



# Ventilation Control Devices

Product Data





## Ventilation Control Devices

Minova has manufactured a range of cementitious and chemical based products and systems used in the design and construction of underground mine ventilation structures and bulkheads for more than 20 years. In 1999 Minova Australia diversified into contract design and installation of Ventilation Control Devices (VCD's) and since that time has considerably expanded the range of products, devices and services available to the underground coal and metal mining industries globally.

Minova Australia boasts the largest range of live tested explosion rated VCD's available, with test work on numerous devices undertaken at world renowned facilities including Lake Lynn test mine in the United States and the Londonderry explosion test chamber in Australia. In addition Minova also has a large range of engineer rated devices designed specifically for underground coal mining and metal mining requirements.

Minova can provide VCD's certified by a registered professional Queensland engineer according to coal industry guidelines.

Minova's vast experience and capability in engineering, design, product manufacture, fabrication and contract installation of VCD's has enabled the successful development and implementation of many specific devices for individual customer requirements. Minova's extensive range of VCD's includes:

- Explosion resistant plug seals – 20 psi, 50 psi (Tekseal™, FB200)\*
- Explosion resistant concrete seals – 20 psi, 50 psi (Meshblock™, Sprayplast)\*
- Explosion resistant ventilation stoppings – 2 psi, 5 psi (Sprayplast™\*\*, Flexistop™\*, shotcrete)
- Explosion resistant fabricated man doors and vehicle doors\*\*\*
- Explosion resistant fabricated overcasts\*\*\*
- Water Bulkheads – 5,10,15 metre (Meshblock™, FB200)

- Steel fabricated vehicle access doors, air-locks, man doors and coffin seals – 5 psi
- Fabricated louvre regulators
- Blastflow™ fabricated louvre regulators
- QBC ventilation blinds
- Fleximesh stopping systems\*
- Plastic regulator drop boards
- Fan flaps

\* Live explosion tested at Lake Lynn  
 \*\* Live explosion tested at Londonderry  
 \*\*\* Engineer rated  
 # Live explosion tested at customer site



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## Plug Seals – Tekseal, FB200

Minova Plug Seals can be individually designed to suit the strata conditions and roadway dimensions of most underground mines, and have been installed throughout coal mines globally for more than 20 years. Plug seals are typically constructed using Minova's "High Volume Output Grouts" including Tekseal and FB200. Specifications for these grouts can be obtained from the relevant Minova product data sheet.

Explosion rated Tekseal plug seals have been extensively tested to withstand blast pressures of 20 psi and 50 psi at the Lake Lynn test mine in the United States.

Minova Australia can offer a full underground roadway evaluation, and the subsequent design and contract installation of explosion rated Plug Seals. Minova contract installed structures are fully rated and quality control tested to ensure construction is completed according to full design specifications.

## Concrete Seals – Meshblock

Minova Concrete Seals can be individually designed to suit the strata conditions and roadway dimensions of most underground mines, and have been installed throughout Australian coal mines for more than 15 years. Minova Concrete Seals are typically constructed using Minova's Meshblock system, reinforced by a series of steel rebars anchored into the surrounding strata. The Meshblocks are subsequently filled with a specifically designed concrete mix to form an effective explosion resistant coal mine ventilation seal, water and gas barrier.

Explosion rated Meshblock concrete seals have been extensively tested to withstand blast pressures of 20 psi and 50 psi at the Lake Lynn test mine in the United States.

Minova Australia can offer a full underground roadway evaluation, and the subsequent design and contract installation of explosion rated Concrete Meshblock Seals. Minova contract installed structures are fully rated, quality control tested and audited to ensure construction is completed according to design specifications.

## Ventilation Stoppings

Minova can provide a range of rated and non rated stoppings for any underground mine ventilation requirements. Devices available include Flexistop, rapidly installed flexible ventilation stoppings, and various sprayed structures using Minova's Sprayplast, Fastshot or Tekflex® products. Individual product specifications on these sprayed products can be obtained from the relevant Minova product data sheet.

Explosion rated Flexistop stoppings have been extensively tested to withstand blast pressures of 2psi and 5psi at the Lake Lynn test mine in the United States. Explosion rated Sprayplast structures have been extensively tested to withstand blast pressures of 2psi and 5psi at the Londonderry test chamber in Australia.

Minova Australia can offer a full underground roadway evaluation, and the subsequent design and contract installation of rated and non rated stoppings. Minova contract installed structures are fully rated and quality control tested to ensure construction is completed according to full design specifications. Rated man-doors designs can be provided to suit customer requirements.



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## Flexistop Advantages

- patented stopping system enables rapid installation with between 2 – 4 stoppings installed per shift
- overpressure designed and live tested to rating that is achieved immediately on completion of installation
- easily installed in high ventilation areas
- flexible structure and sealing system allows stopping to take significant convergence without affecting stopping integrity
- no dust or fumes generated during installation process
- superior cloth strength of over 100kn/m tensile strength ensures resilience to projectile damage
- significant reduction in underground transport requirements
- unique fixing system allows easy detachment for vehicle access if required
- optional integrated rated door design

Once the air pressure has dissipated the louvre blades adjust to their original setting

Blastflow has been **live tested** in a working underground metalliferous mine through a series of stope firings of increasing size cumulated in a 380kT blast. High speed cameras recorded the operation of the Blastflow modules during blasting. No damage was sustained to the regulator modules or components and settings were maintained. A double module installation can regulate up to 50 m<sup>3</sup> per second of air, and is suitable for most mine requirements. Minova can also provide the components to automate the Blastflow modules using actuators.



## Blastflow Advantages

- modules can be fabricated to suit any dimensions
- one person can adjust and set, simply set and leave
- eliminates the manual removal and replacement of boards
- does not need to be adjusted prior to stope firing
- **immediate control** of Primary Ventilation airflow after stope firing
- eliminates damage caused to Drop-Board Regulators
- can be easily lifted into place using an IT
- simple to use locking pins for installation into existing regulator frames
- can be automated and controlled by remote telemetric monitoring
- available in galvanised or 3 coat paint protection system

## Blastflow™ Regulators – Set and Forget

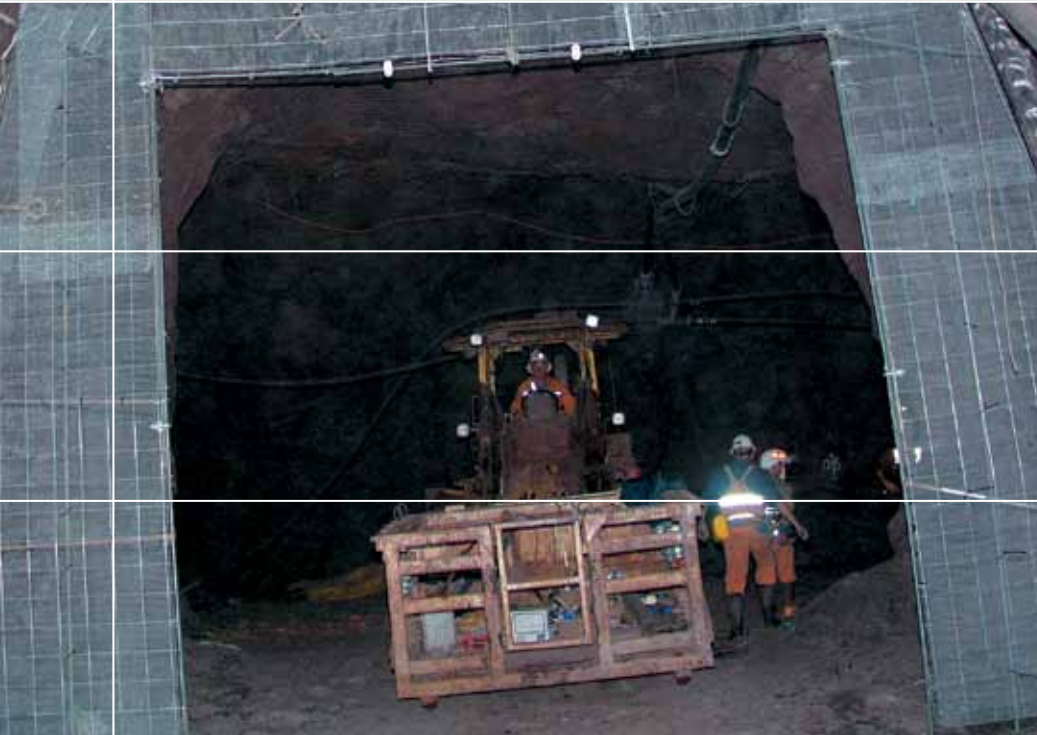
In 2005 Minova developed a revolutionary new automatic airflow regulator for metalliferous mines. Blastflow regulators have been designed to enable simple retrofitting to existing regulator sites by simply lifting and locking the modules into place. Regulator modules can be preset to any position from fully open to fully closed by one person using a wheel adjustment mechanism. The louvre blades will automatically open during stope firings releasing large volumes of air, with a constant force gas strut controlling the opening of the louvre blades.

## Ventilation on Demand (VOD)

Ventilation on Demand allows an underground mine's ventilation circuit to be electronically controlled, enabling instantaneous remote adjustments to maximize ventilation efficiency. VOD combines secondary fans with automated Blastflow regulators, allowing the mine to control where and when air is placed. In addition to airflow efficiency benefits there are considerable savings available through the reduced electricity required to power fans.

## Key Blastflow Design Features

standard module size	1,280 mm x 1,690 mm	1,280 mm x 2,720 mm
locking pins	8 per module	8 per module
module weight	280 kg's (280 kg's with door)	350 kg's (390 kg's with door)
louvre blades	4 per module (370 mm x 1,120 mm)	7 per module (370 mm x 1,120 mm)
opening mechanism	mechanical wheel	mechanical wheel
self closing	single gas strut	double gas strut



## Ventilation Control Devices

### QBC – Easy Access Ventilation Device

The Minova QBC is an easy to install ventilation blind that allows for the stopping of air flow to or from underground mining areas that may require complete access at a later stage. QBC's are used to control ventilation flow at stope accesses and draw points, ore passes, and for the general direction of ventilation throughout other mine areas. Devices are quickly opened and closed using a manual winch and pulley system, and can be clearly and individually numbered to assist with communication by mine personnel during travel throughout the mine ventilation circuit. Minova QBC's are designed for arduous conditions with high tear resistant FRAS cloth and fibreglass dowels that will bend and not permanently deform.

The Minova QBC is fully tested and designed, and is manufactured in Australia to suit specific mine ventilation pressures and requirements.

Minova QBC's are available in two standard sizes , 5.7m(w) x 5.3m(h) (Large) and 4.6m(w) x 5m(h) (Type 3) however other sizes maybe available upon request.

### Minova QBC Advantages

- easily installed using existing mine services
- can be opened and closed within seconds by one person to allow vehicle, truck or loader access
- can be designed to suit specific size opening and ventilation requirements
- durable and high tensile cloth eliminates wear and impact damage
- flexible support ribs eliminate damage from excessive pressures
- easily relocated for re-use if required
- can be numbered for location identification purposes



# Ventilation Control Devices

## Fleximesh Brattice Stoppings

Fleximesh is a lightweight mesh stopping used to replace the use of steel reinforcing mesh sheets for fast and low cost ventilation structures. Fleximesh is a high strength webbing (80 kN tensile capacity per m<sup>2</sup> of cloth) that is attached to the periphery of a mine opening using eye bolts and knocker line. Once in place light-weight vent bag fabric is attached to form a rapid and low cost ventilation barrier. Fleximesh is faster, considerably lighter and much safer to use than steel mesh, and due to its high strength can be reused repeatedly.

## Plastic Regulator Drop Boards

Minova can supply a range of plastic drop boards for use in typical underground mine regulators. The use of recycled plastic drop-boards is the same as for the timber they are intended to replace for controlling air quantities in an underground ventilation circuit. The standard board size is 1,400 mm long x 150 mm wide x 40 mm thick, however boards can be provided up to 1,800 mm long. Plastic drop boards are lightweight (typical 1,400 mm long board weight is 9.5 kg's), are easily removed and replaced, and do not swell or break as is often the case with timber boards. Plastic boards can be machined and formed using the same techniques that are used for timber. Minova plastic regulator drop boards are available in a range of colours including grey (standard), black, green and blue and can be incorporated as an addition to Blastflow regulator frames.

## Advantages

- Environmentally friendly, made from recycled, post-consumer waste plastic.
- Do not swell or splinter (no sharp edges)
- Light-weight and durable
- 40 year life possible

## Combustion Data

(Available on Request.)

## Health & Safety

Full-scale fire studies indicate that polyethylene when under combustion is less hazardous from the standpoint of toxicity than cellulosic material, i.e. burning wood. A joint study by the Dow Chemical Company and the Fire and Safety Research Institute in Chicago showed there is: "no substantial difference in toxicity between burning cellulosic materials and burning polyethylene materials". However, it would be expected that users of recycled-plastic materials will employ the same personal safety items that are used when working with timber.

When comparisons are made on a volume basis, the smoke from wood is the more toxic material. A study found that the main hazards in a large-scale fire situation involving polyethylene or wood are carbon monoxide and temperature.

## Material Specifications & Technical Data

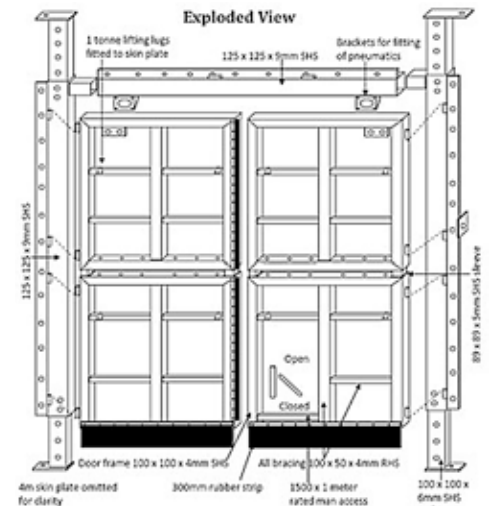
Test results for reinforced material used in plastic boards:

Test	Test Method	Result
Flexural Modulus (MPa)	ASTM D 790M	696
Compressive Strength (MPa)	ASTM D 695M	23.00
Tensile Strength (MPa)	ASTM D 638	9.95
Coefficient of Thermal Expansion (.C <sup>-1</sup> )	ASTM D 696	1.1 x 10 <sup>-4</sup>

## Steel Fabricated VCDs

Minova has provided the mining industry with steel fabricated VCDs for the last 15 years. Vehicle access doors can be designed for 4.5 x 4.5 metre openings and heavy duty for pneumatic or hydraulic control. Coffin seals, air-locks, conventional regulators, overcasts, fan flaps and man-doors can be designed to an over pressure rating. Fabrications can be designed and tailored to a mines specific needs.

## Heavy Duty Vehicle Access Door



## Additional Information

For additional information relating to Minova's Ventilation Control Devices contact your nearest Minova Australia office or representative. Complete contact details are available at: [www.minova.com.au](http://www.minova.com.au)

## Minova Australia

### Production / Operations Sites

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#### Nowra NSW

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#### Wyong NSW

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#### Arndell Park NSW

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#### Mackay QLD

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#### Welshpool WA

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### Sales Offices & Branches

#### Parkes NSW

#### Adelaide SA

#### Townsville QLD

## Minova Worldwide

### Australia

Group Headquarters

### Production Sites

#### Germany

Minova CarboTech GmbH  
Minova BWZ GmbH

#### India

Minova Minetek Pvt. Ltd.

#### Poland

Minova Ekochem S.A.  
Minova Arnall Sp. z o.o.  
Minova-Ksante Sp. z o.o.

#### Russia

ZAO Carbo-ZAKK  
OOO Minova TPS  
Branch OOO Minova (Ural)

#### South Africa

Minova RSA

#### Kazakhstan

TOO Minova Kasachstan

#### Ukraine

OOO Minova Ukraina  
AOZT Carbo i Crep

#### United Kingdom

Minova Weldgrip Ltd.

#### France

Branch Minova AG  
(Minova SA)

#### Australia

Minova Australia Pty Ltd.

#### Canada

Minova Canada Inc.

### Chile

Minova Mining Services SA

### People's Republic of China

Ruichy Minova Synthetic  
Material Co., Ltd.

### Taiwan R.O.C.

Minova Asia Pacific Ltd.

### USA

Minova USA Inc.

### Sales Offices & Branches

#### Austria

Minova GmbH

#### Czech Republic

Minova Bohemia s.r.o.

#### Italy

Minova CarboTech GmbH  
Branch Italy

#### Romania

Minova Romania S.R.L.

#### Russia

OOO Minova

#### Spain

Minova Codiv S.L.U.

#### Sweden

Minova Nordic AB

#### Switzerland

Minova AG

#### Turkey

Minova CarboTech GmbH  
Branch Turkey

#### United Kingdom

Minova Weldgrip Ltd.



The Ground Support Company



A member of the Orica Group