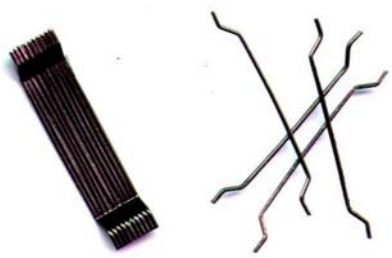
STEEL FIBRES-
TARGET HOOKED

PRODUCT



COLLATED LOOSE

- TARGET® Hooked steel fibres consist of hard drawn carbon steel wire that has been cut into suitable lengths for use as integral reinforcement in concrete and shotcrete mixes. The fibres feature the high aspect ratio (length to diameter ratio) required to minimize the quantity of fibre to be added to a concrete or shotcrete mix to obtain the required physical properties. Fibres are hooked at each end to give improved mechanical anchorage of the fibres within concrete or shotcrete. This provides improved impact resistance, flexural strength and post-cracking strength relative to straight fibres.
- To avoid problems of uneven dispersion or balling of fibres in concrete and wet process shotcrete mixes, Hooked fibres can be adhered together in clips of up to 30 wires each or a special fiber dispenser can be used. When these clips enter the mix the adhesive is dissolved and individual fibres are distributed evenly throughout the mix. Provided recommended mixing procedures and times are followed, the dispersed fibres will not tangle or ball together in properly designed and produced concrete or shotcrete mixes.
- Loose, non-collated Hooked fibres are available for use in dry process shotcrete mixes.
- Contact Target Products Ltd for additional information on steel fibre reinforcement for shotcrete.

USES AND ADVANTAGES

- Because of the even distribution of Hooked fibres throughout concrete and shotcrete mixes, the mixes are ideal for situations where improved ductility, flexural and shear strength or impact resistance is required.
- The use of Hooked fibres in concrete slabs or overlays for roads, airfields, bridge decks, canal linings and industrial floors can reduce required concrete thicknesses by up to 50%.
- In precast products, Hooked fibres are a recommended form of reinforcement for pipes, manholes and covers, breakwater units, vaults, pile tips, building panels and structural units.
- In shotcrete, the use of Hooked fibre in either dry process or wet process systems gives excellent flexural and impact resistance properties without reducing the ease of application of the mix. In applications such as slope stabilization or tunnel lining, the use of mesh reinforcement can be eliminated, giving significant reductions in labor content and material requirements, hence reducing overall costs. Conventional mesh-reinforced shotcrete must fill voids and depressions to build up the required

TARGET PRODUCTS LTD

thickness to embed the mesh. This leads to uneven application thicknesses and the use of greater quantities of shotcrete. Steel fibre reinforced shotcrete is able to provide equivalent or superior reinforcement to mesh with an even coating thickness, eliminating the need to fill depressions and reducing the quantity of material required. Because of the hooked ends, the post-cracking properties of Hooked fiber reinforced shotcrete have been found to be superior to those of shotcrete reinforced with straight fibres.

- Hooked Fibres exceed the requirements of ASTM A820 "*Specification for Steel Fibres for Use in Concrete*" for Type I, Deformed Fibres.

FIBRE SELECTION GUIDE

- For concrete mixes, and for wet-mix shotcrete applications, use collated fibres or loose fibers with special dispensing unit. Available sizes, indicated by mm length/diameter are ZC30/.50, ZC 30/1.00, ZC50/.50, ZC60/.80 and ZC60/1.00.
- For dry-mix shotcrete, use loose fibres, Type ZL30/.50, ZL 30/.60 and ZL30/1.00.
- In most applications, fibre addition rates of 30 to 60 kg/m^3 (50 to 100 lb/yd^3) of concrete or shotcrete are used to achieve the required properties in the hardened product. The addition rates correspond to reinforcement at 0.38% to 0.75% by volume of the concrete or shotcrete.

PROCEDURES

Before adding steel fibre to any mix, the mix design should be checked to ensure it is satisfactory for steel fibre reinforcement. If required, our professional engineers at TARGET will review mix designs to assess their suitability for use with Hooked steel fibre reinforcement.

CONCRETE OR WET PROCESS SHOTCRETE

1. After the mix has been adjusted to the required slump, add the specified quantity and type of Hooked fibres to the mixer shortly before discharge and mix until the fibres are evenly dispersed. In transit mixer trucks, a mixing time of four minutes at approximately 10rpm (mixing drum rotation speed) is usually adequate.
2. Fibre mixes appear stiffer than conventional mixes, but can readily be placed with adequate vibration. Avoid excessive addition of water to steel fibre mixes.
3. Place, finish and cure using standard procedures and equipment.

DRY PROCESS SHOTCRETE

1. Premix the specified amount of Hooked fiber with the dry shotcrete ingredients until the fibres are evenly dispersed.
2. Use premoisturizing equipment (if available) to adjust the moisture content of the mix to 3% to 6% by weight before it enters the shotcreting machine. The use of a premoisturizer significantly reduces wastage due to rebound.
3. Use shotcreting hoses with a minimum inside diameter of 50mm (2 inches).

STEEL FIBRES-
TARGET HOOKED

4. Use conventional shotcrete finishing procedures (if applicable) and standard curing procedures.

CAUTION

To minimize the risk of minor injury when handling or finishing mixes containing steel fibres, gloves should be worn. Gloves of similar quality to those normally worn by concrete placing and finishing crews are adequate. The use of gloves and eye protection during loading of steel fibres to mixers is recommended.

TYPICAL PROPERTIES OF HOOKED STEEL FIBRES

Yield Strength	1100-1380 MPa (160000-200000 lb/in^2)		
Fibre Length	30mm (1.2 inch) ± 5%	60mm (2.0 inch) ± 5%	60mm (2.4 inch)
Fibre Diameter	0.50mm (0.02 inch) ± 5%	0.80mm (0.03 inch)	1.00mm (0.04 inch)

Standard fibres are hard drawn carbon steel. Special grades, such as corrosion resistant, stainless steel, 0.6mm (0.02 inch) diameter, 0.7 mm (0.028 inch) or 0.8 mm (0.03 inch) are available on request.

Concrete and Shotcrete with Hooked Fibres

Because of the wide variety of mixes to which fibres can be added, and the range of addition rates which can be used it is not appropriate to give precise values for properties of steel fibre reinforced mixes. Contact Target Products Ltd for advice on the type of fibre and addition rates required to achieve desired properties in specific mixes.

TARGET PRODUCTS LTD