



KEMIITTI 510

Product information 14.6.2018

1. Product description and use

Kemiitti 510 is an emulsion explosive that is produced at the blasting site and pumped straight into the borehole. Kemiitti 510 is available with solid ammonium nitrate prills (0-30 %). Kemiitti is white or yellowish grease-like emulsion. It is produced at the blasting site in a Kemiitti truck by mixing intermediate products that are non-explosive materials. The mixed product is pumped into the borehole through a charging pipe 40-100 meters in length. A chemical reaction sensitises the product in the borehole to a fully ready explosive within 10-30 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/or a water resistant product is required. A progressive charging (in which the density lessens towards surface) can be attained by using Kemiitti 510. National authority regulations concerning explosives material must be followed when using Kemiitti 510.

2. Packaging and transport classification

Kemiitti 510 is delivered to the blasting site in a specially made Kemiitti truck. The details of the delivery are agreed on case by case in cooperation with the Kemiitti station managers when placing the order.

During transportation, the Kemiitti truck does not contain any explosive material (excluding detonators and boosters). One truck has a capability to produce 12-14 tons of ready Kemiitti explosive. The mixing and charging speed varies from 80 – 150 kg/min.

Transport classification, ammonium nitrate solution	
RID/ADR	5.1 Ammonium nitrate, liquid
IMDG	5.1
UN number	2426
Hazard class	5.1

Transport classification, gassing solution	
RID/ADR	5.1 Nitrites, inorganic, aqueous solution, n.o.s.
IMDG	5.1
UN number	3219
Hazard class	5.1

Transport classification, Ammonium nitrate prills	
RID/ADR	5.1 Ammonium nitrate
IMDG	5.1
UN number	1942
Hazard class	5.1

3. Explosion technical features

Specifications	Unit	KEMIITTI 510
Density	kg/dm ³	0.85-1.25
Velocity of the detonation	m/s	4200 - 5500
Typical and calculated values (content of prills 20%)		
Transmission	cm	0
Initiation sensitivity	°C	Plain detonator and additionally a detonator with detonation velocity at least 4 800 m/s
Power/weight unit	s	0.81
Explosion heat**	MJ/kg	3.0
Gas volume (NTP)**	l/kg	1020
Diameter of the borehole (min)	mm	64
Max depth in water	m	30
Ambient temperature	°C	at least -25

*Density increases along with the depth of borehole ** Cheetah 2.0 (NTP), theoretical

4. Main raw materials and their hazard clauses

Raw material	Risk phrase
Ammonium nitrate solution	O; R5-9
Ammonium nitrate prills	O; R5-9
Gassing solution	O; R8, T; R25, R32, R20-22

Oil mixture	-
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Highly refined mineral oil is always used. The oil is denotations free and it has a high flash point and low evaporability. Emulsifiers are substances commonly used by the food and/or cosmetics industry.

5. Storage life and weather resistance

It is forbidden to store Kemiitti 510. The product is produced on the blasting site and pumped straight in to the borehole where it can remain unchangeable for at least 90 days from the charging date. Kemiitti 510 is almost insoluble to water.

6. Handling safety

Transporting or storing explosives in a Kemiitti truck is forbidden. Small amounts of explosives will be formed in the product funnel of the truck during the manufacturing of Kemiitti 510. The funnel is emptied always at the end of charging.

The test values concerning Kemiitti 510 handling safety are consistent with Anfos. The impact sensitivity of the product is measured in a shooting test where a 15 g brass cylinder is shot into the explosive and the smallest cylinder velocity to give a reaction (explosion, flame, smoke) is measured. With Kemiitti 510, when the cylinder velocity is less than 450 m/s no reaction can be detected. The corresponding value for Anfo is approximately 400 m/s.

The most common reason for accidental ignition with pumpable emulsion explosives is the misuse of the loading pump leading to fast temperature rise and decomposition of the emulsion, which may lead to detonation. It has to be kept in mind when positioning the loading tube that the detonator and booster are already in the borehole.

Although the raw materials used are as harmless as possible, it is recommended to avoid continuous skin contact by using protective gloves. Any explosive getting on the skin is first removed mechanically with a rag or towel. Then wash the skin with water and soap.

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

Overalls and other work clothes with dried explosive material on them may ignite and burn. Protective clothing is washed normally in water.

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 in an explosion.

The water-resistance of Kemiitti 510 is excellent so usually very little nitrates are dissolved from it. All unexploded or otherwise remaining explosives on the ground dissolve gradually into water with a result that the nitrates and oil end up in nature. Nitrates have a eutrophic effect on water system and it soils ground waters. Oil may have long-term harmful effects on water environments and risks polluting the soil and groundwater. With careful and tidy charging work and by following instructions, the environmental impact can be minimized. Also the amount of hazardous gases can be minimized by using the explosive correctly.

8. Operating instructions

Kemiitti 510 is ordered from Forcitr's Kemiitti stations. When placing the order, 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 discuss it with an account manager or the technical service.

The total price for Kemiitti consists of the pumped amount of product, the hours of pumping and the mileage to the delivery site. The mileage is determined according to the nearest Kemiitti station. If the customer wants to order the product from a certain station, the mileage is determined according to that station. If the product must due to Forcitr's reasons be delivered from another station than the nearest one, the mileage will be invoiced according to the nearest Kemiitti station.

A strong booster (≥ 4800 m/s) is required for igniting Kemiitti 510. Redex-, Fordyn- or Kemix cartridge are recommended as a booster. The smallest advisable diameter for the booster is 40 mm. The use of detonating cord to ignite the booster is not recommended.

It is always to be remembered that the product is an explosive, which can, if wrongly used, explode with devastating results. During charging, the charging pipe should not harm the detonator or the booster. The detonator is usually best preserved within a reasonable sized booster. Also the detonator cables might be damaged if handled roughly.

Measures to be taken beforehand:

- Plan the vehicle paths for the Kemiitti truck and repair them if necessary.
- Plan the charging order of the field.
- Make sure to have placed the detonators and boosters in the boreholes.
- Guide the Kemiitti truck as close to the boreholes as possible (the charging pipe in the truck is 40-100 m long).
- The detonator cables should be placed straight with 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. Opening of blockages with the charging pipe is prohibited.
- Field- and charging information (borehole size, empty spaces etc.) must be told to the Kemiitti operator before charging.
- The proactive measures help to minimize the charging time and ensure safe delivery of the product.

Pumping the emulsion

- The charging pipe should be placed in the borehole carefully and see that the detonator cables are not harmed or dropped in the hole. Also make sure that the booster is in contact with the detonator.
- The detonator cables are tightened to the other side of the borehole, which prevents the cables from getting caught with the charging pipe.
- Charging pipe should not be pushed into the possible sludge on the bottom of the borehole.
- Inform the Kemiitti operator the depth of the borehole and the required empty space (if it differs from the information given in field- and charging information).
- The necessary amount of explosive is pumped in the borehole while at the same time pulling the charging pipe upwards. The pipe should not be pulled out from the hole too fast or with big or fast movements.
- The consistence of the explosive column is ensured during pumping by keeping the charging pipe inside the emulsion charge throughout the pumping. This way the charge will function as planned.
- 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.
- When charging wet boreholes or boreholes with diameter of 89 mm or less, the charging pipe must absolutely be on the bottom of the borehole when starting the pumping. NOTE: even though the borehole has been found to be dry while placing the bottom booster, some water may still dribble in the hole while charging a contiguous waterhole.

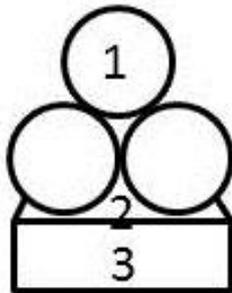
- If charging should be stopped in the middle of charging a borehole, the Kemiitti operator must be notified in good time.
- The bottom booster is tightened carefully to the explosive material after the charging pipe is pulled from the borehole. The detonator cables should not be tightened while the 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 been sensitized. 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 510 can be added (max 1 addition / borehole). If the borehole is so cracked, that Kemiitti will not stay in it, charging should be done with cartridge explosives.
- 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, the pipe is lifted from the hole on the field and is pointed away from people and machinery. The operator empties the pipe using compressed air. During it the pipe should be held firmly in place, for example by standing on it.
- The filling is to be placed in the holes at the earliest 30 minutes after pumping.

Overall information

- Notify the Kemiitti operator immediately if any unusual things occur.
- Kemiitti samples will be taken during charging and process is adjusted if needed. If the field is not detonated within one month from the charging a Forcitr representative should be informed without delay.
- There is a constant pressure in the charging pipe so a clogged pipe should never be pointed towards anyone. Also being around joints has to be avoided during these situations.
- While using Kemiitti 510, a normal working clothes consisting of, for example, overalls and gloves that stand oil and nitrates, are enough. Safety goggles must be worn always when manufacturing, handling or pumping Kemiitti 510 emulsion explosive.
- Site specific requirements for safety equipments and working practices must be taken into consideration.
- For initial cleaning of gloves, the charging pipe, hands etc. is recommended to use drilling waste.
- There is always water in the Kemiitti truck for washing.
- Kemiitti operators will give advice on the field concerning all aspects of the charging.

9. Disposal

Since the explosive is pumped straight in to the borehole, usually no contaminated loose explosive is found. Contaminated Kemiitti batches are destroyed by burnt with accessory fuel. The charger or over charger is allowed to destroy small amounts of explosives. The maximum amount per burning is 5 kg and as a layer of maximum 5 cm. The burning shall be done a minimum of 100 metres from a public road or inhabited building.



1. Maximum 5 kg and as a maximum 5 cm thick layer.
2. Wood cotton or other equivalent burnable product
3. Wooden base (for example 50 x 100 plank)

Fuel oil is applied to the explosives and burnable accessory fuels and they are lit on the side from which the wind is blowing. Igniting the fire can be done using a one-meter-long stick with a wood cotton tip doused in fuel oil.

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

10. Reclamation instructions

If the product has detectable defects or it does not function in the expected manner, the following data shall immediately be given to Forcit customer care or technical services:

- Product name, manufacturing date and possible detonation date
- Product appearance and description of the product's manageability / feel to the touch
- Operating circumstances in the blast site

Defective products are delivered to the nearest ForcIt service station from which they are delivered to the manufacturing plant for further examination. Returned products must be accompanied with a filled out ForcIt product return form which you can print out on our website (<http://www.forcit.fi/forcit-explosives>, menu products). Contact customer care or technical services before returning the product.