DMS - 4550
FIBERS FOR CONCRETE

EFFECTIVE DATE: APRIL 2012

4550.1. Description. This Specification establishes requirements and specific test methods to determine the dosage of fibers for Class A and B concrete.

4550.2. Units of Measurements. The values given in parentheses (if provided) are not standard and may not be exact mathematical conversions. Use each system of units separately. Combining values from the two systems may result in nonconformance with the standard.

4550.3. Material Producer List. The Materials and Pavements Section of the Construction Division (CST/M&P) maintains the Material Producer List (MPL) of all materials conforming to the requirements of this Specification. Concrete made with materials appearing on the MPL, entitled "Fibers for Concrete," must be tested in accordance with the frequency established in the Department's *Guide Schedule of Sampling and Testing*.

4550.4. Bidders' and Suppliers' Requirements. The Department will purchase or allow on projects only those products listed by manufacturer and product code or designation shown on the MPL.

Use of pre-qualified product does not relieve the contractor of the responsibility to provide product that meets this Specification. The Department may inspect or test material at any time and reject any material that does not meet the specifications.

4550.5. Pre-Qualification Procedure.

A. Pre-Qualification Request. Submit a written request for evaluation to the Texas Department of Transportation, CST/M&P (CP 51), 125 E. 11th Street, Austin, TX 78701-2483.

Include the following information in the request:

- Company name,
- Physical and mailing addresses,
- Product name and data sheets, and
- Contact person and telephone number.

B. Pre-Qualification Sample. At no cost to the Department, submit a minimum of 5 pounds of fibers to the Texas Department of Transportation, CST/M&P (CP 51), 9500 North Lake Creek Parkway, Austin, Texas 78717.

Submit the following with the sample:

- Independent laboratory test report containing test results and certifying compliance of the material with this Specification and
- Manufacturer's certification and lot number for submitted sample.

C. Evaluation. CST/M&P will notify prospective bidders and suppliers after completion of material evaluation.

1. Qualification. If approved for use by the Department, CST/M&P will add the material to the MPL. To maintain pre-approved status, submit annual notarized certifications stating that the product has not been altered since it was originally submitted for approval. Report changes in the composition or in the manufacturing process of any material to CST/M&P. Significant changes reported by the manufacturer, as determined by the Director of CST/M&P, may require a re-evaluation of performance.

2. Failure. Producers not qualified under this Specification may not furnish materials for Department projects and must show evidence of correction of all deficiencies before reconsideration for qualification.

Costs of sampling and testing are normally borne by the Department; however, the supplier may bear the costs to sample and test materials failing to conform to the requirements of this Specification. The Director of CST/M&P will assess this cost at the time of testing.

D. Periodic Evaluation. The Department reserves the right to randomly sample and evaluate pre-qualified materials for conformance to this Specification and to perform random audits of documentation. Department representatives may sample material from the manufacturing plant, the project site, and the warehouse. Failure of materials to comply with the requirements of this Specification may be cause for removal of those materials from the MPL.

E. Disqualification. The Department may disqualify and remove materials from the MPL if there is any change in composition or if the material at any time is found to not meet the requirements listed in Article 4550.6. The material must be re-qualified for acceptance.

F. Re-Qualification. The manufacturer may resubmit their product for re-qualification consideration by following the requirements of Article 4550.5.

4550.6. Material Requirements. Provide fibers conforming to ASTM C 1116, including synthetic fibers, that are alkali-proof, non-absorptive, resistant to deterioration due to long-term exposure to moisture or substances present in admixtures, and do not contribute to nor interfere with the air entrainment of the concrete. Steel fibers for fiber reinforced concrete must conform to ASTM A 820, glass fibers must conform to ASTM C 1666, and cellulose fibers must conform to ASTM D 7357. In addition, the fibers and their dosage must meet the average residual strength requirements as listed in Table 1.

Table 1

Average Residual Strength (ARS) Requirements According to General Usage

Class of Concrete	Minimum Average Residual Strength (psi)[1]	General Usage[2]
A	115	Curb, gutter, curb & gutter, sidewalks
B	115	Riprap

1. When tested in accordance with ASTM C 1399 with the following modification: the initial deflection for the initial crack should be 0.02000 in. The sample tolerance of ARS should not fall below 10% of the specified required value.
2. For information only

4550.7. Fiber Testing. CST/M&P will test all fibers submitted for evaluation to determine if the specified dosage and type of fiber meets the requirements listed in Table 1. Table 2 illustrates the standard mixture designs used to test the fibers submitted for evaluation.

Table 2

Standard Mixture Design Proportions and Compressive Strengths

Coarse Aggregate Type	Gravel
Coarse Aggregate Grade[1]	4 (57)
Cement Content	410 lb./cu. yd.
W-C Ratio	0.70
Slump[2]	3 ± 0.5 in.
Coarse Aggregate Factor	0.58
28-Day Compressive Strength	3250 ± 250 psi

1. Corresponding ASTM C 33 gradation shown in parentheses
2. Before fiber addition

CST/M&P will introduce the fibers into the mixer after the addition of the coarse aggregate and will mix in accordance with ASTM C 192.

A. Natural and Synthetic Fibers. CST/M&P will cast two slabs measuring 20 in. × 22 in. × 4 in. from the batch of concrete containing the fibers, vibrate with an internal vibrator a total of nine times spaced equally apart, and moist cure for 28 days. Upon completion of moist curing, CST/M&P will saw eight specimens measuring 4 in. × 4 in. × 14 in. from the slabs with a dual blade saw and test in accordance with ASTM C 1399. The average residual strength of these specimens must meet the requirements of Table 1. CST/M&P will cast, moist cure, and test three companion compressive strength cylinders at 28 days in accordance with ASTM C 39.

B. Steel Fibers. CST/M&P will cast eight specimens measuring 4 in. × 4 in. × 14 in. in steel molds, vibrate with an external vibrator until consolidated, and moist cure for 28 days. Upon completion of moist curing, CST/M&P will test in accordance with ASTM C 1399. The average residual strength of these specimens must meet the requirements of Table 1.

CST/M&P will cast, moist cure, and test three companion compressive strength cylinders at 28 days in accordance with ASTM C 39.

4550.8. Archived Versions. Archived versions are available.