



# **OFFSHORE KEMIITTI**

**Product information 18.8.2005**

## 1. Product description and use

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Offshore Kemiitti is an aluminized water-in-oil emulsion explosive that is charged by pumping. Its physical state is grease-like and it is gray in colour.

Offshore Kemiitti is especially well-suited for underwater rock quarrying where there is a need for quick charging and for a product that resists water and hydrostatic pressure and fills the borehole completely. Offshore Kemiitti is charged by pumping with custom-built charging equipment. The authority regulations on loose explosives have to be followed whenever it is used.

## 2. Package

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Offshore Kemiitti is delivered to the customer in plastic IBC-containers approved for this purpose. One container can hold a maximum of 1,000 kg of explosives.

The containers have at least the following labels:

- An image of a bomb, with the hazard class and compatibility group (1.1.D)
- UN number of the explosive: 0241
- Name of the explosive manufacturer
- CE mark

All of the above-mentioned labels have to be in place when returning the empty unwashed containers.

Containers holding explosives may not be stacked on top of each other.

### 3. Technical features: specifications and typical values

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Specifications	Unit	
Explosion heat	MJ/kg	4-5
Gas volume (NTP)	l/kg	820
Explosive density	kg/dm <sup>3</sup>	1.30±0.03
Ignitability		Detonator cap and a min. of 100 g of explosives, which has a min. detonation velocity of 5,000 m/s
Detonation velocity	m/s	6,000 ± 500
Critical density	kg/dm <sup>3</sup>	When the density exceeds 1.35, the ignitability deteriorates quickly
Smallest borehole diameter	mm	64
Deepest usage depth	m	50 (tested)

### 4. Main raw materials and risk clauses

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- Ammonium nitrate
- Water
- Oil
- Emulsifiers
- Aluminum powder
- Glass microspheres

The used oils are always highly refined mineral oils that are marking-free (Concawc report 95/59) and have a high flashpoint and low volatility. The emulsifiers are substances used in the food processing and/or cosmetics industry. The glass microspheres have no effect on the product user, since they are harmful only as dust and in Offshore Kemiitti they are fixed to the product. The ammonium nitrate included in the product reacts to caustic substances. This reaction releases ammonia.

## 5. Storage life and weather resistance

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The oil film surrounding the nitrate solution makes the Offshore Kemiitti waterproof. The product stiffness (viscosity) increases as the temperature drops. When the temperature drops below freezing there may be problems with flowability/pumping.

If the product is pumped several times, its density may rise so high that it fails to detonate. According to the manufacturer's tests, the product is at its best until 6 months after the manufacturing date. It is recommended to store the product in a closed container at temperature of 0...25 °C. Extreme cold and high heat may spoil the product.

As the product ages, its ignitability gradually deteriorates. This cannot be perceived visually. As the product ages further, it will form local concretions and crystallizations or the entire product will harden. At this point the product should not be used (usually there is a thin hardened layer inside the container that does not pose a problem for use).

Spoiled explosives are disposed by burning them with an auxiliary fuel (wood, paper) according to the official regulations on disposal. The manufacturer accepts spoiled explosives for disposal for a fee.

## 6. Handling safety

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The test values describing the handling safety of Offshore Kemiitti are in the same range as those of ANFO. The impact sensitivity of the product is measured in a shooting test, where a 15 g brass cylinder is shot against the explosive and the slowest cylinder speed causing a reaction (explosion, flame, smoke) to the explosive is measured. Offshore Kemiitti showed no reaction

When the cylinder speed was below 450 m/s. The same value for ANFO is about 400 m/s.

The product does not ignite easily since it contains water. The most common reason for involuntary ignition of similar products has been strong heating of the product due to pump misuse, subsequently causing decomposition that has led to explosion under certain circumstances. (See the instructions.)

Although the raw materials are as harmless as possible, it is recommended to avoid continuous contact with the skin by using protective gloves. Offshore Kemiitti has to be removed from skin first mechanically (hand towel) and then washed off. Working clothes that are stained with dry explosives inflame and burn easily.

If explosives come into contact with the eyes, eyes must be rinsed with plenty of water.

If any irritation persists, seek medical help.

## **7. Enviromental effects**

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Offshore Kemiitti burns very cleanly, because the oxygen providing (ammonium nitrate) and burning (oils and aluminum powder) substances in the emulsion explosive have a large common contact area and their manufacturing technique is very precise. However, some small amounts of carbon monoxide and nitrogen oxides are always released in an explosion.

Offshore Kemiitti has an excellent water resistance, so nitrates do not dissolve easily. All unexploded or otherwise abandoned material on the ground gradually dissolves into the water, so nitrates and oils do end up in the ecosystem. This can be minimized by means of careful and precise charging. The amount of harmful explosion gases can also be reduced through correct use of the product: a large enough booster, ensuring that the booster is in the explosive and that the explosive column is solid.

## **8. Instructions for the use**

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The product is charged by pumping. According to international experience, pumping has been the leading cause of involuntary ignition of emulsion explosives. This has to be considered when charging or transferring Offshore Kemiitti from the transport container to the charging equipment. It is recommended to carefully review all working instructions and safety equipment for pumping with the explosive manufacturer before commencing work. The required charging equipment has to be approved by the authorities. Some safety instructions:

- When the pump is running, the explosive has to flow through the charging equipment.
- The pump has to be stopped immediately if the product does not move. The use of an automatic device (manometer, flow detector) is recommended for stopping.
- The pump has to be equipped with a bursting disc or equivalent to prevent a strong rise in pressure.
- Foreign objects must be prevented from entering the pump.
- The pump materials have to be chosen to withstand (do not swell, for example) explosives.

- The pump has to be dimensioned so that there is no need for a high rotation speed.
- The pump has to have a preventive maintenance program, it is especially important to check the joints, bearings and lead-throughs.
- The compatibility of substances used for greasing etc. with the explosives has to be ensured.

If the equipment has no measuring device to determine the amount of pumped explosive, the amount has to be estimated from the pumping time, for example, in order to prevent over charging.

A powerful booster is always required to ignite Offshore Kemiitti. It is not recommended to use a detonating cord for igniting the booster.

Whenever handling the product it is important to understand that, regardless of its insensitivity, the product is an explosive that can explode when misused, resulting in serious consequences. During charging it is important to avoid damaging the detonator cap. The detonator cap is best kept inside an appropriate booster. The detonator cap cables may also be damaged by overly brisk hose handling.

An appropriate pumping speed has to be chosen for each and every charging location. A speed that is too high may cause the boreholes to overflow. The charging work has to be performed carefully so that there is a solid explosive column in the borehole. In terms of underwater charging, it is especially important to fill the boreholes correctly and use the proper amount of explosive. This has to be ensured and taken into consideration in the functions of the charging equipment and/or when issuing instructions concerning the charging work.