NONEX™ SAFETY CARTRIDGES

Section 1 – PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

NONEX™ SAFETY CARTRIDGES

PRODUCT USE

Rock / Concrete Breaking and excavation

PRODUCT APPEARANCE

- Plastic tube of various lengths (25mm – 460mm)
- External diameter of 12mm, 13mm, 28mm, 34mm or 60mm
- Each Cartridge contains between 2g to 500g of a 50/50 nitrocellulose and ammonium nitrate mixture
- Example of identification of a specific cartridge: 10034
  100 indicates 100g mixture weight and
  34 indicates the external diameter of cartridge

SUPPLIER

Company: NXCO Mining Technologies (PTY) Ltd.

Physical Address: Building P5200
Gate 1
Necsa Industrial Park
Pelindaba
North West Province
South Africa

Postal Address: PO Box 529
Broederstroom
0240
South Africa

Telephone: +27 12 305 5237
Fax: +27 12 305 5247

Emergency Tel: +27 83 279 8695

Section 2 – HAZARDS IDENTIFICATION

GHS Classification

Explosive
UN0432 Articles Pyrotechnic, for Technical Purposes
UN 0323 Cartridge Power Device

EXPLOSIVES

EMERGENCY OVERVIEW

HAZARD

Determined by NXCO Mining Technologies (PTY) Ltd.
H204
Fire or Projection Hazard

Continued …

PRECAUTIONARY STATEMENTS

Prevention

Do not expose to open flames
Keep in a cool, dry area
Store in original packaging

Response

If Swallowed: No Risk – Humans unable to swallow cartridge
If Exposed to open fire: Use water to control fire
Call emergency number: +27 83 279 8695

Storage

Store Nonex Cartridges in original packaging
No smoking, naked flames, heat or ignition source within 10 m of storage location
Store Nonex Cartridges in well ventilated secure store
Store in cool, dry place
Do not store with acids, alkaline, oxidizing agents or reducing agents

Section 3 – COMPOSITION / INFORMATION ON INGREDIENTS

Chemical specification of ammonium nitrate
Chemical specification of nitrocellulose propellant

Table 1. Chemical Specification of Ammonium Nitrate

Item		Quantity
Ammonium Nitrate	$NHNO_3$	99,5%
pH	-	4.5 – 6.0
Moisture	H_2O	0,1% max
Chloride	Cl	50 ppm max
Copper	Cu	10 ppm max
Iron	Fe	50 ppm max
Loose bulk density	-	0.7 – 0.76 kg/l
C Absorption	-	7.5% min
Particle size	> 2.8 mm	3 % max
Distribution	< 1.0 mm	1 % max
Total organic material	C	0.2 %
UN Hazard classification	United Nations 1942 Oxidising Substance Class 5.1	

Continued …

Table 2. Chemical Specification of Nitrocellulose Propellant

	Characteristics	**Specification Limits**		**Method**	**Classification of defects**
1	**Chemical properties**			**SLM 210**	**Minor**
1.1	Nitrocellulose (Spec No. 06-7600-2020-075)	Remainder %			Minor
1.4	Dibuthylphthalate (Spec No. 06-7600-2010-027)	3 to 6 %		**	Major
1.5	Diphenylamine (Spec No. 06-7600-2010-023)	0.8 % min, 1.4 % max		**	Minor
1.6	Calcium Carbonate (Spec No. 06-7600-2010-004)	0.5 % max		**	Minor
1.7	Potassium Nitrate (Spec No. 06-7600-2010-022)	0.4 to 1.0 %			Minor
1.8	Sodium Sulphate (Spec No. 06-7600-2010-075)	0.5 % max			Minor
1.9	Stannic Oxide (Addition optional) (Spec No. 06-7600-2010-077)	0.2 % max			Minor
1.10	Graphite (Spec No. 06-7600-2010-084)	0.1 to 0.4 %			Major
1.11	Water and volatile matter (2h at 100 °C)	0.75 to 1.25 %			Major
1.12	Dust and foreign matter	0.10 % max			Major
2	**Methyl Violet stability at 120 ºC**				**Major**
2.1	Complete discolouration to salmon pink	Not within 45 min			
2.2	Emission of brown fumes	Not within 60 min			
2.3	Explosion	Not within 5 h			
3	**Dimension of granules**	**Rolled**	**Unrolled**		**Minor**
3.1	Smaller than 850 µm	97 % min	97 % min		
3.2	Between 850 and 400 µm	90 % min			
3.3	Smaller than 400 µm	7 % max			
3.4	Smaller than 355 µm	3 % max			
3.5	Between 850 and 355 µm		90 % max		
3.6	Smaller than 355 µm		7 % max		
3.7	Smaller than 212 µm		3 % max		
3.8	Voids and fissures	5 % max			Information only
4	**Bulk Density**	**Reference to approximately 3 %**			**Minor**
4.1	Approximate range	800 to 1000 g/dm^3		SPM 5.1	Minor

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Section 4 – FIRST AID MEASURES

HEALTH EFFECTS - **CARTRIDGE STRUCTURE <u>COMPROMISED</u>**

SWALLOWED

- DO NOT induce vomiting.
- Give water (or milk to rinse out mouth), then provide liquid slowly and as much as the casualty can comfortably drink. DO NOT give liquid to a person showing the signs of being sleepy or becoming unconscious.
- Transport to hospital or doctor without delay'.

EYE

- If the propellant comes into contact with the eyes:
- Immediately hold the eyes open and wash continuously for at least 15 minutes with fresh running water. Ensure irrigation under the eyelids by occasionally lifting the upper and lower lids.
- Transport to hospital or doctor without delay.
- Skilled personnel should only undertake removal of contact lenses after an eye injury.

SKIN

If propellant comes into contact with the skin:

- Immediately remove all contaminated clothing, including footwear (after rinsing with water)
- Wash affected area thoroughly with water (and soap if available).
- Seek medical attention in the event of irritation.

INHALED

If fumes or combustion products are inhaled:

- Remove to fresh air.
- Lay patient down. Keep warm and rested.
- If breathing is shallow or has stopped, ensure clear airway and apply resuscitation.
- Transport to hospital or doctor.

ADVICE TO DOCTORS

Treat symptomatically and as for exposure to nitro compounds.
Delayed Pulmonary Edema may result following exposure to nitrous oxides formed on thermal decompositions.

Section 5 – FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Use & apply water

FIRE I EXPLOSION HAZARD

In the event of a fire, clear area of personnel and move upwind. Propellants contained within the NoneX cartridge are extremely sensitive to heat and will burn with rapidly increasing intensity of fire.
Heating of cartridges may cause expansion or decomposition of the propellant leading to violent rupture of the cartridge housing. Heat affected cartridges remain hazardous.
Use only water to fight a nitrocellulose fire.
Combustion *I* Decomposition produces toxic fumes of oxides and nitrogen (NO), carbon monoxide (CO) and carbon dioxide ($C0_2$) if burned unconfined.

Continued …

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Use only water to fight a nitrocellulose fire.

Combustion / Decomposition produces toxic fumes of oxides and nitrogen (NO_x), carbon monoxide (CO) and carbon dioxide ($C0_2$) if burned unconfined.

Section 6 – ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

In the event that propellant or black powder from a NoneX cartridge should be spilt the following action should be taken:

- Clear up all spills immediately.
- Avoid breathing the powder / vapor and contact with the skin and eyes.
- Wear impervious gloves and safety glasses.
- Remove all ignition sources.
- Use spark free tools when handling propellant.
- Sweep into non-sparking containers or barrels and place under water.
- Place spilled material in a clean container for disposal. Mark the container properly.
- Flush the area with large amounts of water.

CONTACT POINTS

EMERGENCY CONTACTS

Police/Fire Brigade	Dial 10111 (South Africa) Notify Police and Fire Brigade as to location, material, quantity, UN Number and Company contact.

NXCO Mining Technologies

Factory Telephone No.:	+27 12 305 5237
Emergency Telephone No.:	+27 83 279 8695

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Section 7 – HANDLING & STORAGE

STORAGE REQUIREMENTS

- Store NoneX cartridge in original containers.
- Keep containers securely sealed until ready for use.
- No smoking, naked flames, heat or ignition source within 10 meters of storage location.
- Store NoneX cartridge in a well ventilated, secure store.
- Store in a cool dry place, do not store at temperatures above 32 ^{0}C (90 ^{0}F).
- Store in an area away from other materials.
- Protect NoneX cartridge Packaging against physical damage.
- Regularly check storage container and packaging.

STORAGE INCOMPATIBILITY

- Avoid storage with acids, alkalis and oxidizing / reducing agents.

Section 8 – PERSONAL PROTECTION

EYE

No special equipment required due to the physical packaging of the product

- Safety Glasses

HANDS / FEET

No special equipment required due to the physical form of the product

- Safety footwear or safety gumboots, e.g. Rubber

OTHER

- Overalls
- P.V.C apron
- Barrier cream
- Skin cleansing cream
- Eye wash unit

RESPIRATOR

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important. Recommended filter: A1 – organic gasses and vapors with boiling point of 765°C.

Section 9 – PHYSICAL & CHEMICAL PROPERTIES

APPEARANCE

Plastic tube of various lengths 75 to 460 mm and external diameter 12, 13, 28, 34 and 60 mm.

Each Cartridge contains between 2 to 500 grams of a 50/50 nitrocellulose propellant and ammonium nitrate mixture. (10034 = 100 gram mixture and 34 mm diameter)

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Section 9 – PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Boiling Point (^{0}C):	Not Applicable
Melting Point (^{0}C):	Not Applicable
Vapor Pressure (kPa):	Negligible
Freezing Point (^{0}C):	Not Applicable
Specific Gravity of Propellant:	Approx-0.9
Flash Point:	Not Applicable
Lower Explosive Limit.	Not Applicable
Upper Explosive Limit:	Not Applicable
Solubility in Water ('Propellant,):	Immiscible

Section 10 – CHEMICAL STABILITY & REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

Product is considered stable
Do not expose to any form of open flames

Section 11 – TOXILOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE

SWALLOWED

Not normally a hazard due to physical size of product.
The material has NOT been classified as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. Present definitions of harmful or toxic substances are generally based n doses producing mortality (death) rather than those producing morbidity (disease, ill-health).

EYE

Not normally a hazard due to physical form of product.
There is some evidence to suggest that this material can cause eye irritation and damage in some persons.
Eyes exposed to ammonium nitrate particulates, may be liable to irritation and burning. These can remain in the eye causing inflammation lasting weeks, and can cause permanent dark dotty discoloration.

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Section 11 – TOGILOGICAL INFORMATION

SKIN
Not normally a hazard due to physical form of product.
The material is not thought to produce adverse health effects or skin irritation following contact. Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.

INHALED
Inhalation of vapors or aerosols (mists, fumes), generated by the material during the course of normal use, may be damaging to the health of the individual. Coughing, irritation of the upper airways and eye burning may occur.

CHRONIC HEALTH EFFECTS
Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.

TOXICITY AND IRRITATION
Not available. Refer to individual constituents.

Section 12 – ECOLOGICAL INFORMATION

- Units / cartridges are water resistant
- If the cartridges have any indication of growth outside of the cartridge, it must be removed and discarded by means of the disposal method as indicated in section 13: Disposal considerations.

Section 13 – DISPOSAL CONSCIDERATIONS

- Recycle wherever possible or consult manufacturer for recycling options.
- Damaged cartridges to be disposed by means of burning. Consult the manufacturer for disposal instructions of the cartridges.
- The packaging to be treated as explosive contaminated items. Consult the manufacturer for disposal instructions or contact the local authorities in charge of explosives.

Section 14 – TRANSPORTATION INFORMATION

Dangerous Goods Class:	1.4 S	
UN Number:	0432:	Articles Pyrotechnic for Technical Purposes
	0323:	Cartridge Power Device to be transported according to the local regulations for Dangerous Goods

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Section 15 – REGULATORY INFORMATION

REGULATIONS

- Nonex Cartridges are classified as explosives, by means of the United Nations classifications.
- Nonex cartridges are classified as UN Class 1.4 S for transportation of Dangerous Goods.
- Nonex Cartridges proper shipping name / description:
  0432: Articles Pyrotechnic for Technical Purposes
  0323: Cartridge Power Device to be transported according to the local regulations for Dangerous Goods
- All regulations in accordance with the United Nations Standards for Transportation of Dangerous Goods.

Section 16 – OTHER INFORMATION

SDS PREPARED IN ACCORDANCE WITH:

- United Nations Regulations for Transportation of Dangerous Goods.
- IATA Dangerous Goods Regulations
- South African National Standards: SANS 10232.1 Transportation of Dangerous Goods
- South African Explosive Act of 1956
- South African Health and Safety Act of 1993
- Conditions for the Acquisition, Transportation, Storage and use of Rock Breaking Cartridges (RBS) Version 1: 28/1/1: 24 October 2002

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