

ARC INNOVATIONS

The logo for ARC INNOVATIONS is centered in the upper half of the page. The letters 'ARC' are in a large, bold, sans-serif font, while 'INNOVATIONS' is in a smaller, all-caps, sans-serif font. A bright yellow swoosh underline is positioned below the text.

ECOMINE SYSTEM

Ec0mine System

Ec0mine is a polymer enriched liner support system used in block cave mining as a method to enhance safety and productivity.

Ec0-Support is a shotcrete that can be used to inhibit the movement of rock by assisting in the prevention of fall of ground incidents.

Ec0-Support has an inherent energy absorption capability and is used mainly for the secondary support of underground shafts and rock faces.

Further benefits are:

- Ec0mine is water based and is supplied as a blend of powder chemicals and graded sand with fibre in 30kg bags (Ec0support) and a liquid component of blended polymer (Ec0poly) in a 5L container
- The entire contents of the kit are simply mixed together, to form a thixotropic paste that is sprayed onto the prepared rock face.
- This product can achieve the equivalent energy absorption to a standard Shotcrete of double its thickness, i.e. a standard 50mm Shotcrete will have the same energy absorption as a 25mm thick layer of Ec0mine. Due to the reduction of thickness, a reduction of approximately 50% in material handling via cage time and other underground logistics can be realised.

Ec0mine System

Ec0support packed in 30kg bags and Ec0polymer packaged in 5 litre containers are transported underground via cage

Ec0mine can achieve the equivalent energy absorption to a standard Shotcrete of double its thickness, i.e. a standard 50mm Shotcrete will have the same energy absorption as a 25mm thick layer of Ec0mine.



MIXING AREA



Due to the reduction of thickness, a reduction of approximately 50% in material handling via cage time and other underground logistics can be realised.

UNDERGROUND MINING AREA



Ec0mine forms a thixotropic paste that is sprayed onto the prepared rock face.

Ec0support

Ec0-Support is a factory blended material designed to be a secondary support for rockfaces and primary support on embankments that resists up to 300J of energy and gains strength when placed.

Ec0-Support is a shotcrete that can be used to inhibit the movement of rock by assisting in the prevention of fall of ground incidents.

Ec0-Support has an inherent energy absorption capability and is used mainly for the secondary support of underground shafts and rock faces.

Further benefits are:

- Ability to set and strengthen in low waterflow.
- Good early strengths when combined with conventional shotcrete accelerators based on Aluminium Sulphate.
- No shrinkage when used in its designed application.
- Low rebound

Ec0-Support has a low rebound when compared to conventional Shotcrete materials. Ec0-Support is not suitable for use where water is acidic, or the pressure of freeflowing water across the rock face is greater than 1 bar. An air pressure of 3 –5 bar pressure should be used to apply shotcrete. Ec0support is packaged in 30kg polypropylene bags stitched with polyester seams. Ec0support will store for up to 6 months when stored in correct conditions.



EcOPoly

Description

EcOPoly is a liquid blended polymer material designed to increase bond, tensile, and flexural strengths for the EcOShotcrete system.

The **EcOShotcrete** system is used as secondary support on rock faces and primary support on embankments that resists from 200J to 1100J of energy and gains strength when placed.

Typical Uses

EcOPoly is a polymer material which has an inherent energy absorption capability and can increase the tensile, bond and flexural strengths of cementitious shotcrete systems. It is used mainly for these condary support of underground shafts and rock faces.

- Ability to set and strengthen in low water flow.
- Reduce transport costs by up to 50%.
- Reduce material handling by up to 50%
- Reduce maintenance costs of equipment by up to 50%
- Reduce shaft time costs of equipment by up to 50%
- Increase production m² with the same labour force.
- Low rebound, (<5%), when applied with an air pressure exceeding 2.5 bar.
- Zero rebound when used in conjunction with the EcOshotcrete system.

Special Features

EcOPoly increases early bond, tensile and flexural strengths in comparison to standard 40MPa shotcrete which increases the safety of mining personnel.

Limitations

EcOPoly should not be used in an unventilated environment.

Physical Properties

pH	5.5 – 7.0
Specific Gravity	950 - 1050 kg/m ³
Colour	White
Energy Absorption (J)	200 - 1100

Please read MSDS in conjunction with the TDS.

Packaging

5, 25 or 1000 litre containers.

Storage

Keep in cool containers off the ground.

Shelf Life

6 months if correctly stored.

Technical Advice

The technical department is available to assist with advice on the correct application of the **EcOPoly**.

Ec0Support

Description

Ec0-Support is a factory blended material designed to be a secondary support for rock faces and primary support on embankments that resists up to 300J of energy and gains strength when placed.

Ec0-Support is a shotcrete that can be used to inhibit the movement of rock by assisting in the prevention of fall of ground incidents.

Typical Uses

Ec0-Support has an inherent energy absorption capability and is used mainly for the secondary support of underground shafts and rock faces. Further benefits are:

- Ability to set and strengthen in low waterflow.
- Good early strengths when combined with conventional shotcrete accelerators based on Aluminium Sulphate.
- No shrinkage when used in its designed application.
- Low rebound

Special Features

Ec0-Support has a low rebound when compared to conventional shotcrete materials.

Limitations

Ec0-Support is not suitable for use where water is acidic, or the pressure of free-flowing water across the rock face is greater than 1 bar.

An air pressure of 3 – 5 bar pressure should be used to apply shotcrete.

Physical Properties

pH	12.0	>10
Specific Gravity	2300kg/m	>2050
Colour	Grey	
Strength (MPa)	25 @ 7 days	>20
Strength (MPa)	40 @ 28 day	>35
Energy Absorption (J)	200 -300	>200
Washout in non-flowing wate		<3%

Please read MSDS in conjunction with the TDS.

Packaging

20, 25, or 30kgs Bags

Storage

Keep in cool containers off the ground.

Shelf Life

6months if correctly stored.

Technical Advice

The technical department is available to assist with advice on the correct application of the **Ec0-Support**.

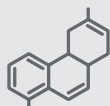


1. Company Details

Name : ARC Innovations (PTY)LTD

Address : 82 Bonnyvale road, Norton Home Estates Benoni, 1501

In case of an emergency contact either Cyril Attwell (078 456 3833)
or Hassim Osman (082 786 4003)



2. Composition

Product name : Ec0-Support

CAS no : 65997-16-2

E.C no : 266-045-5

E.C label : 1272/2008

EU no. : 67/548/EEC



3. Hazardous Identification

Ec0-Support poses little immediate risk. However, prolonged exposure to wet Ec0-Support can cause caustic burns or allergic reactions.

Inhalation : Ec0-Support contains small amounts of free crystalline silica. Prolonged exposure to respirable free crystalline silica can aggravate other lung conditions and cause silicosis, a disabling and potentially fatal lung disease and/or other diseases. Risk of injury or disease depends on duration and degree of exposure.

Skin : Discomfort or pain cannot be relied upon to alert a person to a hazardous skin exposure. Consequently, the only effective means of avoiding skin injury or illness involves minimizing skin contact, particularly contact with wet Ec0-Support. Exposed persons may not feel discomfort until hours after the exposure has ended and significant injury has occurred.

Exposure to dry Ec0-Support may cause drying of the skin with consequent mild irritation or more significant effects attributable to aggravation of other conditions. Dry Ec0-Support contacting wet skin or exposure to moist or wet Ec0-Support may cause more severe skin effects including thickening, cracking or fissuring of the skin. Prolonged exposure can cause severe skin damage in the form of (caustic) chemical burns.

Some individuals may exhibit an allergic response (e.g., allergic contact dermatitis) upon exposure to Ec0-Support. The response may appear in a variety of forms ranging from a mild rash to severe skin ulcers. Persons already sensitized may react to the first contact with the product. Other persons may experience this effect after years of contact with Ec0-Support products.

Eyes : Exposure to airborne dust may cause immediate or delayed irritation or inflammation.

Eye contact with larger amounts of dry powder or splashes of these wet materials may cause effects ranging from moderate eye irritation to chemical burns and blindness. Such exposures require immediate first aid (See section 4.) and medical attention to prevent significant damage to the eye.

Ingestion : Although small quantities of dust are not known to be harmful, ill effects are possible if larger quantities are consumed. Ec0-Support should not be eaten.

Carcinogenic potential : NTP, OSHA, or IARC has not listed Ec0-Support as a carcinogen. It may, however, contain trace amounts of substances listed as carcinogens by these organizations. Crystalline silica, which is present in Ec0-Support in small amounts, has been listed by IARC and NTP as a known human carcinogen (Group I) through inhalation.



4. First Aid Measures

First Aid	Inhaled Move to fresh air in discomfort
First Aid	Skin Wash off with water and pH-neutral soap or mild detergent. Remove clothing. Shower thoroughly.
First Aid Eyes	Flush eyes with water for at least 20 minutes Seek medical advice if symptoms persist Speed is essential
First Aid Ingested	Wash mouth with plenty of water. Do not induce vomiting Contact a medical practitioner



5. Fire Fighting Measures

Flash poin	None
Lower explosive limit	None
Upper explosive limit	None
Extinguishing media	Not combustible
Auto ignition	Not combustible
	No special fire-fighting procedures are required as Ec0-Support poses no fire-related hazard.



6. Accidental Release Measures

Collect dry material using a scoop. Avoid actions that cause dust to become airborne. Avoid inhalation of dust and contact with skin. Wear appropriate personal protective equipment as described in Section 8.

Scrape up wet material and place in an appropriate container. Allow the material to “dry” before disposal. Do not attempt to wash Ec0-Support down drains.

Dispose of waste material according to local, state, and federal regulations.



7. Handling and storage

Keep Ec0-Support dry until used. Normal temperatures and pressures do not affect the material. Promptly remove dusty clothing or clothing that is wet with Ec0-Support fluids, and launder before reuse. Wash thoroughly after exposure to dust, wet Ec0-Support mixtures or fluids.



8. Exposure Controls/Personal Protection

Inhalation : Wear dust mask (never inhale any dust or fumes from any chemical)

Skin : Prevention is essential to avoid potentially severe skin injury. Avoid contact with unhardened wet Ec0-Support products. If contact occurs, promptly wash affected area with soap and water. Where prolonged exposure to unhardened Ec0-Support products might occur, wear impervious clothing and gloves to prevent skin contact. Where required, wear sturdy boots that are impervious to water to eliminate foot and ankle exposure. Do not rely on barrier creams; barrier creams should not be used in place of impervious gloves and clothing. Periodically wash areas contacted by dry or wet Ec0-Support or concrete containing Ec0-Support with a pH-neutral soap. Wash again at the end of the work. If irritation occurs, immediately wash the affected area and seek treatment. If clothing becomes saturated with wet concrete containing Ec0-Support, it should be removed and replaced with clean, dry clothing.

Eyes : In conditions where user may be exposed to splashes or puffs of Ec0-Support wear safety glasses with side shields or goggles. In extremely or unpredictable environments, wear unvented or indirectly vented goggles to avoid eye irritation or injury. Contact lenses should not be worn when working with Ec0-Support.

Ingestion : Observe the rules of hygiene, wash hands before eating, drinking or smoking



9. Physical & Chemical Properties

Chemical class	Commercial
Description	White-gray sand-like powder
Odor	No distinct odor
pH (in water)	11 - 12.5
Solubility in water	Marginal (0.1 to 1.0%)
Flashpoint	Not Applicable
Melting Point	1300 to 1350°C
Specific Gravity	2.3 to 2.5



10. Stability and Reactivity

Stability	Stable
Incompatibility	Wet Ec0-Support is alkaline when wet, as such it is incompatible with acids and aluminium metal
Conditions to avoid	Unintentional contact with water or acids
Hazardous Decomposition	Will not occur spontaneously.
Hazardous polymerization	Will not occur



11. Toxicological Information:

The substance is not classified as dangerous in the sense of European Directive 67/548/EEC on Dangerous Substances and Regulation 1272/2008/EC on CLP.

Effects on human health

Slightly alkaline substance. Risk of irritant dust formation.

Skin contact: Acute effects: Risk of irritation in case of prolonged contact with the skin. Must wear clothes suitable for dealing with alkaline products. Must wear gloves suitable for dealing with alkaline products.

Eye contact: Acute effects: Risk of irritation and/or burns. Must wear safety goggles.

Swallowed: Risk of irritation, burning sensation, abdominal pain.

Inhalation: Acute effects: in case of dust inhalation, risk of irritation of respiratory tract, burning sensation, cough, sore throat, breathlessness.

Aggravation of pre-existing illnesses due to exposure

Exposure to slag dust may aggravate the symptoms of pre-existing illnesses, such as respiratory pathologies, emphysema, asthma, eye pathologies and skin pathologies.



12. Ecological Information

The substance is not classified as dangerous in the sense of European Directive 67/548/EEC on Dangerous Substances and Regulation 1272/2008/EC on CLP.

No negative ecological effects are expected based on current knowledge.

Naturally and environmentally harmlessly, granulated blast furnace slag produces an inhibitory effect on germination in the areas where it is applied. This must be taken into account in areas where natural flora and fauna are protected.

Risk of environmental pH modification ($\text{pH} > 7$). When used in stagnant or slow flow water, it is recommended that water be oxygenated, and speed of work execution be adapted so that water pH does not adversely affect fauna and flora.



13. Disposal Considerations

Ec0-Support must always be reused except in case of mixing or contamination from other substances or mixtures preventing reuse.

If disposal is required when reuse is not possible, the substance must be disposed of according to the current laws. From a safety perspective, long periods of storage do not alter the product characteristics. Do not discharge into sewers or surface waters.

Hardened Ec0-Support is a non-hazardous waste according to Decision 118/2001/EC modifying Decision 253/2000/EC relating to the list of wastes.



14. Transport Information

Ec0-Support is not considered as hazardous according to the following transport regulations:

- ADR/RID/CDG Road / CDG Rail.
- Inland waterway transport (ADN/ADNR)
- Sea transport (IMO/ IMDG)
- Air transport (ICAO/IATA)

No special precautions are required except for those mentioned in section 8.



15. Regulatory Information:

E.C. no.	266-045-5
R36/38	Irritating to skin and eyes.
S24/25	Avoid contact with the skin and eyes
S29	Do not empty into drains
S57	Use appropriate containment to avoid environmental contamination



16. Other Information:

Reason for Alteration: New Issue.

Ec0-Support should only be used by knowledgeable persons. While the information provided in the material safety data sheet is believed to provide a useful summary of the hazards of Ec0-Support as it is commonly used, the sheet cannot anticipate and provide all the information that might be needed in every situation. Inexperienced product users should obtain proper training before using this product.

A key to using the product safely requires the user to recognize that Ec0-Support chemically reacts with water, and that some of the intermediate products of this reaction (that is, those present while a Ec0-Support product is "setting") pose a more severe hazard than does Ec0-Support itself. These hazards include potential injuries to eyes and skin.

The data furnished in this sheet do not address hazards that may be posed by other materials mixed with Ec0-Support to produce Ec0-Support products. Users should review other relevant material safety data sheets before working with this Ec0-Support or with Ec0-Support products, including, for example, concrete containing Ec0-Support.

SELLER MAKES NO WARRANTY, EXPRESSED OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THERE OF FOR ANY PURPOSE OR CONCERNING THE ACCURACY OF ANY INFORMATION PROVIDED BY ARC INNOVATIONS (PTY) LTD., EXCEPT THAT THE PRODUCT SHALL CONFORM TO CONTRACTED SPECIFICATIONS.



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