



KEMIITTI 510

Product information 4.7.2003

1. Product description and use

Kemiitti 510 is an emulsion explosive that is produced in blasting site and is pumped straight in to the borehole. Kemiitti is white or yellowish grease-like emulsion. It is produced on blasting site in Kemiitti truck by mixing intermediate products that are non-explosive materiel. The mixed product is pumped in to the borehole trough a charging pipe 40-100 meters in length. A chemical reaction sensitises the product in the borehole to ready explosive within 10-20 minutes after pumping. The product surface rises slightly in the borehole after the pumping is ready.

Kemiitti 510 is suitable for all sorts of strip mining, where a fast charging and a water resistant product is required. A progressive charging (in which the density lessens towards surface) can be attained by using Kemiitti 510. The national authority regulations concerning explosives material must be followed.

2. Packages

Kemitti 510 is delivered to the blasting site in a special made Kemiitti truck. The details of the delivery are agreed during order case by case in cooperation with the Kemiitti station managers.

During transportation, the Kemiitti truck does not contain any explosive materiel (excluding detonators and boosters). One truck has a capability to produce eight tons of ready Kemiitti explosive. The mixing and charging speed varies from 80 – 100 kg/min.

3. Explosion technical features

Specifications	Unit	KEMIITTI 510
Density	kg/dm ³	0,7-1,2
Velocity of the detonation	m/s	
Typical and calculational values		
Transmission	cm	
Initiation sensitivity		Plain detonator and additionally a detonator with detonation velocity at least 4 800 m/s
Velocity of the detonation	m/s	4200-5500
Explosion heat*	MJ/kg	3,0
Gasvolume (NTP)*	l/kg	900
Power/unit weight *	S	0,78 (Dynamite 1.0)
Diameter of the borehole (min)	mm	64
Max depth in water		tested 20 m

* Cheetah 2.0 (NTP), theoretical

4. Main raw materials and their hazard clauses

Raw material	Risk Clause
Ammonium nitrate	O, Xi; R8, R38
Calcium nitrate	O; R8
Water	X
Oil	Xn; R40-52/53
Emulsifiers	X

Highly refined mineral oil is always used. The oil is denotations free (Concawc-report 95/59) and has a flash point that is high and evaporability is low. Emulsifiers are substances commonly used by the food and/or cosmetics industry.

5. Storage and weather resistance

Kemiitti 510 is not intended to be stored, since it is produced on the blasting site and pumped straight in to the borehole. It will remain static and unchangeable in the borehole for several months. The oil layer surrounding the nitrate solution makes Kemiitti 510 completely insoluble to water.

6. Handling safety

When using Kemiitti 510, there is no need to transport or storage explosive material excluding the detonators and boosters. Therefore there are only small amounts of explosive material in the Kemiitti truck.

The test values concerning Kemiitti 510 handling safety are consistent with Anfos.

The most common reason for accidental ignition with relative explosives around the world has been the misuse of the loading pump, which leads to fast temperature rise and decomposition of the emulsion, and may lead to detonation.

Be sure to have the detonator and booster readily in the borehole before positioning the loading tube.

It is recommended to avoid continuous skin contact with the explosive material by using gauntlets. If the explosive gets on the skin, first remove it mechanically and then wash it away with water and soap.

Dungarees and other work clothes, which have been exposed to explosives, can catch fire if the explosive material dries to the cloth surface. Dungarees are washed with normal wet cleaning.

In case the substance gets into the eyes, rinse with lots of water. Contact the doctor if the irritation continues.

7. Environmental impact

In an emulsion explosive oxygen-giving (nitrates) and burning (oils) substances share a very large contacting surface and the manufacturing technique is very precise. That is why the explosion gases are relatively clean. However, small amounts of carbon monoxide and nitrogen dioxide are always released.

The water-resistance of Kemiitti 510 is excellent. All the unexploded or otherwise remaining explosives on the ground dissolve gradually into water with a result that the nitrates and oil end up in nature. With careful and tidy charging work and by following directions the environmental effects can be minimized. Also the amount of hazardous gases can be minimized by using the explosive correctly, for example to make sure an adequate detonator is used, ensuring the booster is within the explosive material etc.

8. Operating instructions

Kemiitti 510 is ordered from Forciti Kemiitti stations, either from Urjala or Keminmaa. During order phase a detailed delivery schedule, delivery method, amount, borehole diameter etc. are discussed. If Kemiitti 510 is used for the first time, it is suggested to ask a professional from Urjala or Keminmaa Kemiitti station to visit the blasting site before the delivery.

A strong booster, such as Pendex-, Fordyn- or Kemix charges, is required to ignite Kemiitti 510 and smallest suggested diameter for the booster is 40 mm. The use of detonating cord to ignite the booster is not suggested.

Even though Kemiitti 510 is insensitive, it is to be remembered that it is an explosive product, which can, if used wrongly, lead to devastating results. During charging, the charging pipe should not harm the igniter or the booster. The igniter is usually best preserved within a reasonable sized booster. Also the igniter cables might be damaged if handled roughly.

Measures to be taken in beforehand

- Make sure that the Kemiitti truck can be placed / driven close enough to the boreholes
- Make sure to plan charging order and driveway (for the Kemiitti truck) carefully. Also remember to guide the Kemiitti truck to designated place.
- Make sure to have placed the igniters and boosters readily to the boreholes. The igniter cables should be placed straight and have enough tightness before positioning the charging pipe in to the borehole. To ensure the best possible result, use both bottom and top boosters.
- Any blockages in the borehole must be opened before charging. The opening of blockages with charging pipe is prohibited.
- Field- and charging information (borehole size, empty spaces etc.) must be told to the Kemiitti operator before charging.

Pumping the explosive material

- The charging pipe should be placed in the borehole carefully and see that the igniter cables are not harmed. Also make sure that the booster is in contact with the detonator. Charging pipe should not be pushed in to the possible sludge on the bottom of the borehole.
- Inform the Kemiitti operator the depth of the borehole and required empty space (if it differs from the information given in field- and charging information).
- A necessary amount of explosive is pumped in the borehole while at the same time pulling the charging pipe upwards.
- When the required amount of explosive is pumped in, the Kemiitti operator gives a voice signal to the charging pipe handler. After this the charging pipe is swiftly placed in to the next borehole.
- While charging wet boreholes or boreholes with diameter less than 76mm, the charging pipe must be on the bottom of the borehole. NOTE: even though the borehole has been found to be dry while placing the bottom booster, some water may still dribble while charging the contiguous waterhole.
- If charging should be stopped in the middle of charging a borehole, the Kemiitti operator must be notified immediately.
- The bottom booster is tightened to the explosive material after the charging pipe is pulled from the borehole. The igniter cables should not be tightened while the charging pipe is still in the borehole.
- The top booster is pressed to the explosive material with a charging stick, after pumping and after Kemiitti has gasified. After placing the top booster, the explosive material level can be adjusted by adding more kemiitti or explosive cartridges, or possibly removing some amount of Kemiitti.

- If the surface of the explosive has not reached the required level, more Kemiitti can be added (max 1 addition / borehole). If the borehole is so cracked, that Kemiitti wont stay in the borehole, charging should be done with cartridge explosives.
- Excess Kemiitti should be removed with equipment designed for removal.
- The Kemiitti operator should be notified when the charging is coming to final boreholes (make sure that Kemiitti operator is notified of the amount of the remaining boreholes)
- When all boreholes have been charged, the charging pipe is lifted on top of the last borehole for cleaning. After the cleaning of the charging pipe, the pipe is pointed away from people and machinery, and the operator empties the pipe using compressed air. During emptying the pipe, the pipe should be held firmly in place, for example by standing on it.
- The filling is to be placed at the earliest 30 minutes after pumping.

Overall information

- Notify the Kemiitti operator immediately if any unusual things occur. From each charged field a sample of 1 kg of Kemiitti (same batch) will be taken. The sample will be destroyed only after the field has been detonated and the result is acceptable.
- Kemiitti 510 which is pumped to the borehole has a temperature of 50-60 °C. It must be ensured that all the explosives used are suitable for that temperature range.
- There is a constant pressure in the charging pipe. If for example a rock has blocked the pipe, it should not be pointed to any people or machinery.
- While using Kemiitti 510, a normal working clothes, for example dungarees and gloves that stand oil and nitrates, are enough.
- There is water always in the Kemiitti truck for washing.
- Kemiitti operators will give advice on the field concerning all aspects of the charging of the field with Kemiitti.

Since the explosive is pumped straight in to the borehole, usually no contaminated loose explosive is found. Contaminated Kemiitti batches are destroyed by burning with accessory fuel (wood, paper) following the given authority regulations concerning destruction. The maximum amount per burning is 5 kg's and as a layer of maximum 5 cm. More precise demolishing instructions can be found from the regulations of blasting and quarrying.

Forcit accepts aged explosives for destruction. Returned explosives are not compensated and the costs for the destruction are agreed case sensitively.