

**Part 1            General**

**1.1                RELATED REQUIREMENTS**

- .1        The list of work sections in this division is indicative and non-exhaustive. It does not exclude the works described in the other specification sections, shown in the drawings or necessary for the execution of the works in keeping with overall intent of the plans.
- .2        Section 01 33 00 – Submittal Procedures.
- .3        Section 01 45 00 – Quality Control.
- .4        Section 01 61 00 – Common Product Requirements and with Manufacturer’s Written Instructions.
- .5        Section 03 30 00 – Cast in Place Concrete.
- .6        Section 01 74 11 – Cleaning.
- .7        Section 01 74 21 – Construction/Demolition Waste Management and Disposal.

**1.2                SCOPE OF WORK**

- .1        Provide all material, equipment and labour required for synthetic fiber reinforced concrete work required on all the plans and/or required for the complete and correct execution of the work.

**1.3                REFERENCE CODES AND STANDARDS**

- .1        Unless otherwise indicated, the most recent editions of all reference standards must be used.
- .2        Unless otherwise specified, synthetic fiber reinforced concrete work to be done in compliance with A23.1 standard.
- .3        Standard Test Method for Flexural Strength of Concrete (using simple beam with third-point loading) ASTM C 78.
- .4        Standard Test Method for Flexural Toughness and First Crack Strength of Fiber-Reinforced Concrete (using beam with third-point loading) ASTM C 1018.
- .5        Standard Specification for Fiber-Reinforced Concrete and Shotcrete ASTM C 1116.
- .6        Standard Specification for Ready-Mixed Concrete ASTM C 94.

#### **1.4 DESIGN OF SYNTHETIC FIBER REINFORCED SLABS**

- .1 Synthetic fiber reinforced slabs must be designed as to support loads defined in appendices of present section or indicated on drawings.
- .2 Submit structural calculations for work. Calculations must be stamped and signed by professional engineer, member of « l'Ordre des Ingénieurs du Québec ».
- .3 Without being limited to these items, calculations must include the following information :
  - .1 28 day concrete compressive strength;
  - .2 slab thickness (minimum 125 mm);
  - .3 location of shrinkage control joints and construction joints;
  - .4 type, size and dosage of synthetic fibers;
  - .5 soil modulus and bearing capacity;
  - .6 safety factor considered.

#### **1.5 GEOTECHNICAL STUDY**

- .1 Geotechnical studies were performed on site. They contain recommendations on type of backfill, level of fill compaction, bearing capacity, etc. These studies are included as appendices to present technical specifications.

#### **1.6 SYNTHETIC FIBER TEST RESULTS**

- .1 Upon request, provide Departmental Representative with certified copy of factory test report presenting physical and chemical properties of material to be used; at least two (2) weeks prior to starting synthetic fiber reinforced concrete work.

#### **1.7 DELIVERY, STORAGE AND HANDLING**

- .1 Delivery : Deliver synthetic fiber in factory original containers and packaging, unopened and intact, with labels clearly indicating the product name and its unique identification number, the reception code, instructions for use, manufacturer's name and weight of fibers.
- .2 Storage :
  - .1 Store synthetic fibers indoors in a clean and dry area, in accordance with manufacturer's instructions.
  - .2 Keep packaging sealed until use.
- .3 Handling : protect synthetic fibers while handling to avoid any contamination.

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**Part 2            Products**

**2.1                MATERIALS**

- .1      Dosage of concrete mix : the synthetic fiber supplier and concrete supplier must jointly prepare the concrete mix formula :
  - .1      28 day minimum compressive strength: 25 MPa;
  - .2      28 day minimum flexural resistance: 3 MPa;
  - .3      minimum quantity of synthetic fibers : in accordance with fiber manufacturer's recommendations;
  - .4      maximum size of aggregates: less than one third of slab thickness;
  - .5      use of a water-reducer is recommended.
- .2      Properties of concrete mix delivered on site will be measured by means of slump, compressive resistance and flexural resistance tests.
- .3      Synthetic fibers : mix of macro-fibers and micro-fibers as specified on drawings, in compliance with ASTM C 1116 standard.
- .4      Acceptable materials or products : When materials or products are specified by their brand names, refer to bidders instructions for procedure on how to submit equivalent/substitution product or material for approval.

**Part 3            Execution**

**3.1                SYNTHETIC FIBER CONCRETE MIX PREPARATION**

- .1      The synthetic fiber concrete mix must be homogeneous and free of fiber clumps.
- .2      Incorporate synthetic fibers to the concrete mix in accordance with manufacturer's instructions.
- .3      Fibers must be added to the mix at the same time as aggregates, or as last ingredient.
- .4      Incorporate fibers according to manufacturer's recommended minimum rate.
- .5      Mix synthetic fiber in concrete mixer for a minimum of 5 minutes at a maximum speed in accordance with ASTM C 94 standard.

**3.2                PLACEMENT OF SYNTHETIC FIBER REINFORCED CONCRETE**

- .1      Equipment normally used for placing of conventional concrete is appropriate for placing of synthetic fiber reinforced concrete. Section 03 30 00 specifications for concrete placing and finishing fully apply.
- .2      Verify synthetic fiber concrete mix compatibility against proposed surface finished and/or curing products.

**3.3 SURFACE FINISHES**

- .1 No synthetic fiber can be visible on surface of concrete slabs. When finishing slabs Contractor must take all necessary precautions to ensure that concrete surfaces are perfectly smooth for flooring installation. Otherwise, Contractor responsible for concrete placement shall repair surfaces at his own expense and to Departmental Representative's satisfaction.

**END OF SECTION**