Technical Data Sheet

The Power of Partnership

Exel™ Millisecond Detonators

Description

Exel™ Millisecond Detonators are a series of high strength non-electric detonators with millisecond (MS) delay intervals between successive firing times. *Exel™* MS Detonators consist of a non-electric detonator, a length of *Exel™* signal tube, and a J-hook connector. The detonator incorporates delay elements and a high strength PETN base charge inside an aluminium shell. The pink *Exel™* signal tube is a high strength, high abrasion resistant tubing which transmits the initiation signal to the detonator. One end of the signal tube is crimped into the detonator shell, and the other end is closed off by a waterproof seal. The plastic J-hook provides a rapid and secure means of attaching the signal tube to detonating cord. It is colour coded and has the detonator delay number and firing time printed on it.

The *Tangle-Free F100* winding configuration is used for tube lengths in the 3.6 to 12m range. *Tangle-Free F80* winding configuration is used for tube lengths in the 15 to 24m range. These configurations provide tangle-free, easy to deploy leads.

Safety

Exel™ MS Detonators provide a high level of safety against initiation by static electricity, stray electrical currents and radio frequency transmissions. *Exel™* MS Detonators incorporate sensitive components inside the detonator. Care should be taken not to cause initiation via intense impact, friction or heat. *Exel™* MS Detonators may be used in temperatures up to 70ºC. *Exel™* MS Detonators are supplied in Class 1.1B packaging and have UN Number 0360.

Application

Exel™ MS Detonators provide a series of delay times suitable for surface mining, quarrying and underground operations. *Exel™* MS Detonators will directly initiate *Pentex™* boosters and packaged explosives. Refer to the relevant Technical Data Sheets for details. *Exel™* MS Detonators can be safely used when blow-loading ANFO into unlined blastholes, but semi-conductive charging hose and properly earthed charging equipment must be used.

Technical Properties

Signal tube:	Pink *Exel™*
Outer diameter:	3 mm
Nominal tensile strength:	45 kgf
Lengths:	3.6, 6.1, 7.3, 9, 12, 15, 18, 24 m
Detonator PETN mass:	0 Delay 500mg (#8 strength) Delays 1 - 30 790mg (#8* Strength)

Available Delay Range

Delay #	**0**	**1**	**2**	**3**	**4**	**5**
Time (ms)	0	25	50	75	100	125
Delay #	**6**	**7**	**8**	**9**	**10**	**11**
Time (ms)	150	175	200	250	300	350
Delay #	**12**	**12½**	**13**	**14**	**15**	**15½**
Time (ms)	400	425	450	500	600	650
Delay #	**16**	**17**	**18**	**19**	**20**	**21**
Time (ms)	700	800	900	1025	1125	1225
Delay #	**22**	**23**	**24**	**25**	**26**	**27**
Time (ms)	1400	1675	1950	2275	2650	3050
Delay #	**28**	**29**	**30**			
Time (ms)	3450	3900	4350			

Table 1: MS delay # and nominal firing times.
* Not all length/delay combinations are available.
* Extended, half delay range available in some lengths.

Recommendations For Use

At temperatures below 40ºC, *Exel™* MS Detonators must be fired within two weeks after loading into bulk explosives. Sleep time capability may be reduced above 40ºC. *Exel™* signal tube is extremely robust, however if it is cut or split, moisture may enter the hollow core and cause a misfire. *Exel™* MS Detonators should always be secured inside a suitable primer, which fully encloses the detonator. Exposed detonators should not be placed inside blastholes or

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charging hoses. *Exel™* MS Detonators used inside blastholes should normally be "reverse-primed", with the detonator base pointing towards the hole collar. 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™ MS Detonators can be reliably initiated by *Exel™ Connectadet™* detonators (Figure 1) and *Exel™* Trunkline Delays. An *Exel™* MS blast can be reliably started by *Exel™* Lead-In-Lines or #8 Strength Electric Detonators.

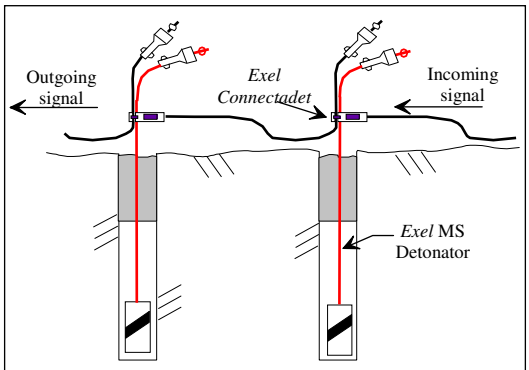

Figure 1

Exel™ MS Detonators can 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™ MS 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 0.22m. For short lead lengths, less than 9m, the tubing is simply coiled. The *tangle-free F80* and *F100* winding configurations are used for tube lengths in the 9 to 24m range.

Lead Length (m)	Units per Case	Nominal Gross Weight (kg)*	Format
3.6	210	10	F100
6.1	150	9	F100
7.3	125	8	F100
9	80	7.5	F100
12	80	8.0	F100
15	50	7.0	F80
18	40	6.5	F80
24	35	7.0	F80

** Gross weight varies according to the delay element.*

Storage And Handling

Exel™ MS 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™* MS Detonators should be used within 12 months of opening the sealed "barrier bag". Batches of detonators more than 4 years old should not be used.

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