

Detonators For General Use

(Non-Permitted)

Explosives Division of GULF OIL Corporation Limited manufactures the full range of detonators for use in opencast mines, quarrying, civil construction works, tunneling and other general applications. These detonators consist of an aluminum shell filled with desired dosage of Penta Erythritol Tetra Nitrate (PETN) as base charge and a mixture of Lead Azide, Lead Styphnate and Aluminum Powder (ASA mixture) as priming charge. ASA mixture is sensitive to flame while PETN is sensitive to the shock wave generated by ASA mixture. In delay detonators, a pyrotechnic delay element is placed above the ASA mixture, which provides the requisite delay.

Electric detonators are fitted with an electric fusehead having firing precision and consistency. The fusehead assembly is crimped to the detonator shell using a PVC plug that offers good resistance to water ingress when loaded in watery drillholes. The twin PVC coated lead wires have good dielectric strength and abrasion resistance. The bare ends of the lead wires are shunted for protection against stray currents.

In Instantaneous Electric Detonators, the flame generated by the fusehead initiates the ASA mixture, which detonates the PETN base charge. In delay detonators, the fusehead ignites the pyrotechnic delay element, which conveys the flame to the ASA mixture, which in turn, detonates the PETN.

Judicious usage of delay detonators result in good fragmentation with controlled throw enabling easy mechanical loading and offers greater control of vibration, noise and flyrock.



Product Range

Ordinary Detonator OD & Special Ordinary Detonator SOD – These are initiated using Safety Fuse. The spit of flame conveyed by a length of Safety Fuse crimped to the shell initiates the ASA mixture, which detonates the PETN base charge. Ordinary Detonator is of No.6 strength and Special Ordinary Detonator is of No.8 strength.

Instantaneous Electric Detonator EDN No.6 & EDN No.8 – On passage of electric current, the flame generated by the fusehead initiates the ASA mixture, which detonates the PETN base charge. Both the leadwires are of white colour. Instantaneous Electric Detonators are manufactured in No.6 and No.8 strength.

Short Delay Detonators SDD – The flame generated by the fusehead ignites the pyrotechnic delay element, which conveys the flame to the ASA mixture, which in turn, detonates the PETN base charge. Short Delay Detonators have delay numbers ranging from 0 to 10 with a nominal time interval of 25 milliseconds between delay numbers 1 to 6, 50 milliseconds in delay numbers 7 & 8, and 75 milliseconds in delay numbers 9 & 10. Extended series with delay numbers 11 to 20 are available on order. Delay number is embossed on the base of the shell upto delay No.9 and a printed number tag is attached to the lead wires for all delays. The twin lead wires are blue-red in colour. Short Delay Detonators are of No.8 strength.

Nominal delay interval of delay numbers 11 to 20 are as under:

Delay Number	Delay Interval (ms)
11	475
12	550
13	625
14	700
15	775
16	850
17	925
18	1000
19	1100
20	1200

Delay numbers 10 to 20 are identified with number tag on the lead wire and would not have number embossed on the bottom of the shells. Colour coded lead wires for Short Delay Detonators are supplied against specific order.

Short Delay Detonators series with delay numbers 0 to 16 having a constant nominal delay interval of 30 milliseconds are available on specific order.

Long Delay Detonator LDD – The flame generated by the fusehead ignites the pyrotechnic delay element, which conveys the flame to the ASA mixture, which in turn, detonates the PETN base charge. Long Delay Detonators have delay numbers ranging from 0 to 12 with a nominal time interval of 500 milliseconds (0.5 second) between successive delay numbers. Delay numbers are embossed on the base of the shell upto delay No.9 and a printed number tag is attached to the lead wires for all delays. The twin lead wires are red-red in colour. Long Delay Detonators are of No.8 strength. Colour coded lead wires for Long Delay Detonators are supplied against specific order.

Product Application

Ordinary Detonators (OD) and Special Ordinary Detonators (SOD) are used in conjunction with Safety Fuse, and offer a safe and effective alternative for use in work sites having electro-static hazards, blasting near high power transmission lines etc. When properly crimped, they can be used in wet drillholes. They are used in small diameter shallow hole blasting in small quarries, in non-gassy underground mines, in opencast mines for setting off a blast, general blasting applications and in secondary blasting.

Instantaneous Electric Detonators (EDN) have a wide range of applications for setting off drillholes charged with cap-sensitive explosive in quarrying, opencast and underground non-gassy mines. They are also useful for secondary blasting using pop-shooting or plaster-shooting methods.

Short Delay Detonators (SDD) are designed for use in opencast and underground metal mines for stoping, driving tunnels, drifts, shaft sinking and in quarries where multi-shot rounds are required to be fired.

Long Delay Detonators (LDD) are especially useful for excavating tunnels, blasting raises and sinking shafts. The longer delay period allows sufficient time for creation of free face in restricted areas such as tunnels.

Specifications

Ordinary and Special Ordinary Detonators

Strength	PETN Charge Qty. cg	Shell Length mm	Shell Inner Diameter mm	Shell Outer Diameter mm
No. 6	30	32	5.7	6.5
No. 8	60	37	6.5	7.2
No. 8	60	42	5.7	6.5

Instantaneous Electric Detonators, Short and Long Delay Detonators

	Instantaneous Electric Detonators - EDN (No.6 & No.8 Strength)	Short Delay Detonators (SDD) (No. 8 Strength)	Long Delay Detonators (LDD) (No. 8 Strength)
Shell Material	Aluminum	Aluminium	Aluminium
Shell Length	37 mm & 42 mm respectively	Varies with delay - 42 mm, 57 mm to 77 mm	Varies with delay - 42 mm, 57 mm to 77 mm
Strength	No. 6 & No. 8	No. 8	No. 8
Lead Wire Colour	White / White	Blue / Red	Red / Red
Lead Wire Material	Steel Wire	Steel Wire	Steel Wire
Lead Wire Gauge / Diameter	25.5 SWG (0.487 ± 0.02 mm)	25.5 SWG (0.487 ± 0.02 mm)	25.5 SWG (0.487 ± 0.02 mm)
Lead Wire Resistance	0.70 ± 0.1 ohms/m	0.70 ± 0.1 ohms/m	0.70 ± 0.1 ohms/m
Standard Wire Lengths	1.5 m & 1.8 m, and as per requirement	2.0 m, 3.0 m, 4.0 m, 5.0 m, and as per requirement	2.0 m, 3.0 m, 4.0 m, 5.0 m, and as per requirement
Fuse-Head Characteristics			
- Resistance	1.6 to 2.4 ohms	1.6 to 2.4 ohms	1.6 to 2.4 ohms
- No Fire Current	180 mA for 300 seconds	180 mA for 300 seconds	180 mA for 300 seconds
- All Fire Current	1.2 A for 4 ms	1.2 A for 4 ms	1.2 A for 4 ms
- Impulse	3.2 mWs/ohm	3.2 mWs/ohm	3.2 mWs/ohm



Contact Information

For more information, please contact:



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Features and specifications mentioned in this brochure are subject to change due to continuous improvements through research and development.



Electric detonators are supplied with 23 SWG copper wire (0.60 ± 0.02 mm) on order. The resistance of the wire is 0.06-0.065 Ohms/meter.

Detonators have an identification mark on the shell bottom.



OD, SOD, EDN



SDD, LDD

The alphabets IDL are marked on the PVC crimping plug.

Packaging

Ordinary Detonators: 100 nos. detonators are packed in a carton. 5 cartons (500 nos.) are wrapped in kraft paper and made into a packet. 20 packets (10,000 nos.) are placed in an inner corrugated fiber board case which in turn is placed in an outer wooden case. The wooden cases are treated to prevent termite / borer attacks on storage. Markings on the case indicate manufacturer's name, product name, quantity, case number, date of manufacture, net weight and gross weight.

Instantaneous Electric Detonators (EDN): 25 detonators are made into a bundle ensuring that all lead wire ends are folded within the bundle. Two such bundles are wrapped in kraft paper to form a packet. Required number of packets are placed in a corrugated fiber board case. Quantity per case varies with lead wire length. Markings on the case indicate manufacturer's name, product name, lead wire length, quantity, batch number, case number, date of manufacture, net weight and gross weight.

Short and Long Delay Detonators (LDD & SDD): Each case contains delay detonators of the same delay number. 5 detonators are held in a bunch keeping lead wire ends folded within the bundle and 5 such bunches are packed to make a larger bundle of 25 nos. Two such bundles are wrapped in kraft paper to form a packet of 50 nos. Commensurate to length of lead wire requisite numbers of packets are packed in corrugated fiber board case. Markings on the case indicate manufacturer's name, product name, lead wire length, quantity, delay number, case number, date of manufacture, net weight and gross weight.

Product	Lead Wire Length (m)	No. of Packets	Quantity / Case (nos.)	Product	Lead Wire Length (m)	No of Packets	Quantity / Case (nos.)
OD No. 6	Not applicable	20	10000	SDD & LDD	3.0	16	800
SOD No. 8	Not applicable	20	10000	SDD & LDD	4.0	10	500
EDN No. 6	1.5 and 1.8	40	2000	SDD & LDD	5.0	10	500
EDN No. 8	1.5 and 1.8	40	2000	SDD & LDD	6.0	10	500

Precautions

- Do NOT subject detonators to impact, friction and fire.
- NEVER force a detonator into explosive cartridge. Always use pricker made of non-sparking material to pierce the wrapper while priming.
- NEVER hold the detonator shell while unfurling the wire for use. Always hold the leadwire about 5 cms away from the crimp portion to avoid any sudden pressure coming on the fusehead assembly.
- Do NOT handle electric detonators while wearing woolen or synthetic clothes or in the vicinity of cell phones, walkie-talkies, etc.
- When used to initiate detonating cord trunkline, connect detonator just prior to firing the blast.
- Always keep the ends of leadwire or blasting cable shorted and unhook just prior to connections. Disconnect the blasting cable from the exploder if circuit needs to be checked.
- Do NOT carry out charging of explosives during an approaching storm or when there is lightning activity in the blast area. Vacate the blast area and resume operations only after the storm has passed.
- Do NOT attempt to fight explosive fires.

Instantaneous and Delay Electric Detonators can be supplied with Moderately Insensitive (0.9 to 1.2 Ohms), Medium Insensitive (0.4 to 0.8 Ohms), and Highly Insensitive (0.03 to 0.08 Ohms) fuseheads. Contact manufacturer for more details.

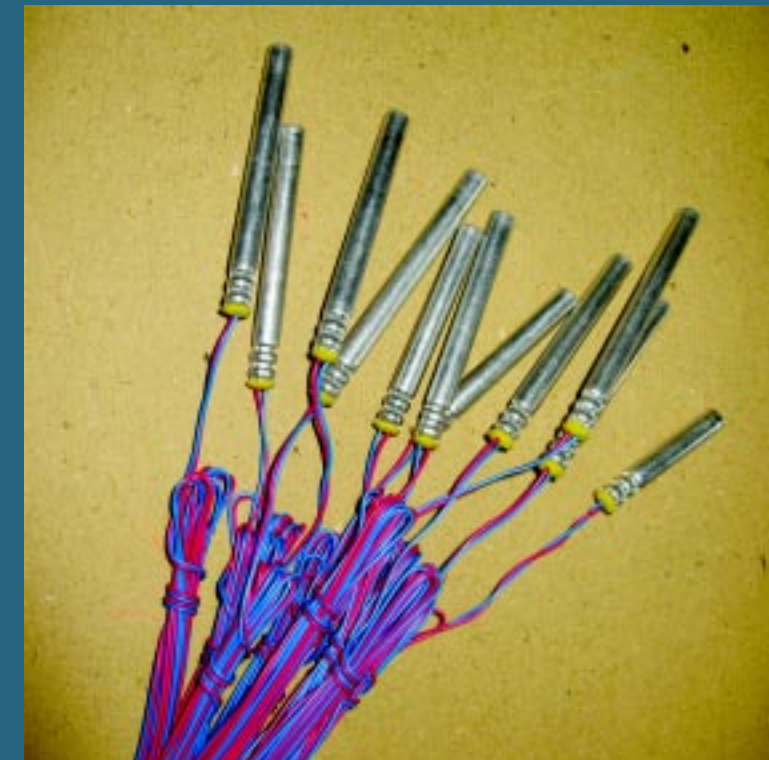
 CE (Conformité Européenne) Mark is approved for the following Detonator products:

- Special Ordinary Detonator
- Instantaneous Electric Detonator EDN
- Short Delay Detonator

Statutory Classifications

Petroleum & Explosives Safety Organization (PESO), Government of India	Class 6 Division 3
IMDG Classification:	
Class	1
Division	1.1
Group	B
U.N Number	
Ordinary & Special Ordinary Detonators	0029
Instantaneous, Short Delay & Long Delay Detonators	0030
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Ordinary & Special Ordinary Detonators	1259
Instantaneous, Short Delay, & Long Delay Detonators	1257
Stowage Category	II Type 'C'

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IDL
Explosives

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