

SHOCK TUBE DETONATORS

NON-ELECTRIC DETONATORS

All commercial detonators require an initiating spark which may be produced by one of the following:

- a) Flame from core in burning safety fuse:
Plain detonator.
- b) Fusion of bridge wire by an electric current:
Electric detonator.
- c) Flame from initiation of reactive powder in a tube:
Shock tube detonator.

NONEL NEPD

This is a shock tube detonator system manufactured by Dyno Nobel, Sweden which contains no primary explosive in its composition thus making it safer in use.

There are three Nonel detonator types:

1. Nonel MS
2. Nonel LP
3. Nonel Unidet

1. *Nonel MS

This is a short delay detonator system of 25ms increments from period No. 3 (75ms) to period No. 20 (500ms). The detonator tubes are connected using either a Snapline connector or low energy detonating cord. (3.6-5.0g/m).

* Special order

2. Nonel LP

This is a long period delay for use in underground applications. It is available in delay periods from no. 0 to no. 60 with time delay of 25 to 6000 ms nominal time with 6m the length. Tubes are connected using either Bunch connectors or low energy detonating cord (3.6-5.6 g/m)

3. Nonel Unidet

This is a detonator system designed for surface applications. The principle is that the same delay period is used for every hole with the timing between holes being affected by surface delays incorporated into connector units. For double-decked holes a common delay period is used for the bottom deck with another common delay for the top deck. Unidets are available in the following delays:

Nominal time* (ms)

U 450	450
U 475	475
U 500	500

* Nominal times with 6m length tubes.



SURFACE DELAY

SNAPLINE CONNECTOR UNITS

Delay Time* (ms)	Colour
0	Green
17	Yellow
25	Red
42	White
67	Blue

*Nominal time with 3.6m length tubes.

Snapline Connector units contain a detonator with a reduced base charge as well as a small primary explosive charge.

NONEL ACCESSORIES

1. Bunch Connectors

The Bunch Connector is used in tunnel blasting and is designed to initiate a maximum of 20 Nonel tubes at the same time. It consists of a snapline 0 connector block coupled to a loop of low energy detonating cord.

2. Snapline Starter

This is a Snapline 0 connector with a long tube for connecting the blast round to the firing apparatus.

Tube lengths

50.0m	2 per bag	10 per box
100.0m	1 per bag	5 per box

See over for safety data ►

The information and recommendations are given without warranty, expressed or implied, statutory or otherwise, and no liability shall be accepted for the consequence of any reliance placed thereon. Recipients should make their own tests to determine the suitability of products for their particular purposes.

NOTE: If in any doubt concerning the correct use of the above products contact Irish Industrial Explosives Ltd.

IMPORTANT: If considering destruction of surplus products in the field please refer to *Recommended methods for the destruction of Explosives and Accessories.*



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Safety data for:

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For further information on these or other **Irish Industrial Explosives Ltd.** products please contact us at one of the addresses below.



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1. CHEMICAL COMPOSITION

The explosive elements of a detonator consist of lead azide and pentaerythryl tetranitrate (PETN). The delay elements consist of various chemicals, mainly lead oxide, silicon, antimony, and potassium permanganate.

2. HAZARDS IDENTIFICATION

Detonators are classed Division 1.1 i.e. substances which have a mass explosion risk. Some detonators have been designed in such a way that they may be classed as U.N. Division 1.4 i.e. they will not set off adjacent detonators.

Hazards	Risk
1. Explosion	Serious
2. Lifting	Medium
3. Splinters from accidental detonation	Serious

Precautions

- Personnel handling detonators must be trained in their use.
- Personnel should be trained in lifting and handling.

3. FIRST AID MEASURES

A single detonator exploding accidentally will cause serious injury as it will produce metal splinters. Treat as any traumatic injury. Get urgent medical assistance.

4. FIRE FIGHTING MEASURES

In the event of fire there is a risk of explosion. Any fire involving detonators must NOT be fought. An area of at least 300 metres around the fire should be evacuated, and the site of the fire must not be approached until it is absolutely certain that the fire is out.

5. ACCIDENTAL RELEASE MEASURES

Damaged detonators should be disposed of by being put into a drill hole and detonated.

6. HANDLING AND STORAGE

Detonators must be handled with care and not subjected to naked flame, high temperatures, friction or shock. Tubing should never be put under excessive tensile strain. Smoking while handling detonators is strictly forbidden. Storage of Nonel detonators is permitted only by the Government Inspector of Explosives who will lay down the conditions of storage.

7. EXPOSURE CONTROL AND PERSONAL PROTECTION

When handled properly detonators do not present any serious hazard to personnel.

8. PHYSICAL AND CHEMICAL PROPERTIES

Description: Detonator of aluminium with non-electric wire of the low energy type (plastic tubing covered with a reactive substance).

Solidifying/melting point (°C)

Plastic of the tube	120°C
PETN in the cap	141°C

Ignition temperature 202°C.

Each detonator has approximately one gramme of explosive and varying amounts of delay compound. (For further details see over).

9. STABILITY AND REACTIVITY

Stability

It is recommended that Nonel detonators are stored at a maximum temperature not exceeding 50°C. Dangerous combustion products:

- Nitrous gasses (NOx)
- Carbon monoxide and
- 0.03g Pb.

On detonation metallic splinters are created.

10. TOXICOLOGICAL INFORMATION

There is no toxic hazard from intact detonators. However should the ingredients become exposed there will be a toxic hazard from lead azide and lead fumes.

11. ECOLOGICAL INFORMATION

When burned these explosives will detonate and give off some nitrous and lead fumes.

12. DISPOSAL CONSIDERATIONS

See *Accidental release measures* above.

13. TRANSPORT INFORMATION

Explosives may only be transported as laid down in the relevant legislation viz.

- S.I. No. 38 of 1995
- S.I. No. 151 of 1960
- S.I. No. 309 of 1973
- S.I. No. 317 of 1981
- S.I. No. 275 of 1986 and
- any legislation that may be enacted.
- U.N. No. 0360, 0361, 0500, Packaging Group II
- ADR/RID 1.1.B, 1.4.B, 1.4.S
- Substance No. 1, 35, 47, 1-01
- IMDG Class. As above. Page 126
- EmS No. See ADR

Description of Goods

Detonator assemblies, non-electric, for blasting.

14. REGULATORY INFORMATION

Customers wishing to purchase explosives must comply with S.I. 115 of 1995, European Community (Placing on the Market and Supervision of Explosives for Civilian use) Regulation 1995.

15. OTHER INFORMATION

The following is an extract under the above heading from the Safety Data Sheet of the manufacturer of the product, Dyno Nobel:

"Nonel detonators are made without a primary explosive which make them safer to manufacture and handle. Sensitivity to impact and friction is significantly less than in caps made with the more sensitive primary explosives. Nonel blasting caps do not contain any carcinogenic components or raw materials and the amount of lead is very low. By using new substances which are not classified as hazardous to the environment we have greatly reduced the amount of dangerous residues produced when the blasting caps are detonated. It is our aim to develop products which are as environmentally friendly as possible. Lead, for example, has to a great extent been replaced by non-classified substances. The detonation of a single blasting cap produces one litre of gas which must be regarded as minimal in this context in comparison with the amount of gas produced by the blast".

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I.S. EN ISO 9002