

Exel™ Enduradet™ Detonators Underground Mining



Description

Exel Enduradet Detonators are a series of highly durable, oil resistant non-electric delay detonators for use in the harsh mining conditions experienced in long sleep time, long hole applications underground.

Exel Enduradet Detonators consist of a non-electric delay detonator, a length of highly visible red *Exel* heavy duty signal tube, and a plastic J-hook or multiclip connector. The detonator incorporates millisecond delay elements, and a high strength PETN base charge, inside an aluminium shell. The special outer plastic of *Exel Enduradet* signal tube provides excellent protection against damage from impact or abrasion and oil penetration. One end of the signal tubing is crimped into the detonator shell and the other end is closed off with a waterproof seal.

The *Tangle-Free F80* and *F100* winding configurations are used for tube lengths in the 9 to 24 m range. These configurations provide tangle-free, easy to deploy leads. *F80* and *F100* wound detonators are fitted with J-hooks. The J-hook provides a rapid and secure means of attaching the signal tube to detonating cord. To simplify identification of the detonator delay time, the J-hook connectors are colour coded and have the delay number and time printed on them. Long lead lengths, greater than 24 m, are wound onto plastic spools and supplied with yellow multiclips.

Safety

Exel Enduradet Detonators provide a high level of safety against initiation by static electricity, stray electrical currents and radio frequency transmissions.

Exel Enduradet Detonators incorporate sensitive components inside the detonator. Care should be taken not to cause initiation via intense impact, friction or heat. *Exel Enduradet* Detonators may be used in temperatures up to 70°C. *Exel Enduradet* Detonators are supplied in Class 1.1B packaging and have UN Number 0360.

Application

Exel Enduradet Detonators are ideal for use in long blastholes loaded with bulk explosives, which "sleep" for an extended time before firing. A series of delay times are available to specially cater for production blasting in underground stopping operations.

Technical Properties

Signal tube:	Red Heavy Duty <i>Exel</i>
Outer diameter:	3 mm
Nominal tensile strength:	61 kgf
Lengths:	9, 12, 15, 18, 24, 30, 36, 45, 60, 80m
Detonator PETN mass:	790 mg (8* strength)

Delay #	1	2	3	4	5	6
Time (ms)	25	50	75	100	125	150
Delay #	7	8	9	10	11	12
Time (ms)	175	200	250	300	350	400
Delay #	13	14	15.5	16	17	18
Time (ms)	450	500	650	700	800	900
Delay #	19	20	21	22	23	24
Time (ms)	1025	1125	1225	1400	1675	1950
Delay #	25	26	27	28	29	30
Time (ms)	2275	2650	3050	3450	3900	4350

Table 1: delay # and nominal firing times.(Not all length, delay combinations are available, extended delays up to 36 available in some lengths.)

Recommendations For Use

Exel Enduradet Detonators have a sleep time capability of 4 months. Sleep time capability may be reduced above 40°C. This provides greater insurance when loading large blasts and incurring disruption due to unforeseen delays. Take care to check the corresponding sleep time of the bulk explosives being used.

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Exel Enduradet signal tube is extremely robust, however if the signal tube is cut or split, moisture may enter the core and cause a misfire. *Exel Enduradet* Detonators should always be secured inside a suitable booster, which fully encloses the detonator shell to protect it from abrasion or damage during charging. *Exel Enduradet* Detonators blastholes should normally be "reverse-primed", with the detonator base pointing towards the blasthole collar. When using packaged explosives primers in long blastholes, the signal tube should be taped alongside the primer, not "half-hitched" around it.

Excessive force should not be applied to signal tubes connected to in-hole detonators and primers. If a primer becomes stuck when attempting to retrieve or reposition it, a replacement unit should be used. *Exel Enduradet* Detonators can be reliably initiated by *Exel Connectadet* and *Exel Trunkline Delay Detonators* (TLDs). *Exel Enduradet* Detonators can also be reliably initiated by detonating cord which has a core charge between 3.6 and 5.0 g/m PETN, using standard J-hook connections. Clip each J-hook to the detonating cord trunkline, keeping the cord and signal tube at right angles. Pull the end of the signal tube through its J-hook until the tube is straight and taut between the connection and the blasthole collar. Ensure that no signal tubes cross over or lie within 200 mm of the detonating cord.

Packaging

Exel Enduradet Detonators are packed into sealed "barrier bags" inside cardboard cases. All detonators within a case have the same lead length and delay. The case dimensions are 0.60 x 0.32 x 0.22 m. For short lead lengths, 9 to 24 m, the tubing is wound in the tangle-free F80 and F100 configurations. Long lead lengths, greater than 24 m, are wound onto plastic spools.

Storage And Handling

Exel Enduradet Detonators should be stored in a cool, dry detonator magazine licensed for Class 1.1B explosives. Stacks of cases should be no more than 2 metres high. *Exel Enduradet* Detonators should be used within 12 months of opening the sealed "barrier bag". Delay detonators deteriorate with age, and should be used in order of manufacturing date (oldest first). Batches of detonators more than 4 years old should not be used.

	Lead Length (m)	Units per Case	Nominal Gross Weight (kg)*	
F100	9	80	8.0	T A N G L E
	12	80	8.0	
F80	15	50	7.0	
	18	40	7.0	S P O O L
	24	35	9.0	
SPOOL	30	36	11.0	
	36	36	12.0	
	45	36	14.0	
	60	16	9.0	
	80	16	11.0	

* Gross weight varies according to the delay element.

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