



# **K-pipecharge**

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**Product information 02.04.2013**

## 1. Product description and use

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K- and KK-pipecharges are powder explosives which contain nitroglycol and kieselguhr (diatomaceous earth). The brown powder explosive is packed in polypropylene pipes, K-pipes are green and KK-pipes are yellow. K- and KK-pipecharges are used for dimensional stone quarrying.

## 2. Packages

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Name	Ø /mm	Length / mm	Explosive g/cartridge	Explosive in box /kg
K-pipecharge	17	500	100	15
KK-pipecharge	17	500	100	15

Transport classification	
RID/ADR	1.1D Blasting Explosive, type A (K-/KK-Pipecharge)
IMDG	1.1 D
UN nummer	0081

### 3. Explosive properties

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	Unit	K-pipecharge	KK-pipecharge
<b>Specifications</b>			
Form		Powder	Powder
Density	Kg/dm <sup>3</sup>	0,95 - 1,05	0,90 - 1,10
Velocity of detonation	m/s	>1800	>1600
Transmission	cm	>2	>2
<b>Typical and theoretical values</b>			
Velocity of detonation*	m/s	1900-2100	1700-1900
Transmission*	cm	2-5	2-5
Oxyge balance	%	- 5,4	- 5,4
Gas volyme**	dm <sup>3</sup> /kg	200	170
Explosions heat**	MJ/kg	1,7	1,5
Power / unit weight**	S	0,40 (ANFO 1,00)	0,35
Initiation sensitivity			
Detonator		Detonator sensitive	Detonator sensitive
Detonating cord		Usable	Usable
Reliability		Tested - 25 °C	Tested - 25 °C

\* free, 20 °C, \*\* Cheetah 2,0 (NTP), theoretical

## 4. Main raw materials and their hazard clauses

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Raw material	
Nitroglycol (ethylene-glycol-dinitrate)	E; R2, T+; 26/27/28; R33
Kieselguhr	X <sub>n</sub> ; R48
Sodium chloride	-

## 5. Storage and shelf life

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In dry conditions K- and KK-pipecharges have a storage life of two years. The products are stored in a dry and cool place, according to valid legislation.

The frost resistance of K- and KK-pipecharges is good. Transmission and initiation sensitivity properties are slightly lower at sub-zero temperatures.

## 6. Safety in handling

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K- and KK-pipecharges are CE-accepted products, which fulfill the substantive safety requirements according to the EU directive. ("Essential safety requirements"). The testing has been conducted at the Finnish Defence Forces Research Institute of Technology (PvTeknTL, 0812), a civil explosives notified body in Finland. The products have to fulfill e.g. the following handling safety requirements.

Test	Requirements
Impact sensitivity (BAM)	$\geq 2$ J
Abrasion sensitivity (Julius Peters)	$\geq 80$ N
Heat stability	75 °C, 48 h (no reaction)

Nitroglycol might cause headache and reduced blood pressure due to skin contact or respiration. Skin contact should be avoided by using protective gloves. Any substance on skin must be removed and washed with water and soap. If the substance gets into the eyes, the eyes must be rinsed thoroughly with water. If irritation continues, a doctor is to be conducted. Substance caught on clothes should be removed mechanically, after which the clothes are washed with normal wet cleaning.

## 7. Environmental impacts

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The water resistance of K- and KK-pipecharges is reasonable. However, the unexploded agent dissolves gradually into water, with a result of nitrate and nitroglycol ending up in nature. Nitroglycol doesn't dissolve into water and it degrades very slowly in nature. Nitrate has a eutrophication effect on the water system and it soils the ground water. Pipecharges contain Kieselguhr which is a stable, non-poisonous natural raw material and doesn't cause damage to the environment or danger to organisms. As such, Kieselguhr is suitable as earth-fill material. Sodium chloride dissolves gradually into water and it has a corroding effect on metal.

Careful and clean charging helps to minimize harmful environmental effects. In addition, the amount of harmful fire gases (CO, NO<sub>x</sub>) produced by the explosion can be reduced by correct use of the product. In general, the amount of gases produced in the explosion depends on the oxygen balance and how complete the explosion is. At ideal conditions, where the oxygen balance is zero and the explosion is complete, the main explosion products produced are carbon dioxide, water vapor and nitrogen gas. In practice, this ideal is never achieved and the oxygen balance is usually slightly negative or slightly positive. The pipes are made of polypropylene, which mainly burns in the detonation and do not form particularly toxic gases. Some plastic parts can spread in the surroundings of the site. In an incomplete detonation sooty residue will be formed from the plastics.

The oxygen balance of K- and KK-pipecharges is approximately -5%, which means that during explosion carbon monoxide is being formed more in proportion to NO<sub>x</sub> gases.

## 8. Operating instructions

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To absolutely ensure the explosion, detonating cord (10g PETN/m) shall be used with K- and KK-pipecharges. The detonating cord is swirled around the pipecharge line so that the cord will make a circle at each pipecharge. The ends of the cord will be attached with tape in the first and the last pipecharge. K- and KK-pipecharges will usually be ignited with detonating cord so that adjacent holes detonate simultaneously. This method gives a better result than without detonating cord.

K- and KK-pipecharges are not completely water-resistant so they cannot be used in specially wet quarrying sites. K- and KK-pipecharges that are not presumed to be fit for blasting must be disposed of by burning them together with additional combustible materials. Not more than 5 kg of explosive, with a maximum thickness of 5 cm, is allowed to be disposed at one time. More detailed disposal instructions can be found in the Finnish legislation for blasting (Räjätys- ja louhintatyön järjestysohje) paragraphs 71 and 73.

OY FORCIT AB accepts outdated explosives for disposal. Returned explosives are not compensated and the costs for disposal are agreed separately case by case.

Reclamation instructions:

If defects are found in the products or they function unexpectedly, the following information regarding the product must be supplied to the Forcitr explosives plant in writing:

- the dimensions of the product and the date from the package
- the appearance of the product and the description of the handling characteristics
- the conditions and charging procedure at the blasting site

A sample of the deviant product is to be delivered immediately to the producing plant for further investigations. The sample must be marked properly with identification data to ensure right identification.