

0007/061538 Product
Safety Data Sheet

1. Product Identification

Product Identification: Clayton Certainty Fog Signal - Single – Lead Clip
Common Name : Railway Fog Signal Detonator
Proper Shipping Name : SIGNALS, RAILWAY TRACK, EXPLOSIVE

Use of product: Audible Railway Track Warning Device

Document Date 25/09/2013

2. Composition & Information on Ingredients

Hazardous Component – Potassium Nitrate 5.6 grammes

Risk Phrases

R2	Risk of explosion by shock, friction, fire or other source of ignition
R5	Heating may cause explosion

Safety Phrases

S1/2	Keep locked up and out of reach of children.
S3	Keep in a cool place.
S4	Keep away from living quarters.
S7/8	Keep container tightly closed and dry.
S13	Keep away from food, drink and animal feeding stuffs.
S15	Keep away from heat.
S16	Keep away from sources of ignition – NO SMOKING.
S18	Handle and open container with care.
S20	When using do not eat, drink or smoke.
S22	Do not breathe dust.
S25	Avoid contact with eyes.
S33	Take precautionary measures against static discharges.
S35	This product and its container must be disposed of in a safe way.

Composition/ Information on Device

A railway fog signal is a small metal device containing a limited quantity of explosive. In use, the device is placed on the running surface of a rail such that any rail-mounted vehicle passing over it would cause it to explode, and in so doing, alert the driver of the vehicle to a hazard on the line ahead. A common use for railway fog signals is to protect possessions.

Size	51mm diameter by 9mm deep
Case	The outer case of each signal is comprised of two parts, a base plate and an upper flat-topped dome, both are made from cold reduced tinplate of thickness 0.43mm and joined at the rim.
Construction	The rim joint is comprised of a single fold, made by bending the edge of the upper part of the case underneath the base plate and sealed to prevent entry of moisture.
Percussion	Each signal contains five percussion caps fitted on an anvil made of tinned malleable iron, sufficiently soft not to indent the rail. The anvil assembly is held securely in a central position on the base plate by a perforated tinplate disc
Explosive	Each signal contains 8 grammes weigh of gunpowder.
Binding Strip	Signals shall have a lead strip, average length 178mm by 6.4mm wide and 0.8mm thick firmly soldered to the base plate.
Marking	The word SINGLE and figures to show the month and year of manufacture shall be stamped on the dome plate of each signal and painted with a protective coating of paint. The Signals have a maximum service life of 5 years (60 months) from the date of manufacture after which they should be disposed of in line with section 13.



3. Hazard Identification

No signal under any condition of explosion, properly placed, shall eject fragments of metal in quantity or size likely to cause injury to personnel.

The signal is designed to be used as a stand alone device and should not be modified or used with any adaptor or alternative Binding Strip.

UN NUMBER UN 0493

CLASSIFICATION

The detonators are classified as 1.4G.

The explanation for this classification is as follows:

- 1.4 Substances and articles which present no significant hazard.
- G A substance which is an explosive substance because it is designed to produce an effect by heat, light, sound, gas or smoke or a combination of these as a result of not-detonative self-sustaining exothermic chemical reactions or an article containing such a substance or an article containing both a substance which is explosive because it is capable by chemical reaction in itself of producing gas at such a temperature and pressure and at such a speed as could cause damage to surroundings and an illuminating, incendiary, lachrymatory or smoke-producing substance (other than a water-activated article or one containing white phosphorus, phosphide or a flammable liquid or gel)

4. First Aid Measures

In the event of close proximity to the activation of a device, check the integrity of ear drums and hearing (Audiogram by an ENT Specialist)

If combustion products are inhaled, remove victim to fresh air. If Symptoms (nausea) persist consult doctor.

5. Fire Fighting Measures

Extinguishing Media : If product is on fire, all personnel should retire to a safe location some distance away (100m) from the fire.

Individual signals will trigger if involved in a fire however do not present a mass explosion risk.

Large quantities of water may be used for cooling purposes if product is at risk of fire / heat.

1 x 2kg dry powder extinguisher must be on vehicle regardless of load quantity. Additional will be required if load exceeds 333kg.

Exposure Hazards

Resulting Gases

Oxides of Nitrogen (NOX), Carbon Monoxide (CO), Sulphur Dioxide (SO₂), Hydrogen Sulphide (H₂S)

Combustion Products

As above plus Nitrogen (N₂), Water Vapour (H₂O), Carbon Dioxide (CO₂)

6. Accidental Release Measures

All objects and material must be collected to be evacuated and destroyed.

Avoid Shocks , rough handling, friction, sparks & fire

Keep away from any source of heat, do not approach with a naked flame.

In the event of damage or rupture to the packaging of the signals, they should be transferred into suitable approved packaging.

7. Handling & Storage

Precautions for :-

Safe Handling

Avoid flame, spark, shock & Impact
Protect from fire
Open and Handle containers with care
The Lead binding strip has a finite number operations and care should be taken when bending or repacking not to create a stress fracture

Storage

A number of common principles should be applied to the safe storage of explosives no matter the quantity:

- a) protect explosives from sources of ignition
- b) prevent fire and explosion spreading
- c) avoid unsuitable storage conditions
- d) ensure both accurate control and record keeping arrangements.

Details of these principles can be found in the Approved Code of Practice and Guidance to MSER (HSE L139).

The safety principles that should be followed when storing explosives:

- a) keep explosives within their transport packaging wherever possible
- b) separate 'normal' product explosives from those which have suffered deterioration or are waste explosives
- c) explosives should be stored well away from other dangerous goods (eg flammable materials, gas cylinders and pesticides).

A suitable place of storage whether in a container, store or cupboard should where appropriate:

- a) be suitably weatherproof
- b) prevent explosives from coming into contact with any incompatible substances
- c) be protected by a lightning conductor
- d) be used only to store explosives or connected implements
- e) be kept clean with steps taken to prevent grit entering unpackaged explosives.

Quantity Limits

The MSER govern the storage of railway fog signals. These regulations set thresholds relating to the storage conditions and the need to license or register the storage premises, according to the 'net mass' of explosives stored

'Net mass' refers to the actual weight of explosive substances in the article rather than the whole weight of the article (explosives and casing). Each railway fog signal contains on average 8g of gunpowder.

If no more than 5kg net mass of HT4 explosive is stored, there is no need to register the premises under the MSER. 5kg is equal to approximately 600 railway fog signals.

An unlimited amount of HT4 explosive can also be stored for up to 24 hours without the need to license or register the premises. This allows a large consignment of railway fog signals to be delivered to one location and then split up and distributed to other locations.

If 5kg to 250kg 'net mass' of HT4 explosive (over 600 to 30,000 railway fog signals) is stored then the premises have to be registered by the local licensing authority (this is usually the local council, county council, London Borough or City of London). If more than 250kg 'net mass' of railway fog signals is stored then the premises must be licensed.

MSER refer to 'each place of keeping' and not each individual company. Therefore an individual company may keep up to 5kg net mass of railway fog signals at 'each place of keeping' (these must have different addresses) without the need to license the premises. Where more than one individual company occupies a premise, they should co-operate with each other to ensure that no more than 5kg net mass of railway fog signals are kept on the premises.

8. Exposure Controls & Personal Protection

When used in line with Rail Safety & Standard Board , Guidance on railway fog signals no special Personal Protective Equipment is required.

The detonators are secured to the rail track by a lead strip, lead in sheet or extruded form does not in itself present a health hazard however normal washing precautions should be performed after handling.

9. Physical and Chemical Properties

Outer Shell	Tin Plated Steel		30 grammes
Anvil	Malleable Iron		6 grammes
Binding Strip	Lead		10 grammes
Blackpowder	Potassium Nitrate	75%	5.6 grammes
	Sulphur	15%	1.4 grammes
	Charcoal	10%	0.8 grammes
Percussion Caps			0.8 grammes

10. Stability & Reactivity Data

Conditions to Avoid	
Temperature	High
Pressure	Not Applicable
Light	Store out of Direct Sunlight when not in use
Impact	Yes
Friction	Yes
Ignition	Yes

Materials to avoid :-

Water	No
Air	No
Acids	Yes
Bases / Alkalis	Yes
Oxidisers	Yes

Decomposition	
Stabilisers Required	No
Exotherm Possible	Yes
Physical Appearance Change	Yes, Separates into component assemblies
Contact with Water	Cooling affect
Degradation to unsatable	No

11. Toxicological Data

Dangerous to Health

Sulphur and charcoal present in these formulations are not considered to be toxic by ingestion, the toxicity of potassium nitrate is 3750 mg/kg, Acute oral toxicity of sulphur LD50 oral rat is more than 500mg.kg. The fumes developed as a result of operation can cause strong irritation of the eyes and respiratory system resulting in possible pulmonary oedema.

A Lead strip is used for the binding strip, in normal use this does not present a significant exposure to lead or significant risk to health providing basic cleanliness good practice is followed.

The main exposure risk from the lead strip is ingestion which can be avoided by after contact always washing hands prior to eating or drinking.

Please refer to the HSE guidance note INDG305 Working Safely with Lead.

12. Ecological Data

Sulphur and charcoal are regarded in an eco-toxicological sense to be chemically inert. Only potassium nitrate is classified as being environmentally relevant. Information on the biodegradability or the bioaccumulation of potassium nitrate is unavailable at present.

Potassium Nitrate	Aquatic Toxicity	LC50 1650 mg/24h (Daphnia) EC50 200/1000 mg/l (Plankton)
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Lead is toxic to birds and animals if ingested, ensure any lead debris disposed of or recycled in a responsible manner.

13. Disposal Considerations

Waste and / or contaminated signals must be disposed of only by authorised personnel by incineration on an approved burning or blasting ground in accordance with local and/or national regulations concerning hazardous waste.

Please contact either the distributor or manufacturer for further information.

14. Transport Information

Proper Shipping Name	SIGNALS, RAILWAY TRACK, EXPLOSIVE
UN Number:	0493.
IMDG Code/Class:	1.4G
IMDG Code Page No:	See Current Edition.
ICAO/IATA (Air) Class:	1.4G
Packing Group: -	
RID/ADR Class:	1.4G

In addition, attention should be paid to additional information as set out in the Carriage of Dangerous Goods by Road and Rail (Classification, Packaging and Labelling) Regulations 1994, or in international agreements on the transport and packaging of dangerous goods.

Transport Category	2	Load threshold 333kg (explosive content) before ALL packaged goods transport rules apply
Small Packages	LQ0 E0	
Packaging	<i>Small package rules never apply</i> P135 applies (column 8 – ADR 2011) <i>Approved combination packaging to be used at all times when being transported 'commercially' (ie: not for own use during normal work)</i>	
Special provisions for road carriage when load above 333kg if EU journey.	Packages	V2 EXII/EXIII vehicles
	Loading/Unloading	CV1, CV2, CV3 No loading in public area, clean vehicles, no naked flames, and limits to be carried.
	Operation	S1 Special driver training

AIR (IATA)	Additional rules applying to air transport	
Aircraft type	UN0493 cannot be transported in passenger planes, they must go in cargo planes.	
Load Limits	Cannot be transported as limited quantities (LQ) or excepted packages (E0) so must always be packaged in approved combination packaging as for road. The packaging must meet the requirements for a Packing Group (PG) 2 load (X or Y on code)	
Packing Instruction	135	
Maximum Load	75kg net	

SEA (IMDG)	Additional rules applying to sea transport		
Stowage rules	Category 06	Cargo ships (up to 12 passengers) Passenger ship	On deck in closed cargo transport units or under deck. On deck in closed cargo transport units, or under deck in closed cargo transport units. Maximum NET mass on passenger ships is 10kg (7.1.7.5.2)
Segregation	There are additional segregation rules if other classes of dangerous goods are to be carried. IMDG to be consulted.		

These are intended as a guide only, dependent on the type of journey ADR, IATA, IMDG should be consulted to clarify exact rules.

Packaging

All Clayton Certainty Signals are shipped in certified packaging compliant with VCA packaging certificate 5985 & Packing Instructions P135, and contain a maximum of 100 Signals.

Packaging Dimensions : 274mm length x 116mm width x 160mm high
Material : Solid Board Cartons
Gross Pack Weight : Maximum 6kg
Stacking Height: Max 8 box's stacked upright.

15. Regulatory Information

Because railway fog signals are explosives they are classified for transport under the Classification and Labelling of Explosives Regulations 1983 and for storage under the Manufacture and Storage of Explosives Regulations 2005. For transport railway fog signals are classified as UN Division 1.4 and for storage they are classified as Hazard Type (HT) 4.

The main legislation covering the transport, storage and use of railway fog signals is as follows:

- a) Classification and Labelling of Explosives Regulations 1983 (CLER)
- b) The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (CDG)
- c) Manufacture and Storage of Explosives Regulations 2005 (MSER).

CDG is revised and reissued every two years (2007, 2009, 2011 etc.) to align with the RID Regulations that are also revised and re-issued to the same timescale. Where references are made to CDG they refer to the version in force. Stakeholders should ensure that they are referring to the most up to date version of those Regulations.

16. Other Information