

DURUS[®] EasyShot

SAFE & EASY TO APPLY REINFORCEMENT
FOR DURABLE SPRAYED CONCRETE



For its ease of usage and performance benefits, macro-synthetic fibre reinforced shotcrete (MSFRS) is enjoying increasing popularity over steel reinforcement amongst tunnel and mine design engineers. The Australian underground mining industry even has adopted this technology as a standard reinforcing method. This has meant the end of the use of steel fibres in this sector. Durus EasyShot is the answer to the growing demand for high performance synthetic fibres specifically designed for tunnel and mine sprayed concrete.

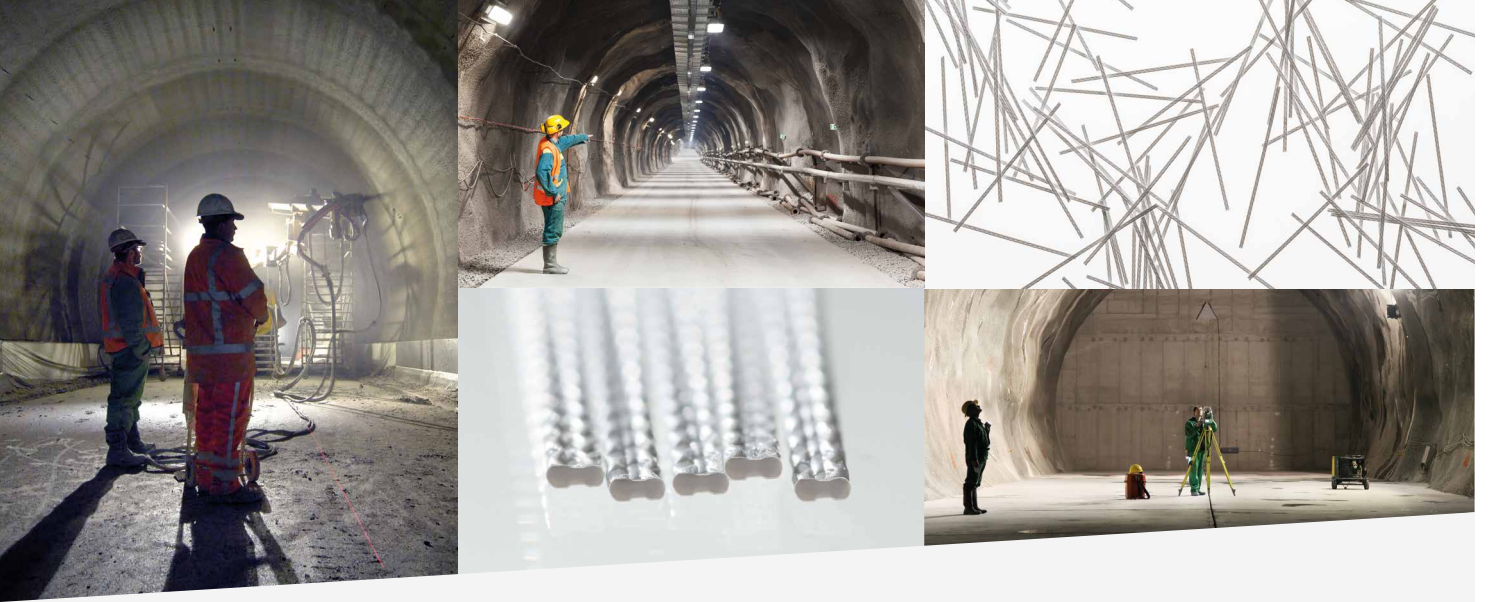
Complies with EN and ASTM standards

In addition to permanent support, typical end-uses of sprayed concrete in tunneling and mining include the application as initial support for hard rock. The shotcrete bridges the gap between the rock bolts. It so creates arches spreading local loads. At the same time the material seals off the exposed rock surface and protects it from the elements. The failure mechanism is comparable with a punching or shear failure induced by a concentrated load. Two structural tests are internationally applied and accepted methods to evaluate the toughness of the

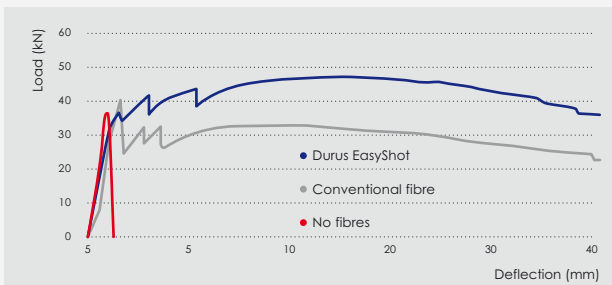
finished concrete: EN 14488-5 as well as its North American equivalent ASTM C1550.

Provides high energy absorption at low weight

Durus EasyShot has been tested in different parts of the world and in multiple concrete mix designs proving that this fibre is setting the benchmark for MSFRS: In plate tests according to the relevant norm, an average of more than 800 Joules was reached with no more than 4 kg of Durus EasyShot per m³ (steel fibres: 25-30 kg/m³). Class-leading energy absorption leaving alternative fibres behind.



Load deflection, test according to EN 14488-5



Outperforms steel

As Durus EasyShot macro synthetic fibres are flexible, their length is not limited by the opening size of the nozzle. This is a major advantage over steel. Rigid steel fibres have to be produced shorter or they block the nozzle during spraying.

Advantages and benefits

- Easy to handle and to apply
- Reduced rebound during spraying
- Improved construction site safety
- Enhanced long-term properties of the finished concrete
- Low cost per Joule energy absorption
- 100% rust-free, hence no crack width limitation for durability as with steel
- Significant reduction in embodied CO₂ when compared with steel
- Less wear and tear on pumps and slick lines

General applications

- Tunnels (initial support in hard rock and soft ground, reinforcement of linings)
- Mines (initial support in hard rock and soft ground)
- Slopes (stabilization)

All Durus macro synthetic fibres are chemically inert and have been subjected to the EN ISO 13438 aging test, which proved 100 years durability under normal conditions (see website for full report).

Chemical and physical properties

Fibre length	55 mm
Fibre type	Macro monofilament
Shape	Embossed elongated design
Absorption	None
Specific gravity	0.92 kg/dm ³
Electrical conductivity	None
Softening point (melt point)	165°C
Colour	White
Tensile strength	527 MPa
E-modulus	4400 MPa
Chloride content	None
S ₀₃ content	None

Geometry

The length and the diameter of Durus EasyShot have been tailored to provide maximum pull-out force over growing cracks. This ensures optimum performance over the full concrete surface. Each fibre delivers durable reinforcement and energy absorption and facilitates the transfer of high loads even over large crack widths that can occur in shotcrete in tunneling and mining applications.

Quality assurance

Durus EasyShot complies to EN 14889 - 2 : 2006 (EC Certificate of Conformity). The Quality Management Systems of Low & Bonar facilities have been approved to the ISO 9001 Quality Management System Standard. Certificates are available on request. Adfil products are manufactured to exacting standards on technologically advanced production and packaging lines allowing constant monitoring of quality.

All information and product specifications provided in this document are accurate at the time of publication. As the Low & Bonar Group follows a policy of continuous development the provided information and product specifications may change at any time without notice and must not be relied upon unless expressly confirmed by a relevant member of the Low & Bonar Group upon request. No liability is undertaken for results obtained by usage of the products and information.

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Adfil. Reinforced concrete reinvented.