Scotchcast™ Polyolefin Fibers
For Use in Wet-Mix Shotcrete

Section 03241 Polyolefin Fiber Reinforcement

Part 1 General

1.1 Section Includes
A. Polyolefin fiber reinforcement for wet-mix shotcrete.

1.2 Related Sections
A. Section 03361: Shotcrete.

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)
B. American Concrete Institute (ACI)
   1. ACI 506 State of the Art Report on Fiber Reinforced Shotcrete
   2. ACI 506 Measurement of Properties of Fiber Reinforced Shotcrete
   3. ACI 506 Guide Specification For Shotcrete For Underground Support

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.

A mock-up may not be needed for every project.
Delete the paragraph B if a mock-up is not necessary.
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 25/38, 25 mm length by 0.38 mm diameter (1 inch length by 15 mils diameter,) which is preferred for wet-mix shotcrete applications.

A Fiber Reinforcement: 3M polyolefin fibers type 25/38, 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.)
5. Morgan et. al. Toughness Performance Level [_______]:

2.3 Mixes
Coordinate fiber loading with mix proportions and design specified in Section 03361 Shotcrete. Other fiber dosages than those specified are possible to meet specific project requirements. Increasing fiber loading may reduce slump compared to non-fiber reinforced wet-mix shotcrete. Contact manufacturer for technical assistance to determine fiber loading, mix proportions and 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.

Paragraph B below specifies 3M’s recommended fiber reinforcement dosage for normal wet-mix shotcrete mix proportions (30/70 coarse/fine aggregate ratio) to obtain shotcrete structural material property improvements and plastic shrinkage crack control.

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

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.

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Corrosion Protection Products
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http://www.3M.com/corrosion

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

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