



# Company Overview

Safer... Faster... Stronger

**Aquacrete is one of Australia's leading specialist manufacturers and providers of ventilation control and geology consolidation solutions to the underground mining industry.**

**A wholly Australian-owned company, we manufacture and supply a range of products to more than 80% of Australia's underground coal mines and a growing base of underground gold, nickel, copper and lead mines throughout Australia. Aquacrete can attribute much of its success to a company-wide commitment to delivering products that increase mining productivity while improving underground safety.**

**This is reinforced by the continued demand for Aquacrete products by many of the world's largest resource companies**



# Safer...Faster...Stronger



## TURNKEY VENTILATION CONTROL MANAGEMENT

Our control of raw material supply, product manufacture and direct-to-site distribution enables us to provide customers throughout Australia with the assurance of a consistent quality product when and where it is needed.

With offices across Australia, Aquacrete provides a specialist team that offers product application training, ventilation control device (VCD) management support and installation auditing and testing for its customers.



This hands-on partnership approach to ventilation control management has resulted in Aquacrete becoming a supplier of choice for underground ventilation control.

## ENGINEERING CERTIFICATION

In co-operation with international engineering consulting firm, Parsons Brinckerhoff (PB), Aquacrete has developed a computational engineering model to determine the design of the VCDs that comply with the relevant regulations, standards and conditions.

With data obtained from live underground testing of Aquacrete VCDs, explosion dynamics and structural responses of full-size VCDs were analysed to establish precise ventilation device specifications.

The resultant model provides customers with the assurance of knowing that their VCDs comply with the most stringent industry regulations. Any factor of safety required by the mine can be entered into the computational engineering model. The Aquacrete engineering model enables customers to obtain engineering specifications regarding product selection, product thickness and required strength for each individual installation site.

If an installation conforms to the specifications, structural engineering certification can be obtained from PB, who will also provide a RPEQ number.



## TECHNOLOGY AND INNOVATION

To stay at the forefront of ventilation control development, we invest significantly in product innovation and technology advancement.

Given the difficulty in conducting field tests in operational environments, as well as the high variability of mine ventilation conditions and gas emission rates, we have developed a range of ongoing product testing procedures to provide customers with the assurance that Aquacrete products comply with the most stringent industry specifications.

In addition to live blast testing by an electronic monitoring instrumentation and consultancy service, Aquacrete products regularly undergo tests to determine product strength, overpressure ratings, fire resistance, diffusivity properties and water permeability ratings.

As a further means of ensuring that Aquacrete products consistently comply with the required standards, Aquacrete periodically co-ordinates live testing of product by simulating product application. Core samples are analysed by an independent NATA-accredited laboratory to obtain compliance verification with the following:

AS 1012.14: Method for securing and testing cores from hardened concrete for compressive strength

AS 1012.9: Determination of the compressive strength of concrete specimens

AS 1012.21: Determination of water absorption and apparent volume of permeable voids in hardened concrete

AS 1012.11: Determination of modulus of rupture of concrete specimens

ISRM PT.2: Direct shear, single stage on intact specimen

## ASSURED QUALITY MANAGEMENT

To ensure that Aquacrete products meet the company's stringent quality and engineering specifications, Aquacrete operates an integrated batch control system. During production, batches are sampled on an hourly basis and stored at an on-site laboratory. A comprehensive batch numbering system is linked to the sampling system and provides a tracking and production reference.



# Product Features

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## Safer

- Low toxicity
- Specialist training provided
- Fire resistant
- Anti-static
- Creates an explosion-rated gas and air barrier
- Cures to off-white colour

## Faster

- Aquacrete products can be shot blasted to any desired thickness in a single application
- Aquacrete products are rapid-setting and achieve the specified rating within 24 hours and a compressive strength of 14 MPa in as little as 48 hours and 25 MPa in 28 days
- With a bulk density of 1.2 - 1.4, Aquacrete products have a significantly lower bulk density when compared to shotcrete products, resulting in reduced transport costs and application time
- Aquacrete products do not slump

## Stronger

- Aquacrete VCDs comply to relevant regulations and standards when shot blasted to a minimum thickness using the Aquacrete VCD installation guidelines
- Product certification has been issued by an accredited National Association of Testing Authorities (NATA) laboratory for overpressure performance in a live underground blast test



# Product Range...

Aquacrete products have been developed to specifically address the varied and complex geology consolidation and ventilation control requirements of underground mines.

This table identifies Aquacrete products and their suitability for a range of applications.

APPLICATION	OPR2™	Wet-Repel™	Flexible Sail Stoppings	Hessian Mine Bricks
<b>Ventilation Seals &amp; Stoppings</b>				
Wet Conditions		✓		
Dry Conditions	✓		✓	✓
<b>Overcasts &amp; Overcast wings</b>				
Wet Conditions		✓		
Dry Conditions	✓			
<b>Rib consolidation</b>				
Wet Conditions		✓		
Dry Conditions	✓			
<b>Longwall rib consolidation</b>				
Wet Conditions		✓		
Dry Conditions	✓			
<b>Rib highlight</b>	✓			
<b>Cavity filling</b>				
Wet Conditions		✓		
Dry Conditions	✓			
<b>Ground stabilisation</b>				✓
<b>Roof &amp; fall consolidation</b>				
Wet Conditions		✓		
Dry Conditions	✓			
<b>Stopping &amp; seal repairs</b>				
Wet Conditions		✓		
Dry Conditions	✓			
<b>Bulkheads</b>		✓		
<b>Segregation stoppings</b>				
Wet Conditions		✓		
Dry Conditions	✓		✓	
<b>Roadway stabilisation</b>				✓
<b>Dam walls &amp; Water control</b>		✓		✓





# OPR2™

Safer... Faster... Stronger

Aquacrete OPR2™ is a rapid-setting, high performance, single component product that provides explosion-rated ventilation control and geology consolidation and sealing in underground mines. Achieving a high early strength, Aquacrete OPR2™ can be applied in a single application to any desired thickness without risk of slumping. As with all Aquacrete products, ease of application is a further benefit of OPR2™.



In addition to consistently exceeding industry overpressure performance standards - achieving up to 24 MPa in 28 days – Aquacrete OPR2™ can be engineered to site-specified overpressures in excess of 100psi. OPR2™'s performance has been verified by full-scale blast testing in an underground mine, the results of which are certified by independent engineering consultants.

Used in more than 80% of underground coal mines and an increasing number of metalliferous mines throughout Australia, Aquacrete OPR2™ consistently conforms to the most stringent industry standards for shot blasted ventilation control devices.



## PRODUCT APPLICATIONS

As a result of its superior performance, Aquacrete OPR2™ is specified for a wide range of applications.

These include:

- Rated ventilation stoppings
- Rated ventilation seals
- Overcasts and overcast wings
- Rib consolidation
- Rib highlight
- Cavity filling
- Roof and fall consolidation
- Stopping and seal repairs
- Segregation stoppings
- Artificial pillars



## PRODUCT FEATURES

### Safer

- Low toxicity
- Specialist training provided
- Fire resistant
- Anti-static
- Creates an explosion-rated gas and air barrier
- Cures to off-white colour

### Faster

- Aquacrete OPR2™ can be shot blasted to any desired thickness in a single application
- Aquacrete OPR2™ is rapid-setting and achieves the specified rating within 24 hours and a compressive strength of 15 MPa in as little as 48 hours and 24 MPa in 28 days
- Aquacrete OPR2™ does not slump
- Requires minimal site preparation work

### Stronger

- Aquacrete OPR2™ complies to relevant regulations and standards when shotblasted to a minimum thickness using the Aquacrete VCD installation guidelines
- Product certification has been issued by an accredited National Association of Testing Authorities (NATA) laboratory for overpressure performance in a live underground blast test
- Has a high bond strength to rock and coal

# OPR2™ Performance Data



## PERFORMANCE PROPERTIES

Compressive Strength		MPa
2 days		15
7 days		18
28 days		24
Shear Strength		kPa
n/a		851
Flexural Strength		MPa
2 days		2.6

*The performance test results are subject to variation depending on the care taken at the job site, the level of product application expertise, site conditions and any other conditions beyond Aquacrete's control.*

## TESTING & CERTIFICATION

To ensure that Aquacrete OPR2™ conforms to the most stringent industry standards, testing and certification is undertaken by laboratories approved by the National Association of Testing Authority (NATA). These include SGS Australia Pty Ltd. Relevant certificates are available from Aquacrete on request. For further technical information, please refer to the MSDS.

## STORAGE AND PACKAGING

Aquacrete OPR2™ is supplied in 20kg bags on 1.5 tonne pallets or 1 tonne bulk bags. Product referred in gross weight. Product should be stored undercover in dry conditions.





# Wet-Repel™

Safer... Faster... Stronger

Aquacrete Wet-Repel™ is a water-resistant, single component, high-strength product that provides ventilation control and geology consolidation in underground mines. Developed specifically for applications where conditions may result in erosion from water, Aquacrete Wet-Repel™ achieves a new benchmark in ventilation control performance.



In independent immersion testing, Aquacrete Wet-Repel™ typically absorbs less than 18% water whilst achieving a compressive strength of up to 25 MPa. Overseas research has shown that water absorption in concrete can vary from 15% to 25%. These figures indicate that with respect to water absorption, the performance of Wet-Repel™ is very similar to that of concrete.

As with all Aquacrete products, ease of application is a major benefit of Wet-Repel™. The product can be applied in a single application to any desired thickness and does not slump. It is not necessary to apply a thin spray-on liner prior to or after shot blasting with Wet-Repel™, and as a result of its rapid-setting properties, Wet-Repel™ achieves specified compressive strength in as little as 24 hours.



## PRODUCT APPLICATIONS

In addition to addressing more severe gas and water ingress concerns, Aquacrete Wet-Repel™ is increasingly specified by underground mines throughout Australia for a wide range of applications.

These include:

- Rated ventilation stoppings
- Rated ventilation seals
- Non-rated segregation stoppings
- Dam walls
- Bulkheads
- Overcasts and overcast wings
- Rib consolidation and longwall rib consolidation
- Stopping and seal repairs



## PRODUCT FEATURES

### Safer

- Low toxicity
- Fire resistant
- Anti-static
- Creates an explosion-rated ventilation control device
- Cures to off-white colour

### Faster

- Aquacrete Wet-Repel™ can be applied to any desired thickness in a single application
- Aquacrete Wet-Repel™ is rapid-setting and achieves the specified rating within 24 hours and a compressive strength of 17 MPa in as little as 48 hours and up to 25 MPa in 28 days
- Aquacrete Wet-Repel™ does not slump

### Stronger

- Aquacrete Wet-Repel™ complies to relevant regulations and standards when shot blasted to a minimum thickness using the Aquacrete VCD installation guidelines
- Product certification has been issued by an accredited National Association of Testing Authorities (NATA) laboratory for over-pressure performance in a live underground blast test

# Wet-Repel™ Performance Data



## PERFORMANCE PROPERTIES

Compressive Strength	MPa
2 days	17
7 days	17
28 days	25
Shear Strength	kPa
n/a	1.594
Flexural Strength	MPa
2 days	3.2

*The performance test results are subject to variation depending on the care taken at the job site, the level of product application expertise, site conditions and any other conditions beyond Aquacrete's control.*

## TESTING AND CERTIFICATION

To ensure that Aquacrete Wet-Repel™ conforms to the most stringent industry standards, testing and certification is undertaken by laboratories approved by the National Association of Testing Authority (NATA). These include SGS Australia Pty Ltd. Relevant certificates are available from Aquacrete on request. For further technical information, please refer to the MSDS.

## STORAGE AND PACKAGING

Aquacrete Wet-Repel™ is supplied in 20kg bags on 1.5 tonne pallets or 1 tonne bulk bags. Product referred in gross weight. Product should be stored undercover in dry conditions.





# Flexible Sail Stoppings

Safer... Faster... Stronger

Aquacrete Flexible Sail Stoppings provide a flexible fire resistant, anti-static barrier for a range of underground conditions. Specified to achieve a 2psi or 5psi overpressure rating, Flexible Sail Stoppings are designed to maintain ventilation control in adverse conditions as well as to offer a flexible solution to convergence.

Supplied as a complete kit or rated fabric only, Flexible Sail Stoppings can be sealed with Aquacrete shot blast products to enhance overpressure performance and can be fitted with a man door.

## PERFORMANCE PROPERTIES

Electrical Resistance	Results
Mean upper surface resistance	66.5 MΩ
Mean lower surface resistance	39 MΩ
<b>Fire Resistance:</b>	
<b>Spirit-Barthel Burner Test</b>	
Mean persistence time of flame	0 seconds
Mean persistence time of glow	0 seconds
<b>Fire Resistance:</b>	
<b>Spirit Lamp Test</b>	
Mean persistence time of flame	0 seconds
Mean persistence time of glow	0 seconds
<b>Air Permeability</b>	
Average air flow per unit are	Ls-1m-2 : 4.8
<b>Determination of Flammability by Oxygen Index</b>	
Oxygen index	43.6

## STORAGE AND PACKAGING

Product should be stored undercover in dry conditions.

## PRODUCT APPLICATIONS

Aquacrete Flexible Sail Stoppings are specified for the following applications.

- Rated ventilation stoppings
- Stoppings

## PRODUCT FEATURES

### Safer

- Low toxicity
- Fire resistant
- Anti-static
- Creates a FRAS-rated gas and air barrier
- Specifically suited for high convergence areas

### Faster

- Simple and fast to install
- Minimal material handling required
- Can be removed and re-used in similar sized cut throughs

### Stronger

- Specified for a 2psi or 5psi overpressure rating
- Can incorporate a man door
- Can be sealed with Aquacrete shotblast products for enhanced overpressure performance

## TESTING AND CERTIFICATION

To ensure that Aquacrete Flexible Sail Stoppings™ conform to the most stringent industry standards, independent testing has been undertaken and certification obtained to verify performance. Relevant certificates are available from Aquacrete on request.

# Flexible Sail Stoppings Component Overview

## Anchorage System

Aquacrete plastic strapping support is the recommended anchorage system to secure Aquacrete Flexible Sail Stoppings to the roadway aperture. Straps are supplied in various lengths and are installed end-to-end to cover the perimeter.



## ANCHORAGE SYSTEM PROPERTIES

### Plastic Strap Properties

<b>Profile width</b>	<b>200mm</b>
Circle diameter	12mm
Circle thickness	3mm
<b>Web thickness</b>	<b>4mm</b>
Moment inertia	241,462mm <sup>4</sup>
Section Modulus	7,629mm <sup>3</sup>
Polar moment inertia	7,218,015mm <sup>4</sup>
Volume	0.0013m <sup>3</sup> /m
Mass	1.27kg/m

### Resin Properties

Density	0.95g/cc
Tensile yield strength	26 MPa
Flexural modulus	1,206 MPa

### Central Point Load Capacity

Support Centres	mm	1,000	500
Loading	kg	100	200
Deflection	mm	66	18

## Screwbolts

The 120mm x 10mm screwbolts are threaded bolts that will cut through their own thread into hard rock and coal after drilling a 10mm hole to the required depth with a handheld air rotary drill. Screwbolts can be used in competent roof to eliminate the use of handheld roof bolts.

### Description:

Screwbolt ; 120mm x 10mm  
Embedment depth : 100mm  
Drill diameter : 10mm  
Safe working tensile load : 4.7Kn  
Safe working shear load 10.1Kn

**Note :** Screwbolts should only be used when the geology perimeter is of sound nature and not loose and crumbly. If the geology perimeter is loose and crumbly, roof bolts should be used.

## Allthread Rod

The M24mm Allthread Rod can be used in the ribs and floor after a 24mm hole has been drilled to the correct depth with a handheld rib boarer. The allthread rod is then anchored using chemical anchors.

### Description:

Allthread bolt : M24mm  
Embedment depth : Up to 3 metres  
Drill diameter : 24mm  
Safe working tensile load : 121.6Kn  
Safe working shear load : 67.2Kn

## Sealant

The outside perimeter of the Flexible Stopping can be sealed by spraying or hand scrimming with Aquacrete shot blast products.

## Doors

The Flexible Stopping can accommodate man doors.

- There are two options available:
- 1800mm x 900mm or 900mm x 900mm 2psi rated metal doors
  - 900mm x 900mm Velcro doors





# Hessian Shapeable Mine Bricks

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Aquacrete Hessian Shapeable Mine Bricks provide a time-efficient and cost-effective solution for wall and stabilisation construction. Used extensively in mining and civil applications throughout Australia and abroad for more than 15 years, Aquacrete Hessian Shapeable Mine Bricks require minimal site preparation and have excellent strength properties.

## PRODUCT APPLICATIONS

Aquacrete Hessian Shapeable Mine Bricks are specified for a range of applications.

Mining applications include:

- Ventilation walls
- Air regulators
- Bund walls
- Existing ventilation device repairs
- Road conditioning

Civil applications include:

- Culvert construction
- Retaining walls
- Geotechnical stabilisation
- Rockfall management
- Site dam walls
- Hazardous geology containment



## PERFORMANCE PROPERTIES

Compressive Strength	MPa
Maximum	10.7

*The performance test results are subject to variation depending on the care taken at the job site, the level of product application expertise, site conditions and any other conditions beyond Aquacrete's control.*

## PRODUCT FEATURES

### Safer

- Low toxicity
- Fire resistant
- Anti-static
- Creates a FRAS-rated gas and air barrier

### Faster

- Simple and fast to install
- No electricity or compressed air required
- Minimal site preparation required

### Stronger

- Achieves a compressive strength of 10.7 MPa

# Hessian Shapeable Mine Bricks Performance Data



## INSTRUCTIONS FOR USE

There is no need to prepare a level strip footing prior to construction.

### Step 1

Completely submerge Aquacrete bags upright in water with the top of the bag at least 100mm underwater. Rectangular shaped water tubs preferred.

### Step 2

Leave bags submerged until no air bubbles form for approximately 30 seconds. Do not leave submerged for more than a few minutes as Aquacrete will begin to set.

### Step 3

Lay bag in position in the same format as brick laying. Pat down until shaped to requirements, making sure to obtain maximum area contact.

### Step 4

Wait approximately 24 hours before use of site area.

## STORAGE AND PACKAGING

Store under cover in dry conditions.

Aquacrete Hessian Shapeable Mine Bricks are available in 1 tonne pallets of 10kg hessian bags (bag dimensions 400mm length x 260mm width x 80mm height). Product referred in gross weight.

## HEALTH AND SAFETY

Not classified as hazardous.

If in contact with eyes, rinse thoroughly with water.

For further information, please refer to the MSDS.

