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Technical Specification

ERGODYN 35E

NITROESTER ROCK EXPLOSIVE, WATER RESISTANT, PRESSUREPROOF, ECOLOGICAL

GENERAL INFORMATION

1. **Application in specific conditions:**
    - **ERGODYN 35 E** is destined for use in underground mines, open pit mines and sulphur mines as a rock explosive.
    - **ERGODYN 35 E** can not be used in conditions where the danger of coal dust and/or methane explosion exists.

2. **Information about the allowable period of storage:**
    - The shelf life of **ERGODYN 35 E** is 12 (twelve) months from the date of manufacture.

3. **Storage conditions:**
    - **ERGODYN 35 E** should be stored in original package in temperature from -10°C up to +30 °C in well-ventilated places.

4. **Disposal:**
    - Destruction of explosives wastes and explosives out of it's expiry date as well as packaging wastes can be performed only by authorized company. Explosives wastes should be destroyed by detonation is specially designed areas (e.g. military ranges) by using a charge which is at least 5% mass of destroyed explosive. Explosives wastes containing up to 5% of explosives should be destroyed by burning in specially designed areas (e.g. military ranges)

ADDITIONAL INFORMATION

1. **Information about physical form and dimensions:**
    - Material structure: plastic
    - Material colour: red to brown
    - Shielding colour: red
    - **ERGODYN 35 E** can be used in cartridges:
        - paper (diameter between 25÷38 mm)
        - plastic foil (diameter between 36÷120 mm)
        - plastic tube (diameter between 25÷39 mm)
        - seismic cartridges in plastic tube (diameter 50 mm)

2. **Information about initiating sensitivity:**
    - **ERGODYN 35 E** detonates by detonator of minimal PETN charge 0,6 g or other blasting agent with comparable initiation ability.
    - **ERGODYN 35 E** detonates by detonating cord of minimal 6 g/m PETN.

3. **Information about loading conditions:**
    - **ERGODYN 35 E** can be loaded to dry and wet blasting holes.
    - **ERGODYN 35 E** in cartridges 90 mm/5000g plastic foil can be used in holes at pressure up to 20 MPa
    - **ERGODYN 35E** in seismic cartridges (plastic tube) can be used at hydrostatic pressure up to 0,5 MPa during 10 (ten) days

4. **Information about application in humid conditions:**
   - **ERGODYN 35 E** can be used in humid conditions.
   - **ERGODYN 35 E** can be used under water at the depths 0,2 m within 5 h.
   - **ERGODYN 35E** in seismic cartridges can be used under water during 10 (ten) days.

5. **Information about application in high and low temperature:**
   - **ERGODYN 35 E** can be used in minimal temperature -17 °C.
   - **ERGODYN 35 E** can be used in maximal temperature + 50 °C.

6. **Information about technical parameters:**

Density	$1{,}40 \pm 0{,}14$ g/cm^3
Velocity of detonation (plastic tube Ø 32)	5000 m/s
Velocity of detonation (steel tube Ø 34)	6000 m/s
Velocity of detonation, min.	> 2500 m/s (Ø 25 ÷ 32mm) > 4500 m/s (> Ø 32 mm)
Lead block test, average	425 cm^3
RWS, min.	80 % Hx
Sensitivity to impact, min.	2 J
Sensitivity to friction, min.	80 N
Transmission of detonation, min.	2 cm
Abel test, min	30 minutes
Thermal stability in temperature 75 °C	48 h
Oxygen balance	2,6 %
Specific volume of gaseous products of explosion	868 dm^3/kg
Heat of explosion	4379 kJ/kg
Concentration of energy	6130 kJ/ dm^3
Specific energy	1063 kJ/kg

7. **Certificates:**
   - CE Certificate – No. **1453.EXP.07.0147** issued by Central Mining Institute in Katowice, with attachments.
   - Classification Certificate – No. **065/IPO-BW/2007** issued by Institute of Industrial Organic Chemistry in Warsaw.

8. **Packaging:**
   - **ERGODYN 35 E** (paper cartridges) is packed into foil bag and then into cardboard boxes. **ERGODYN 35 E** (plastic foil and plastic tube) is packed into cardboard boxes. Cardboard boxes filled up with **ERGODYN 35 E** are closed by using adhesive or polypropylene tape and arranged on wooden pallets. According to customer requirements it can be additionally tied up by polypropylene tape. Pallets are wrapped with stretch film.

9. **Transport guidelines:**
   - **ERGODYN 35 E** is allowed to be transported only by authorized trucks. Cardboard boxes and pallets should be arranged side by side and secured from movement during transport. Transport of **ERGODYN 35 E** by road, rail and sea must be performed in accordance with ADR, RID and IMDG regulations.
     ERGODYN 35 E is nitroester rock explosive with:
     Proper shipping name: **BLASTING EXPLOSIVE, TYPE A**
     UN Number: **0081**
     Class: **1**
     Classification code: **1.1D**

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INSTRUCTIONS FOR SAFE USE

ERGODYN 35E

NITROESTER ROCK EXPLOSIVE
WATER RESISTANT, PRESSUREPROOF, ECOLOGICAL

The information and recommendations included in this instructions are provided to ensure safe handling of the product by the users. The recommendations do not replace any regulations which apply to using blasting agents. The manufacturer shall not be held responsible for using the product not as directed. A material safety data sheet available for the user has been prepared for ERGODYN 35E following separate regulations. The use of ERGODYN 35E without prior making the contents of this Instruction and the Material Safety Data Sheet known to the personnel is prohibited.

HAZARDS IDENTIFICATION

1. ***Explosion hazard***
   ERGODYN 35E is an explosive which creates a mass explosion hazard (involves the entire load immediately). The initiation of the explosion may be caused by impact, friction or fire.

2. ***Fire hazard***
   ERGODYN 35E is a flammable substance. Combustion of small amounts of the substance in open spaces is a calm process. Combustion of small amounts in closed spaces or combustion of large amounts may result in detonation. During the combustion toxic gases are emitted: nitrogen oxides and carbon monoxide. The decomposition of the explosive occurs in temperatures exceeding 165 °C.

3. ***Toxicological hazard***
   Toxic substance. The product is toxic by inhalation, skin contact and swallowing. The greatest toxicological hazard is caused by the effects of nitroglycerin and nitroglycol which are the components of ERGODYN 35E. The toxic effects of those components are presents in absorption of nitroglycerin and nitroglycol both through the skin and by respiratory tracts. During constant exposure to the hazard the critical system is the circulatory system, the critical effects are the following: lowering the arterial systolic blood pressure and heartbeat rate along with headaches. Contamination of mucous membranes may result in local redness of the skin.

4. ***Environmental hazard***
   The product is partly water soluble. On releasing to environment, there is a slight risk of soil and underground water contamination.

SCOPE AND CONDITIONS OF USE

ERGODYN 35E can be used in underground mines, open pit mines and sulphur mines as a rock explosive. ERGODYN 35E **cannot** be used in conditions where the danger of coal dust and/or methane explosion exists. It can be loaded to dry and wet blasting holes.

CONDITIONS FOR SAFE TRANSPORT, STORAGE AND USE

1. ERGODYN 35E is to be transported in compliance with the applicable RID, ADR and IMDG regulations.
   Proper shipping name: **BLASTING EXPLOSIVE, TYPE A**
   Class: **1**
   Classification code: **1.1D**
2. ERGODYN 35E is to be stored in warehouses compliant with the requirements of regulations applicable for temperature range: -10°C ÷ + 30°C.
3. ERGODYN 35E is to be used in compliance with the applicable mining regulations within the temperature range between -17°C ÷ + 50°C.
4. The explosive is to be handled exclusively by personnel trained and authorized in compliance with all applicable legal regulations.
5. Never use the product in case its quality is questionable.
6. Do not eat, drink or use open fire during the use and application of ERGODYN 35E.
7. Avoid direct contact of the non-elaborated explosive with the skin.
8. All operations involving ERGODYN 35E are to be carried out in well-ventilated spaces. Avoid inhaling vapours during work.
9. Avoid operations where mechanical factor such as friction and impact, thermal factor and electrical sparks affect ERGODYN 35E.
10. Wash hands after completing operations involving ERGODYN 35E.
11. ERGODYN 35E waste, expired explosive and used packaging are to be submitted for neutralisation to a company holding appropriate permits.

SPECIFIC RECOMMENDATIONS

1. For initiating ERGODYN 35E use detonators which contain min. 0.6 g PETN, a detonating cord with min. PETN charge 6 g/m, in compliance with specific conditions of their use.
2. After the blasting line has been set up a visual control of all connections has to be carried out.
3. The blasting net may be initiated only from a safe distance away from the explosion site, at a safe place.

EXPIRY DATE

1. The allowable storage period for ERGODYN 35E is **12 months** from the date of manufacturing.
2. Expired product must not be used under any circumstances.

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