Clayton Penistone
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Product Safety Data Sheet
Clayton Certainty Signals

1. Product & Company 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
Manufacturer's name:	Clayton & Co (Penistone) Ltd Westhorpe Works Halifax Road Penistone, Sheffield S36 7EY
Contact:	T: 01226 763130 E: mail@clayton-penistone.co.uk
CE Registration Number	**1008-P2-69261096**
Category	**P2**
Generic Type	Sound Emitter
NEQ	8g per device

CE
2806

The UK Government has extended indefinitely the recognition of CE Marking for pyrotechnics products, therefore UKCA marking is no longer required for new supplies of this product.

Document Date 15/03/2024

2. Hazard Identification

EXPLOSIVE

It is prohibited for anyone under the age of 18 to acquire, possess, or use Clayton Certainty Signals.

Hazardous Component	Potassium Nitrate 5.6 g
Type of Effect	Pyrotechnic
Ignition Method	Impact
Effect Time	<1s
Sound Pressure	120db@8m
Ejection Safe Distance	8m
Thermal Hazard Boundary	1m

Hazard Statement	H204	Fire / Projection Hazard
Precaution Statement	P102	Keep Out of Reach of Children
	P201	Obtain special instructions before use
	P202	Do not handle until all safety precautions have been read and understood
	P210	Keep away from Heat/Sparks/Open Flames/Hot Surfaces/No Smoking
	P250	Do not subject to Grinding / Shock / Friction
	P261	Avoid breathing dust/fume/gas/mist/vapours/spray
	P264	Wash hands thoroughly after handling
	P270	Do not eat, drink or smoke when using this product
	P280	Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/.
	P370	In case of Fire
	P372	Explosion Risk
	P373	Do Not Fight fire when fire reaches explosives
	P380	Evacuate Area
	P405	Store Locked up
	P411	Store at temperatures not exceeding 35°C/ 95° F

3. 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 track possessions.

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 standalone 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)

Description

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 8g of gunpowder.
Binding Strip	Signals shall have a lead strip, average length 178mm by 6.4mm wide and 0.8m 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
Service Life	The Signals have a maximum service life of **5 years (60 months) from the date of manufacture** providing they are stored correctly, after which they must be removed from service. After the Signals first use, a condition check should be undertaken before each and every subsequent use. Any signals showing signs of damage, corrosion or heavy wear and tare should be removed from service and sent for disposal Signals which have been removed from service should be disposed of in line with section 13.

4. First Aid Measures

In the event of being in 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.

If any byproduct of lead is ingested or inhaled seek medical advice.

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 they 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.

During transport 1 x 2kg dry powder extinguisher must be present on the vehicle regardless of load quantity. Additional fire precautions will be required if load exceeds 333kg.

Exposure Hazards
Resulting Gases
Oxides of Nitrogen (NOX), Carbon Monoxide (CO), Sulphur Dioxide (SO_2), Hydrogen Sulphide (H_2S)

Combustion Products
As above plus Nitrogen (N_2), Water Vapour (H_2o), Carbon Dioxide (CO_2)

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

a) Avoid flame, spark, shock & Impact
b) Protect from fire
c) Open and Handle containers with care
d) 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

The following common principles should be applied to the safe storage of explosives no matter the quantity:

a) Protect explosives from fire and local heat sources
b) Store well away from other dangerous goods (eg flammable materials, gas cylinders and pesticides).
c) Ensure Dry Storage Conditions,
d) Normal Storage Temperature Range -20°C to +25°C, Short term can be up to +35°C
e) Humidity is recommended to be below 50% RH
f) Ensure both accurate control and record keeping arrangements.
g) Operate a First in First out stock control
h) Separate out of date or damaged fog signals from operational stock.

Details of these principles can be found in the Approved Code of Practice and Guidance to for the Explosive Regulations 2014, (HSE ACOP L150 & L151).

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

a) Be suitably dry & 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) Have a maximum storage temperature of 35 Deg C

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 good hygiene practice should be followed and hands washed after handling.

If stored incorrectly in a damp atmosphere the lead strip will form a lead based compounds which presents as a white power, this should not be ingested or inhaled.

9. Physical and Chemical Properties

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

10. Stability & Reactivity Data

Conditions to Avoid

Temperature	>35 Deg C
Pressure	Not Applicable
Light	Store out of Direct Sunlight when not in use
Impact	Yes
Friction	Yes
Ignition	Yes
Damp & or Humid Storage	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 unstable	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 following good hygiene practices and 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)

Lead is toxic to birds and animals if ingested, ensure any lead debris disposed of or recycled in a responsible manner.

13. Disposal Considerations

Under the waste directive all explosives are classified as exempt under article 2 providing they are packed in the manufacturer certified UN packaging, managed and transported in line with the requirements of the explosive regulations 2014.

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
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 and Use of Transportable Pressure Receptacles Regulations (CDG), International Carriage of Dangerous Goods by Rail (RID), European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) and packaging of dangerous goods.

Transport Category	**2** Load threshold 333kg (explosive content) before ALL packaged goods transport rules apply		
Small Packages	**LQ0** **E0** *Small package rules never apply*		
Packaging	**P135 applies (column 8 – ADR 2017)** *Approved combination packaging to be used at all times when being transported 'commercially' (ie: not for own use during normal work)*		
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)	On deck in closed cargo transport units or under deck.
		Passenger ship	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.

Distribution Transport Packaging
All Clayton Certainty Signals are shipped in certified packaging compliant with the appropriate VCA packaging certificate and Packing Instruction P135.

Certificate 6326 - contains a maximum of 20 Signals.
Packaging Dimensions : 109mm x 59mm x 148mm
Material : Solid Board Cartons
Gross Pack Weight : Maximum 2kg
Max NEQ : 0.160kg
Stacking Height: Max 8 box's stacked upright

End User Transportation
Within RID 1.1.3.1 (c) & ADR 1.1.3.1 (c) there is an exemption which when complied with permits a vehicle to carry Railway Fog Signal Detonators in NR Approved Detonator Containers, providing they are only for the use of those personnel travelling in the vehicle. In this case the NR Approved Detonator Containers should be securely stored to prevent them rolling around, or in designated storage case restrained in the vehicle. Personnel should also be aware of the relevant RSSB or other relevant national body guidance on

This packaging exemption does not apply where a vehicle is carrying detonators for others not in the vehicle to use, as this is classed as distribution, and the UN Approved packaging is required.

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 Explosives Regulations 2014. 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) Explosives Regulations 2014 (MSER).
b) Classification and Labelling of Explosives Regulations 1983 (CLER)
c) The Carriage of Dangerous Goods and Use of Transportable Pressure Receptacles Regulations (CDG)
d) International Carriage of Dangerous Goods by Rail (RID),
e) European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)

Where references are made to CDG they refer to the current version in force. Stakeholders should ensure that they are referring to the most up to date version of those Regulations.

16. Other Information

None