



ANFOS

ANFO

ANFO 800

ANFO 600

AHTI-ANFO

PITO-ANFO

Product information 26.4.2007

1. Product description and use

Anfos are explosives mainly used in large open cast blasts out side of urban areas as well as in underground excavations. There are some special Anfo products developed for specific applications like Ahti-Anfo, which is developed for wet conditions and resists water better than ordinary Anfo, Pito-Anfo is developed for up hole charging having additives for stickiness to better stay in upholes. Anfo 800 and Anfo 600 are lighter in density compared to standard Anfo. Anfo is a mix of prilled ammonium nitrate and fuel oil. Special Anfos include different additives.

2. Package

Product name	Package	Weight/bag	Stack weight	Colour code
Anfo	Plastic bag	25 kg	1000 kg	White
Anfo	Large recycle bag	500 kg		
Anfo 800	Plastic bag	25 kg	1000 kg	Orange
Anfo 600	Plastic bag	20 kg	800 kg	Black
Anfo 600	Large recycle bag	300 kg		
Ahti-Anfo	Plastic bag	25 kg	1000 kg	Blue
Pito-Anfo	Plastic bag	20 kg	800 kg	Green

Transport classification	
RID/ADR	1.1D Blasting Explosive, type B
IMDG	1.1 D
UN nro	0082

3. Technical features: specifications and typical values

		Anfo	Anfo 800	Anfo 600	Ahti-Anfo	Pito-Anfo
Specifications						
Structure		Prills	Prills	Prills	Prills	Prills
Density *	kg/dm ³	0,85-0,95	0,75-0,85	0,55-0,65	0,85-0,95	0,65-0,80
VOD	m/s	> 3 000	> 3 000	> 2 500	> 3 000	> 3 000
Typical calculated values						
VOD (Ø 55 mm)**	m/s	3 200	3 500	2 800	3 200	3 200
Transmission (Ø 40 mm)**	cm	-	-	-	-	-
Oxygen balance	%	± 0	± 0	- 10,5	- 2,2	- 5,2
Gas volume***	dm ³ /kg	965	965	1035	925	1015
Energy***	MJ/kg	4,00	3,90	3,40	3,80	3,50
Relative mass strength (S)***	S	1,00	1,00	0,90	0,95	0,90
Detonator Sensitivity		Detonator > Ø 50 mm closed space				
		Use of suitable booster is recommended, see chpt. 8.				

* density measured in laboratory conditions, density in blast hole depends on charging method

in steel pipe, free space * Cheetah 2.0 (NTP), theoretic

4. Main raw materials and risk clauses

Raw material	Risk clause
Ammonium nitrate	O; R 5-9
Fuel oil	Xn; R40-52/53

5. Storage life and weather

In dry conditions Anfo can be stored for 6 months. Products should always be stored in dry and cool conditions according to the regulations in force.

In general the resistance against below 0 celcius conditions is good for Anfo. Sensitivity of detonation reduces when temperature drops, although being reliable down to -25 °C.

Generally Anfo does not resist water, but is soluble to water. Ahti-Anfo resists water for couple of hours see chapt. 8.

6. Handling safety

Anfo is CE-marked product, which has been found to fill the EU:s safety requirements. The testing has been done by the Notified Body for civil explosives, Finnish Defence Forces Research Center (0812). The products has to fill for instance the following minimum requirements describing handling safety:

Test	Requirement
Impact sensitivity (BAM)	≥ 2 J
Abrasion sensitivity (Julius Peters)	≥ 80 N
Heat stability	75 ° C, 48 h (no reaction)

Dungarees and other work clothes, which has been exposed to explosives, can catch fire. Dungarees are washed with normal wet cleaning.

7. Environmental effects

Non-exploded or spillage Anfo solutes quickly to ground water releasing nitrates and fuel oil. Nitrate has an over fertilizing effect on the water system and it soils ground water. Oil can cause long-term ill-effects in the water environment and create a pollution risk for the ground and ground water. With careful and tidy charging work and by following directions the environmental effects can be minimized

In general the gases formed in explosion are dependent on the oxygen balance of the product and the explosion itself. In ideal case when having perfect balance and perfect detonation, the remaining gases are basically carbon dioxide, water and nitrogen. In practice the balance is never perfect, neither the detonation

Anfo blasting generates NO_x-gases and carbon monoxide. The more negative the oxygen balance the more CO-gases are generated compared to NO_x and vice versa. In open air the gases are quickly diluted, but in under ground excavation one must take care of sufficient ventilation

8. Instructions for the use

According to Finnish regulations Anfo is allowed to use only outside of urban areas, which is defined as a distance of 200 m from the nearest house, public road or area where people usually meet.

Anfo blasting requires a booster. Suitable boosters are e.g. Fordyn, Pendex, Redex, Aniitti, Kemix A and Nobel Prime (in tunnelling).

Anfo can be charged pouring directly from bag to down hole or by using mechanised charging unit. Pito-Anfo and Anfo 600 require always a mechanised charging unit to keep Anfo mix homogenous. It is recommended to use mechanised charging unit also for Ahti-Anfo. Specific charge increases when using mechanised charging unit.

Ahti-Anfo is suitable for wet holes when the blast holes are dried before charging. The use of Anfo in very wet conditions is not recommended.

If there is a risk that Anfo is out of date or other way not proper, it can be disposed by burning or blasting..

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

Instructions to make a reclamation:

If Kemix A is suspected not to work as wanted, please contact Forcitr or Forcitr's dealer immediately. Please inform us about the following things:

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

If the product is not in order, please deliver a sample of the product to Forcitr for further investigations. The sample must be marked properly to ensure right identification.