



Material Safety Data Sheet

for

AutoStem Cartridges

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

1.1. Identification of the substance or preparation

The **AutoStem Cartridge** is a cartridge with lengths varying and external diameter of approximately 32mm, containing an igniter and a granular mix designed to deflagrate on initiation. The cartridge cannot detonate under any circumstances.

1.2. Use of the substance/preparation

The Cartridge is used to break rock and concrete in the construction/demolition and related industries. The innovative design of the granular mix and cartridge results in a rapidly developing pressure wave throughout the rock or concrete structure. The pressure developed causes mechanical stress into either the rock or reinforced concrete carrying to tensile fracturing.

1.3. Company/undertaking identification

PROPRIETOR: Non-Detonating Solutions (Pty) Limited
Tel No. : +27 82 978 8548
Contact person: Jonathan Cohen

1.4. Emergency telephone

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2. COMPOSITION/INFORMATION ON INGREDIENTS

2.1 Composition

Each Cartridge can contain a granular mix of between 20g and 100g. All the ingredients, mixed together, are held inside the cartridge case. Each Cartridge is equipped with an igniter. No other means of initiation is allowed.

3. HAZARDS IDENTIFICATION

The Cartridges are classified as following:
UN NO. : 0323 Cartridges, Power Device
CLASS: 1.4S

Subsidiary Risk: None
Poisons Schedule Number: None



Modifying a Cartridge or tampering with its contents can result in serious injuries to the user.

Although the Cartridges, due to their dimensions, are not suitable to be ingested, ingestion or handling of propellant powder, accidentally released, may be hazardous.

Periodic inhalation of normal combustion products presents no hazard to the user. Repeated inhalation of significantly large quantities of ignition gases may become hazardous.

Permanent damage to hearing may result from frequent exposure to impact noise without wearing suitable hearing protection.

4. FIRST AID MEASURES

If a headache develops as a result of inhalation of combustion products, proceed to an area of fresh air. Ensure that the work area has been sufficiently ventilated, before resuming work.

5. FIRE-FIGHTING MEASURES

Douse fire with water, dry powder, carbon dioxide or foam.

Exposure to flame will destroy packaging and may result in the ignition of Cartridges.

A fire involving the Cartridges presents no mass explosion risk. An risk exists only when they are tightly confined in a closed vessel or similar container. A pressure build-up may cause a scattering of the confined material.

Typical mass decomposition products include carbon monoxide, carbon dioxide, nitrogen and water vapour.

Carbon and Nitrogen oxides as well as other noxious gases could be present in hazardous quantities, when Cartridges are burnt in mass. Self Contained Breathing Apparatus (SCBA) use is advised when large quantities of Cartridges are burning.

6. ACCIDENTAL RELEASE MEASURES

The special design of the Cartridge makes spillage of propellant very unlikely. However, should this occur, the recovered propellant would have to be sent to a suitably qualified and equipped authority for disposal. Cartridges should be similarly disposed of. These may also be returned to the Manufacturer in their original packaging for disposal.

7. HANDLING AND STORAGE

7.1. Handling

Cartridges should only be transported in the specified packaging in which they are supplied.



Cartridges should not be tampered with in any way. Modifying a Cartridge or tampering its contents can result in injuries to the user.

Cartridges that have been damaged should not be used. Instead, they should be disposed of as outlined above.

Cartridges are not sensitive to reasonable levels of impact, friction, heat or any electrostatic sources.

As a general guideline, apply all safety practices that are applicable to handling of explosives.

7.2. Storage

Cartridges should be stored in a dry place with temperature preferably between 5°C and 35°C (ideally 20°C) and Relative Humidity less than 50%.

Cartridges should not be exposed to water or very high humidity for long periods of time, since the ingress of moisture can adversely affect functioning of the Cartridges.

Cartridges should not be exposed to direct sunlight or any other source of radiant heat, since their internal temperature may rise to levels that would adversely affect the shelf life of the product. In very extreme circumstances, the temperature may rise sufficiently to cause either auto-ignition of the propellant contained in a cartridge.

7.3. Specific use(s)

Cartridges should be used under the direct supervision of trained personnel only, strictly adhering to the instructions contained in the Operating Manual.

No impact force should be used to insert a Cartridge into the borehole, since this may cause the auto ignition of the Cartridge and result in injuries to the user. Rather remove the Cartridge from the drilled hole and clear it of any obstruction, before trying again.

Special precautions are required when using the Cartridges in the vicinity of HV (high voltage) power lines or buried cables as well as RF (radio frequencies) sources because they may cause unintentional initiation of the igniter by induced currents.

Respect the safety distance, when you initiate the Cartridges.

Do not use a too small burden or a very shallow hole when breaking rock, since this could give rise to high speed fly-rock and result in serious injuries. A burden of approximately 800 mm is recommended, a hole depth of 65-70% of the depth of the structure is recommended.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Exposure limit values

No OEL prescribed. Refer to specific OEL's for combustion by-products.

8.2. Exposure controls

8.2.1. Occupational exposure controls.

- 8.2.1.1. Respiratory protection: Periodic inhalation of normal firing products presents no hazard to the user. Do not use the Cartridges in confined spaces. Ensure good ventilation during use.
- 8.2.1.2. Hand protection: Working gloves with proper sensitivity should be worn during handling of Cartridges.
- 8.2.1.3. Eye protection: Safety glasses and/or a face shield should be used during firings.
- 8.2.1.4. Skin protection: Use standard protection equipment.
- 8.2.1.5. Head protection: Use a protective hat during firing.
- 8.2.1.6. Hearing protection: Hearing protection, which provides at least 50db(A) attenuation, should be worn or use should be made of the percussion valve type earmuff. Permanent damage to hearing may result from frequent exposure to impact noise without wearing suitable hearing protection.

8.2.2. Environmental exposure controls.

All fired Cartridge residual parts should be disposed properly, according to the environmental law in force.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1. General information (referred to propellant mix)

Appearance: *ball powder*
Odour: *none*

9.2. Important health, safety and environmental information (referred to the propellant powder)

pH:	<i>not applicable</i>
Boiling point/Boiling range:	<i>not applicable</i>
Flash point:	<i>> 150°C</i>
Flammability (solid, gas):	<i>flammable solid</i>
Explosive properties:	<i>propellant</i>
Oxidising properties:	<i>oxidant when exposed to moisture</i>
Vapour pressure:	<i>negligible at ambient temperature</i>
Bulk density:	<i>1.0 g/cm³</i>
Solubility:	
- water solubility:	<i>partially soluble</i>
-	<i>fat solubility (solvent - oil to be specified):</i>
	<i>partially soluble in organic solvents</i>
- partition coefficient: n-octanol/water:	<i>not determined</i>
Viscosity:	<i>not applicable</i>
Vapour density:	<i>not applicable</i>
Evaporation rate:	<i>negligible</i>

9.3. Other information

Auto-Ignition temperature: *> 165°C*

10. STABILITY AND REACTIVITY

10.1. *Conditions to avoid*

Excessive heating (above ambient temperature), moisture and shocks to the extent possible, should be avoided.

10.2. *Materials to avoid*

Do not use any Cartridges in an environment containing flammable gases or dusts and/or in immediate contact with combustible materials.

10.3. *Hazardous decomposition products*

Cartridges present no relevant decomposition product at normal storage conditions.

11. TOXICOLOGICAL INFORMATION

A headache could develop as a result of inhalation of combustion products. In this case proceed to an area of fresh air. Ensure that the work area has been sufficiently ventilated, before resuming work.

Ensure that people who have inhaled large quantities of ignition gases are put under medical observation for at least 24 hours (primarily as a precaution against the toxic effects of nitrogen oxides).

12. ECOLOGICAL INFORMATION

12.1. *Ecotoxicity*

No data available.

12.2. *Mobility*

Not applicable.

12.3. *Persistence and degradability*

The cartridge case is not biodegradable. Double base powder is suitable to slow degradation in relevant environmental media, either through biodegradation or other processes such as oxidation or hydrolysis. Ammonium nitrate becomes deliquescent in the presence of moisture.

12.4. *Bioaccumulative potential*

No data available.

12.5. *Other adverse effects*

No data available.

13. DISPOSAL CONSIDERATIONS

Cartridge disposal:	Cartridges should be sent to a suitably qualified and equipped authority for disposal. These may also be returned back to the Manufacturer in the original packaging. A clear indication "Material for Disposal" must be provided.
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Propellant disposal: the propellant recovered from accidental release should be sent to a suitably qualified and equipped authority for disposal.

Always refer to any relevant community provisions relating to waste. In their absence, national or regional provisions in force should be adhered.

14. TRANSPORT INFORMATION

UN Number: 0323 Cartridges, Power Device
Class: 1.4s



Symbol:
Packaging Code Designation: 4G Fibreboard Boxes
Packing Group: II Medium danger hazardous materials
Gross Mass: Not exceeding 25 kilograms
Shipping name: AutoStem Cartridges

Packing: Outer - A brown fibreboard box 500mm x 300mm x 300mm - Virgin Craft - RSC Grade: 225v/125/230r/125/225v: DBW 3 V/V
Inner - 2 x polywoven carry bag containing equal quantities of rock breaking cartridges
2 x 300mm x 300mm x 2 mm hardboard (Masonite) squares at the top-and-end of the box serving as inner sleeves. The box clearly displays the words "AutoStem Cartridges".

Packaging referenced above has passed the Performance Oriented Packaging Standards outlined in the UN Recommendations on the Transport of Dangerous Goods. This package is also certified under IMDG, ICAO and IATA Regulations. It is responsibility of the end user to determine authorization for use under these regulations.

15. OTHER INFORMATION

Sources of key data used to compile this data sheet are:

- UN Publication: Recommendations on the Transport of Dangerous Goods;
- South African Bureau of Standards Code of Practice for the Identification and Classification of Dangerous Substances and Goods, SABS 0228;
- Occupational Health & Safety Act No. 85 of 1993 and its amendment dated 2005;
- COMMISSION DIRECTIVE 91/155/EEC of 5 March 1991, amended by Commission Directive 93/112/EC of 10 December 1993 and Commission Directive 2001/58/EC of 27 July 2001.

Disclaimer:

Although the information contained in this safety data sheet has been compiled from sources believed to be reliable based upon our best knowledge, no warranty, guaranty or representation is made as to the accuracy or completeness of the information contained herein and no responsibility or liability is assumed regarding the suitability of this information for the user's intended purpose or the consequences of its use.



The end user, below its own responsibility, should strictly adhere to laws and regulations in force in its country.