Scotchcast™ Polyolefin Fibers
For Use in Cast-in-Place Concrete
Guide Specification

NOT FOR USE AS A CONSTRUCTION DOCUMENT.
Edit carefully to meet your specific project requirements.
You must determine suitability of this guide specification in whole or part for a particular project.

Section 03241 Polyolefin Fiber Reinforcement

Part 1 General

1.1 Section Includes
A. Polyolefin fiber reinforcement for cast-in-place concrete

1.2 Related Sections
A. Section 03300 Cast-in-Place Concrete.

1.3 References
A. American Society for Testing and Materials (ASTM)
   1. ASTM C 1116 Standard Specification for Fiber Reinforced Concrete and Shotcrete
   2. ASTM C 1018 Standard Test Method for Flexural Toughness and First Crack Strength of Fiber-Reinforced Concrete (Using Beam with Third Point Loading)
   3. ASTM C1399 test method for obtaining Average Residual Strength of fiber reinforced concrete.
B. American Concrete Institute (ACI)
   1. ACI 544.1R State of the Art Report on Fiber Reinforced Concrete
   2. ACI 544.2R Measurement of Properties of Fiber Reinforced Concrete

1.4 Submittals
A. Submit [_______] copies of manufacturer’s literature for fibers including product data, brochures, guide specifications written batching and mixing instructions and appropriate Material Safety Data Sheets (MSDS).
B. Submit [_______] copies of a certificate prepared by concrete supplier, under provisions of Section [01400] [_______], stating that the specified fibers were added to each batch of concrete delivered to the project site. Each certificate should be accompanied by one copy of each batch delivery ticket indicating product name, manufacturer and quantity of fiber reinforcement added to each concrete load.

1.5 Quality Assurance
A. Manufacturer: Provide technical assistance from design through construction for use of fiber reinforcement.

B. Mock-Up: Provide mock-up(s) of concrete using fiber reinforcement specified in this Section. Mock-up(s) shall be representative of Work of Related Sections and techniques specified in this Section. Mock-up(s) is (are) to be approved by [architect/engineer] [owners representative]. Use mock-up(s) for reference during project.

1.6 Delivery, Storage, and Handling
A. Deliver fiber reinforcement in sealed, undamaged containers with labels intact and legible, indicating material name and lot number.
B. Deliver fiber reinforcement to location where it will be added to each truck load
C. Store materials covered and off the ground. Do not allow boxes to become wet.

Part 2 Products

2.1 Manufacturer
A. 3M Corrosion Protection Products
   6801 River Place Blvd
   130-3N-01
   Austin, TX USA 78726-9000
   Telephone: 800/722 6721

2.2 Materials
Paragraph A below specifies fiber type 50/63, 50 mm length by 0.63 mm diameter (2 inches length by 25 mils diameter,) which is preferred for cast-in-place applications. However, fiber type 25/38, 25 mm length by 0.38 mm diameter (1 inch length by 15 mils diameter) may also be used.

A. Fiber Reinforcement: 3M polyolefin fibers type 50/63, non-metallic monofilament fibers with the following typical physical properties:
   1. Specific Gravity (Bulk Relative Density): 0.91
   2. Tensile Strength: 275 MPa (40,000 psi)
   3. Modulus of Elasticity: 2647 MPa (384,000 psi)
   4. Elongation at Break: 15 percent
   5. Ignition Point: 593 degrees Celsius (1100 degrees Fahrenheit)
   6. Melt Point: 160 degrees Celsius (320 degrees Fahrenheit)
7. Chemical, Salt and Alkaline Resistance: Excellent
8. Electrical Conductivity: Low

Edit toughness data in paragraph B below for desired performance. Contact manufacturer for assistance regarding dosage and performance.

B. Fiber reinforcement provided in this section shall produce concrete conforming to the requirements for each type and class of concrete required, as indicated on drawings, and in Section 03300 and requirements of:

1. ASTM C 1116: Type III
2. ASTM C 1399: Average Residual Strength [_______] MPa (_______ psi)
3. ASTM C 1018: Toughness Index I_{10} [_______] and I_{20} [_______].
4. JSCE-SF4 Toughness Factor: Nm (in-lbs.)

2.3 Batching Mixes

Coordinate fiber loading with mix proportions and design specified in Section 03300 Cast-In-Place Concrete. Other fiber dosages than those specified are possible to meet specific project requirements. Increasing fiber loading may reduce slump compared to non-fiber reinforced concrete. Contact manufacturer for technical assistance to determine fiber loading, mix proportions a design. Fiber balls do not usually occur when mixing 3M fibers. If balling has occurred it is due to mixture proportions, equipment and/or procedures.

A. To avoid the formation of fiber balls, do not unwrap or open fiber bundles. Fiber reinforcement bundles must be intact when added to concrete mix.

The paragraph B below specifies 3M’s recommended fiber reinforcement dosage for normal concrete mix proportions (60/40 coarse/fine aggregate ratio) to obtain concrete structural material property improvements. This dosage also provides plastic shrinkage crack control.

B. Add fiber reinforcement at [_______] kilograms per cubic meter (_______ pounds per cubic yard), as fast as possible after concrete has been loaded into truck.

C. Add fiber reinforcement with drum turning.

D. Once fiber reinforcement has been added, turn truck drum at ACI established mixing speed one minute. Back concrete up to discharge end of drum then take concrete back down into drum and mix one minute for each inch of slump but not less than 4 minutes at ACI established mixing speed.

Handling and Safety Precautions

Read all Health Hazard, Precautionary, and First Aid statements found in the Material Safety Data Sheet, and/or product label prior to handling or use.

Important Notice

All statements, technical information, and recommendations related to 3M’s products are based on information believed to be reliable, but the accuracy or completeness is not guaranteed.

Before using this product, you must evaluate it and determine if it is suitable for your intended application. You assume all risks and liability associated with such use. Any statements related to the product which are not contained in 3M’s current publications, or any contrary statements contained on your purchase order shall have no force or effect unless expressly agreed upon, in writing, by an authorized officer of 3M.

3M

Corrosion Protection Products
6801 River Place Blvd.
Austin, TX 78726-9000
http://www.3M.com/corrosion

Retain Paragraph E only for fiber reinforcement loading greater than 1.6 percent by volume (14.5 kilograms per cubic meter, 25 pounds per cubic yard of concrete) otherwise delete Paragraph F.

E. Truck load must not exceed 80 percent of rated capacity when using fiber reinforcement.

F. If truck drum contains less than 50 percent capacity, back concrete up to top of discharge end of drum and put fiber reinforcement directly on top of concrete before mixing.

The following only describes requirements specific to using 3M Fiber. Other requirements for mix proportions and design, placement and finishing should be specified in Section 03300 Cast-In-Place Concrete.

Part 3 Execution

3.1 Placement

A. Place concrete in accordance with provision of Section 03300 Cast-In-Place Concrete and with additional instructions as follows.

B. Avoid using rakes or other tools that will align fibers or disrupt uniform fiber dispersion when moving concrete.

C. Using flat tined pitch forks (potatoe fork) may be useful for moving low slump concrete.

D. After concrete has cured, protruding fibers are readily removed (if desired for aesthetics) by using a typical weed burner.

3.2 Finishing

A. Using a roller bug (rolling jitter bug) screed to bury fiber reinforcement near surface may make final finishing easier.

B. Hand Finishing: use steel/magnesium tools.

C. Broom Finishing: use a stiff bristle broom. Hold broom so that bristles lie flat on surface. Avoid positioning bristles perpendicular to surface. Pull broom in one direction, do not push.

D. After concrete has cured, protruding fibers are readily removed (if desired for aesthetics) by using a typical weed burner.

3.3 Schedules

A schedule may be needed to coordinate fiber dosage specified in this section with drawings indicating areas for each fiber dosage type especially if more than one fiber dosage is specified in this Section.

Ordering Information/Customer Service

For ordering information, technical information, product information or to request a copy of the Material Safety Data Sheet: Phone: 800/722-6721 or 512/984-1038
Fax: 877/601-1305 or 512/984-6296

Warranty; Limited Remedy; Limited Liability.

This product will be free from defects in material and manufacture for a period of one (1) year from the time of purchase. 3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. If this product is defective within the warranty period stated above, your exclusive remedy shall be, at 3M’s option, to replace or repair the 3M product or refund the purchase price of the 3M product. Except where prohibited by law, 3M will not be liable for any loss or damage arising from this 3M product, whether indirect, special, incidental or consequential regardless of the legal theory asserted.

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