel. Place the explosives under supervision and unavailable for persons not concerned. Avoid smoking and use of open fire. Protect against heating. Protect against physical damage and/or friction. Avoid direct contact.

**Storage**
Store in tightly closed container. Storage room must be locked and secured from fire. Store in cool, dry, well-ventilated location. Keep away from heat, flame, ignition sources and strong shock. To be stored at temperatures between 0 and 30 °C. Store at temperature below 65°C.

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Special risks and properties
Risk of explosion by shock, friction, fire or other sources of ignition.

8. exposure controls/personal protection

Exposure limit values

<table>
<thead>
<tr>
<th>Component name</th>
<th>Identification</th>
<th>Unit</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethylene dinitrate</td>
<td>CAS no.: 628-96-6</td>
<td>8h: 0,03 ppm</td>
<td>2007</td>
</tr>
<tr>
<td></td>
<td>EC no.: 211-063-0</td>
<td>8h: 0,18 mg/m3, H</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Index no.: 603-032-0-0-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbon dioxide</td>
<td>CAS no.: 124-38-9</td>
<td>8h: 0,18 mg/m3, H</td>
<td></td>
</tr>
<tr>
<td></td>
<td>EC no.: 204-696-9</td>
<td>8h: 0,03 ppm</td>
<td>2007</td>
</tr>
<tr>
<td>Carbon monoxide</td>
<td>CAS no.: 630-08-0</td>
<td>8h: 0,6 ppm</td>
<td>2007</td>
</tr>
<tr>
<td></td>
<td>EC no.: 211-128-3</td>
<td>8h: 25 ppm</td>
<td>2007</td>
</tr>
<tr>
<td></td>
<td>Index no.: 006-001-00-0</td>
<td>8h: 29 mg/m3, 4)</td>
<td></td>
</tr>
<tr>
<td>Nitrogen Dioxide</td>
<td>CAS no.: 10102-44-0</td>
<td>8h: 0,6 ppm</td>
<td>2007</td>
</tr>
<tr>
<td></td>
<td>EC no.: 233-272-6</td>
<td>8h: 25 ppm</td>
<td>2007</td>
</tr>
<tr>
<td></td>
<td>Index no.: 007-002-00-0</td>
<td>8h: 1,1 mg/m3, 9)</td>
<td></td>
</tr>
<tr>
<td>Nitrogen oxide</td>
<td>CAS no.: 10102-43-9</td>
<td>8h: 25 ppm</td>
<td>2007</td>
</tr>
<tr>
<td></td>
<td>EC no.: 233-271-0</td>
<td>8h: 30 mg/m3</td>
<td></td>
</tr>
</tbody>
</table>

Exposure controls

Other Information
The exposure limit values are Norwegian limits. The given safety equipment is a suggestion. Risk assessment (actual risk) may lead to other requirements.

Occupational exposure controls
No eating, drinking or smoking while working with this material. Wash hands at the end of each work shift and before eating, smoking and using the toilet.

Respiratory protection
Normally not required. If ventilation is insufficient, use a respirator with A filter.

Hand protection
Use gloves suitable for the work. When handling explosive residue, use gloves from resistant material, eg.: Nitrile.

Eye protection
Wear approved chemical safety goggles where eye exposure is reasonably probable.

Skin protection (other than of the hands)
Wear appropriate clothing to prevent any possibility of skin contact.

Other Information
Eye wash facilities should be available when handling this product. Clothing that becomes wet or contaminated should be changed.

9. physical and chemical properties

Physical state
Tube charge based on nitroglycerol-bearing powder formula. The tubes comes in different colours.

Odour
Sweetish Characteristic

Colour
Yellow / grey.

Solubility in water
Partly soluble

Specific gravity
Value: 1,0-1,3 kg/dm3

Explosion limit
Value: > 159 °C

Other physical and chemical properties
Comments
See Technical Data Sheet for more information.

10. stability and reactivity

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

Hazardous decomposition products
Thermal decomposition or combustion may liberate carbon oxides (COx) and other toxic gases or vapours. Nitrous gases (NOx). Ammonia.

Stability
Stable under normal temperature conditions and recommended use.

11. toxicological information

Other information regarding health hazards

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General
With an uncartridged product, the risks are connected with the ingredient nitroglycerin. The health risks will amplify with intake of alcohol.

Inhalation
Very toxic by inhalation. Symptoms like headache, fatigue and nausea may appear.

Skin contact
Very toxic in contact with skin. Skin penetration possible.

Eye contact
Moderately irritating.

Ingestion
Very toxic if swallowed.

Chronic effects
Contains components which have cumulative effects.

Sensitisation
Sensitizing properties are not known.

Carcinogenicity
Carcinogenic properties are not known.

Teratogenic properties
Effects on fetus development are not known.

Reproductive toxicity
Effects harmful to reproduction are not known.

12. ecological information

Ecotoxicity
The product is not classified as dangerous for the environment. Uncartridged product may in large amounts be harmful to aquatic organisms.

Mobility
The product is water resistant. Ammonium nitrate will over time be released and it is soluble in water.

Persistence and degradability
This product mainly consists of inorganic compounds which are not biodegradable. The remaining components of the product are expected to be biodegradable.

Bioaccumulative potential
Will not bio-accumulate.

Other adverse effects / Remarks
Ammonium nitrate is a nutrient in water. Spills can cause massive algal blooms in static waters and affect local species population balance in the aquatic environment.

13. disposal considerations

Product classified as hazardous waste
Yes

Packaging classified as hazardous waste
Yes

Specify the appropriate methods of disposal
Dispose of in a regulated landfill site or other method for hazardous or toxic wastes. Residues of explosives must immediately be removed for intermediate storage and disposed for safely destruction. Product and package is hazardous waste. Deliver to approved depot.

Product disposal is regulated by the Norwegian Ministry of Government Administration and Reform under the supervision of Directorate for Civil Protection and Emergency Planning.

14. transport information

Proper Shipping Name
EXPLOSIVE, BLASTING, TYPE A

Product name (national)
SPRENGSTOFF, TYPE A

Dangerous goods ADR
Status: Yes
UN no.: 0081
Class: 1
Other applicable information.: Classification code: 1.1 D

Dangerous goods RID
Status: Yes
UN no.: 0081
Class: 1
Other applicable information.: Classification code: 1.1 D

Dangerous goods IMDG
Status: Yes
UN no.: 0081
Class: 1
EmS: F-B, S-Y
Proper shipping name: Classification code: 1.1 D

Dangerous goods ICAO/IATA
Other applicable information.: Forbidden

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15. regulatory information

Hazard symbol

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

S phrases
- S28 After contact with skin, wash immediately with plenty of soap and water.
- S35 This material and its container must be disposed of in a safe way.
- S36/37 Wear suitable protective clothing and gloves.
- S41 In case of fire and/or explosion do not breathe fumes.
- S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

References (laws/regulations)
- Dangerous goods regulation.
- Regulation regarding compiling of material safety data sheets.
- CHIPS Regulation.
- Regulation on Hazardous Waste.
- Norwegian regulation on handling explosives by 26.06.2002

16. other information

List of relevant R phrases (under headings 2 and 3).
- R22 Harmful if swallowed.
- R26/27/28 Very toxic by inhalation, in contact with skin and if swallowed.
- R2 Risk of explosion by shock, friction, fire or other sources of ignition.
- R33 Danger of cumulative effects.
- R36 Irritating to eyes.
- R8 Contact with combustible material may cause fire.
- R9 Explosive when mixed with combustible material.

Recommended restrictions on use
- The product can only be handed out to personnel that have valid permits issued by the police.

Information which has been added, deleted or revised
- Version: 081-06.eng.01_N(15.05.2008). Amendment: 1,16. Responsible: MR.

Supplier's notes
- Information in this document is to be made available for all who handle the product.

Checking quality of information
- This MSDS is quality controlled by National institute of Technology, Norway, which complies with the Quality Management System requirements specified in NS-EN ISO 9001:2000.

Responsible for safety datasheet
- Dyno Nobel AS (Orica Mining Services)