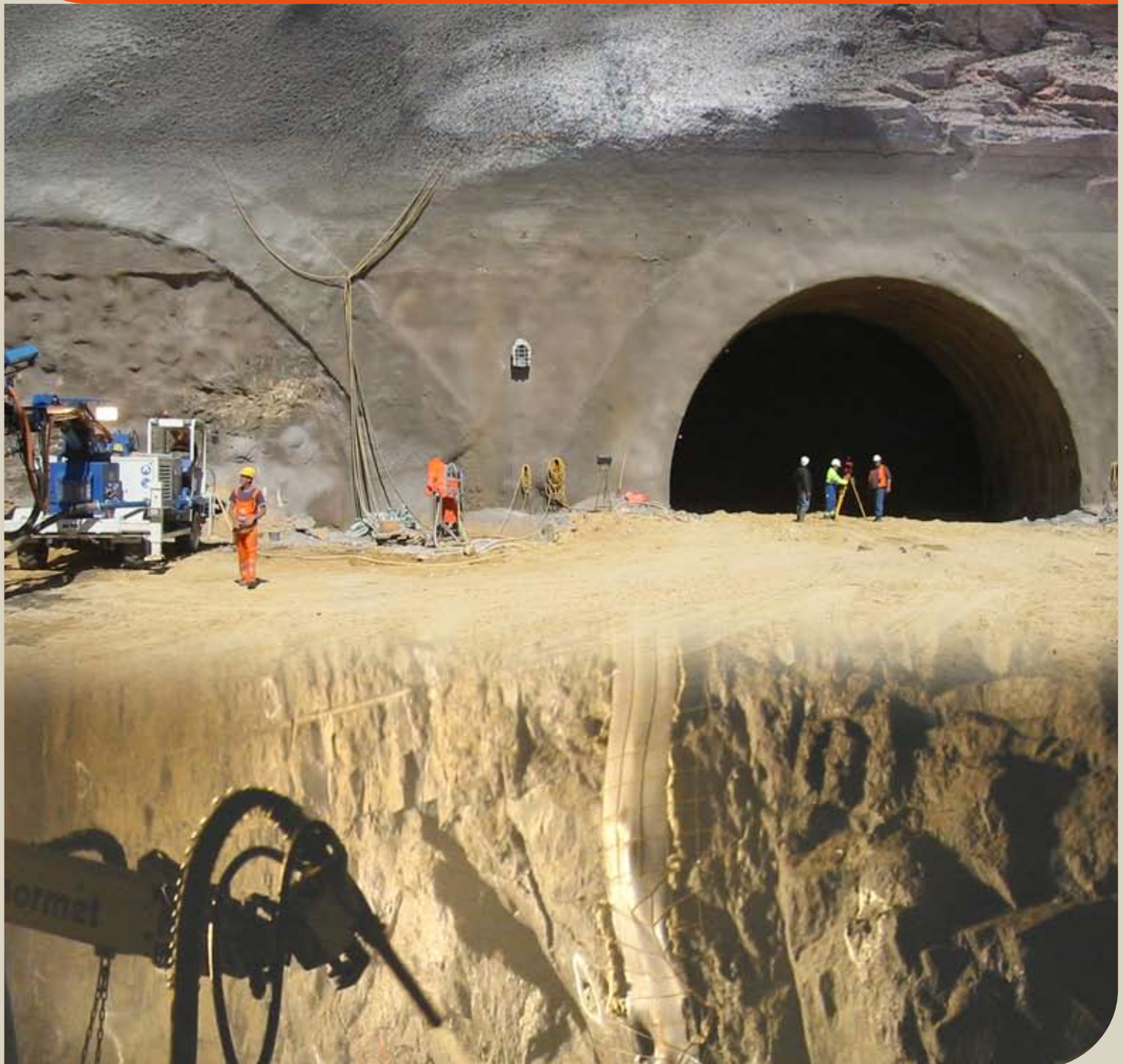


Distribution Solutions  
WireSolutions



ArcelorMittal

# Steel fibres Shotcrete applications



# WireSolutions

## Steel fibres solutions

WireSolutions is part of the ArcelorMittal Group, the number one steel company in the world. Major product lines of the unit are industrial wires (bright, galvanised, annealed, coppered...), agricultural products (fencing, barbed wire...), and steel fibres for concrete reinforcement.

ArcelorMittal has been producing steel fibres for over 30 years and is one of the leading suppliers of steel fibres worldwide. Through a local presence, ArcelorMittal aims to be closer to its customers to improve its service.

All the fibres manufactured by ArcelorMittal are made of cold drawn, high tensile steel wire produced using the most modern equipment. Our policy of continuous investment helps guarantee the durable performance of our products which are manufactured ISO 9001, ISO 14001 and OHSAS 18001 standards compliant. All our fibres have CE-marking.

**Transforming tomorrow.**



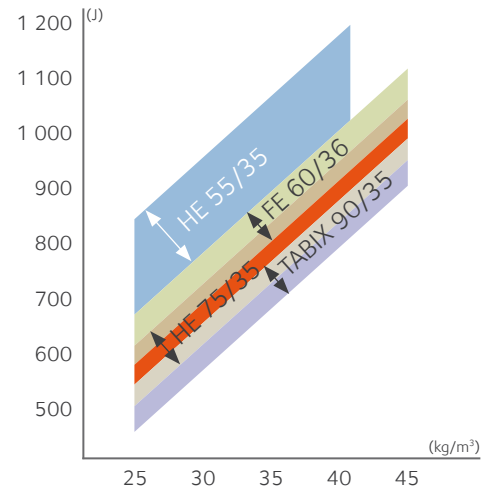
# Product range

ArcelorMittal has overcome challenges by optimizing the aspect ratio (fibre length over effective diameter) and by shaping their steel fibres in specific ways. These deformations can be along the fibre and/or at the extremities.

Aspect ratios between 40-80 are currently used. The higher the aspect ratio is, the more difficult will be the handling of a fibre. Steel fibres are available in various lengths from 20 mm up to 40 mm for shotcrete. 30 and 35 mm fibres have been applied most successfully. Specifying steel fibres by the dosage rate (kg per cubic meter of shotcrete) is common, but it is not in accordance with the latest findings, because of major differences in engineering

properties and performance between the various types of fibres. Nevertheless a specification by performance is more and more common as it takes into account the specific characteristics of the different fibre types (rebound, anchorage, aspect ratio...).

**Ongoing research at ArcelorMittal has resulted in the development of a variety of steel fibres for shotcrete, each performing best in its specific application. All steel fibres from ArcelorMittal are cold drawn wire fibres and therefore type I fibres according to ASTM A820 and type 1 according to EN 14889-1. All our fibres have CE-marking.**



## Steel fibres

Steel fibre reinforced concrete for shotcrete applications is now successfully used for many years due to its unique characteristics and its numerous advantages.



FE (Flat End) fibres are straight fibres with flattened, enlarged ends for improved anchorage. FE fibres can be applied with minimum rebound loss. The typical tensile strength of the wire is 1200 MPa.



HE (Hooked End) fibres are straight fibres with additional hooked ends. The HE shotcrete fibre can be used in all shotcrete applications. Commonly used with dosage of 25 to 50 kg/m<sup>3</sup>, depending on ground conditions. The HE fibre is shot with low rebound losses. The typical tensile strength of the wire is 1200 MPa.



TABIX is an undulated steel fibre (1100 MPa) used in slope and wall applications without overhead projection.

### ASTM A820, type I, cold drawn wire fibres EN 14889-1, type 1, cold drawn wire fibres

#### Range of aspect ratios

Aspect ratio FE	l/d: 60
Aspect ratio HE	l/d: 47,64
Aspect ratio TABIX	l/d: 39

#### Range of dimensions

Dimensions FE	d: 0.60 mm	l: 36 mm
Dimensions HE	d: 0.55 – 0.75* mm	l: 35 mm
Dimensions TABIX	d: 0.90 mm	l: 35 mm

\*Available as galvanized Crapal® fibres

#### Packaging

25 kg boxes and big bags of 500 and 1 000 kg



**Fibre performance able to cover the full range of actual standard requirements (EFNARC, SIA, ASTM, all European standards).**

# Applications

- ▶ ArcelorMittal steel fibres have been used now for years successfully in many application areas.



01 Road tunnel

02 Railway tunnel

03 Water tunnel

04 Emergency gallery

05 Mining

06 Slope stabilization



06



07



10



09



08



07

07 Ground and rock support

09 Excavation and open pit stabilization

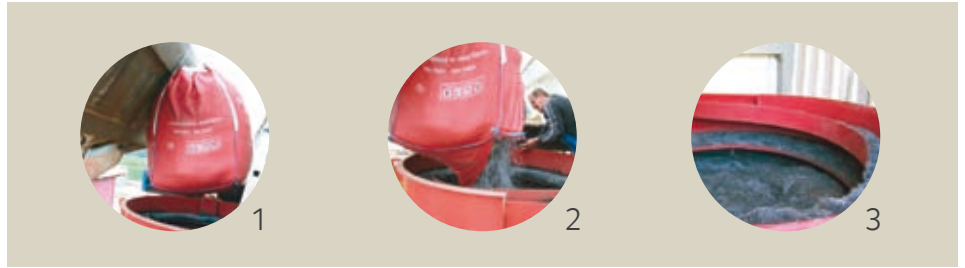
08 Repair and refurbishment

10 Special applications

# Dosing equipment

## Easy charging of a dosing unit

- 1) Transportation of the big bag by a wheel loader or forklift truck over the dosing unit.
- 2) Big bag bottom is cut and the fibres are dropping down.
- 3) Vibrating hopper for easy dosing of the fibres.



▶ **Giving advice for the integration of the fibres.**

▶ **Available dosing units:**

- Automatic dosing unit with permanent control of fibre dosage rate.
- Conveyor belts.
- Bucket elevators.
- Steel fibre blowers.
- Storage and buffer belts.

▶ **Assistance for planning and installation of dosing equipments.**

▶ **Possibility to control the dosing equipment by the batching plant IT system.**

▶ **Assistance and service on site.**

▶ **Easy installation and application:**

- All machinery is plug-and-play. So any installation can be done.
- Within a short time and the production of SFRC can be started quickly.



# Technical Support

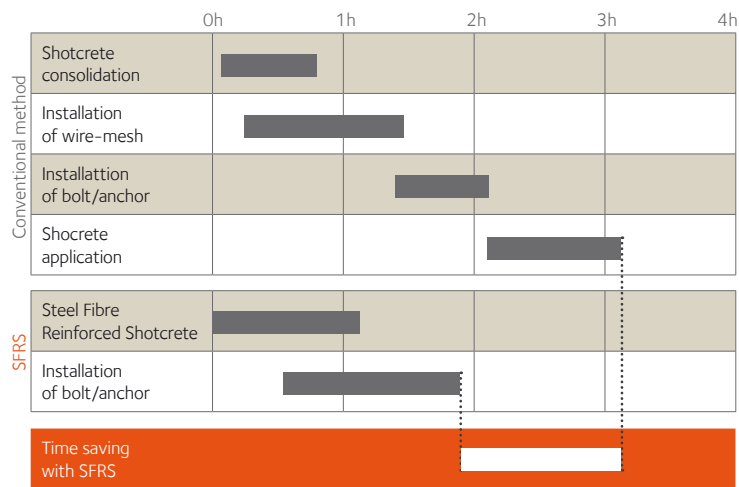
With worldwide experience and site assistance, ArcelorMittal is your partner for the equipment selection and installation assistance, the chemical and additive recommendation, the right fibre selection for your application and for the mix-design for steel fibre reinforced shotcrete.

With ArcelorMittal fibres, you do not have just “pneumatically applied concrete”, but a steel fibre reinforced shotcrete of highest quality and reliability!

## Advantages

Steel fibre reinforced concrete for shotcrete applications has now been successfully used for many years due to its unique characteristics and numerous advantages:

- ▶ **Ductility of the reinforcement.**
- ▶ **Cost savings.**
- ▶ **Time savings.**
- ▶ **Material savings.**
- ▶ **Safe job site.**
- ▶ **Easy installation and application.**



Conventional method without mucking compared to Steel Fibre Reinforced Shotcrete method (SFRS).

## Outstanding technical support

- ▶ Providing top technical service to the customers from job start up until finalization of the project.
- ▶ Giving advice on mix design, fibres selection and dosing equipment in order to optimize performance and quality.
- ▶ Giving advice and training to the workers.
- ▶ Participating to testing and results analysis.
- ▶ In our opinion, research & development is the key to success. We allow our customers to take profit from our experience collected on job-sites around the world.



ArcelorMittal Bissen & Bettembourg  
PO Box 16  
L-7703 Bissen

T +352 83 57 72 1  
F +352 83 56 98  
reception.bissen@arcelormittal.com

[www.arcelormittal.com/steelfibres](http://www.arcelormittal.com/steelfibres)  
[www.arcelormittal.com/wiresolutions](http://www.arcelormittal.com/wiresolutions)