

9320300 NONMETALLIC ACCESSORY MATERIALS FOR CONCRETE PAVEMENT AND
CONCRETE STRUCTURES
INTERNAL/INDUSTRY REVIEW COMMENTS

Rich Hewitt
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Comments: (12-1-16, Internal)

1. In Table 3-2, it looks like the letter “a” after the term, “Guaranteed Tensile Load” should be a superscript to refer to the note for the superscript “a” listed at the bottom of Table 3-2.

Response: This will be changed as noted.
Change made.

2. I recommend rewording the sentence to make it clear the testing is at the contractor’s expense. Current wording could be construed to mean the Department approval of the lab is at the contractor’s expense, but not necessarily the testing itself.

<p>LOT of FRP reinforcing for testing in accordance with Table- 3-4. At the Contractor’s expense, Testing shall be conducted by a Department approved, an-ISO- 17025 accredited, laboratory approved by the Department, at the Contractor’s expense. Each test shall be replicated a minimum of 3three times per production LOT. Submit the test results to the Engineer for review and approval prior to installation. A minimum of six samples of reinforcing bars per LOT will be</p>

Response: The sentence will be revised to: Testing shall be conducted, at the Contractor’s expense, by a Department approved ISO-17025 accredited laboratory.
Change made.

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Comments: (12-23-16)

1. Table 3-2, Bond Strength to Concrete, Block pull-out test method referenced is ACI 440.3R, method B.3.. this test method is obsolete superseded by ASTM D7913.

Response: The most recent version of ACI 440.3R available (08/2012) still contains Method B.3. Change will be made to allow the use of either test method/standard.
Change made.

2. Table 3-3, Strength of 90°Bends references ACI 440.3 method B.5, this test method is obsolete superseded by ASTM D7914.

Response: The most recent version of ACI 440.3R available (08/2012) still contains Method B.3. Change will be made to allow the use of either test method/standard.
Change made.

3. Section 932-3.3.. reference is made to "Qualification testing shall be conducted by an ISO 17025 accredited lab approved by the department. The DOT should be aware that there are very few labs with experience testing FRP bars and even fewer labs that would be ISO17025 accredited. This author is aware of only 2 labs that could qualify in the field of FRP bars (Univ Miami and Sherbrooke in Canada) Would it be possible for the department to provide a list of acceptable labs to producers? More importantly, contractors needing to satisfy the requirements of 932-3.4.1 for sampling will have a difficult and expensive and cumbersome time fulfilling this requirement. The department needs to give guidance to contractors so they can legitimately obtain the required independent testing for material acceptance. Further, should the "accredited ISO independent test lab" material acceptance testing cost \$3000 to \$5000 to perform, is there a "threshold" for the size of a project where that could be required or waived. For example, if the "value" of GFRP bars for a project is \$10,000, does it make sense to require the contractor to obtain \$5000 worth of independent ISO accredited lab tests for the project ?

Response: It is understood that the initial cost of FRP reinforcing is higher than that of traditional reinforcing, but it is expected that the additional service life of FRP will still produce positive cost benefits. Since the Department is still in the initial period of using these products, it is necessary to ensure the quality of FRP reinforcing products used on projects. It is expected that once the use of FRP reinforcing becomes more widely used on Department projects, more labs will seek qualification. In addition, the Department will consider gaining the ability to perform project testing in the future.

There is currently a list of Qualified Laboratories at <https://mac.fdot.gov/smreports>. Select "Qualified Labs Report" District: SMO; Category: Corrosion.

No change made.

4. Table 3-1 includes provisions for both Glass and Carbon bars. Having been in the FRP bar business for 25 years, I'm aware of only one or two projects where Carbon internal reinforcing bars have been use. They simply are NOT a practical alternative material and I believe its a disservice to the designers who might use this specification to include them as an option in the tables. There are no domestic American producers of this material, the cost of this option is in the realm of exotic and there is little to NO experience with the practical use of Carbon FRP bars for internal reinforcing. ASTM D30 provisions do NOT include the use of Carbon bars at this time.

Response: The FRP Composites Industry is growing rapidly and utilizes a wide and expanding range of material combinations. As is the case with all structural materials, the engineer must practice appropriate standard of care when designing components using FRP composites. There may be locations where the benefits of using CFRP reinforcing bars outweigh the costs. For example, the pile splice details require the use of CFRP bars under Index 22601, since there is not enough capacity provided by GFRP bars for the practical sizes needed. [Corroborated by Structures Design Office]

No change made.

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Comments: (12-27-16)

1. 932-3.3 requires material from 3 production lots randomly sampled by a designee of the state, is the state planning on sending someone to the plant to select the samples? Note that 3 production lots of each size would require frequent trips as material "lots" are not generally produced at the same time.

Response: It is understood that manufactures produce bars at varying rates and lot sizes. Arrangements will have to be made accordingly to accommodate the sampling process. No change made.

2. 932.3.4.1 requires an ISO 17025 accredited lab which is likely going to cause delays and added expense to the project. It is hard enough to find independent labs with the required knowledge and experience to test the FRP bars let alone one that is ISO 17025. The ISO requirement should be removed and changed to independent lab.

Response: The lack of independent labs with adequate experience to perform FRP testing is one of the reasons for the ISO requirement. ISO certification provides the Department with a level of confidence in the ability of a laboratory to provide reliable test results. No change made.

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Comments: (1-1-16)

Please consider modifying Section 932-3.1 to allow fabrication of GFRP closed stirrups using mechanical processes other than pultrusion. ICC-ES AC454 could be used as a source for alternative manufacturing requirements: 2.7.4 Manufacturing Process: 2.7.4.1 FRP bars under this criteria are to be manufactured using variations of the pultrusion process or some other suitable process. 2.7.4.2 The manufacturer shall document the process used and report the date of production and the production lot size. 2.7.5 FRP Bar Shapes: 2.7.5.1 FRP Bent shape: an FRP reinforcing bar bent to a prescribed shape. 2.7.5.2 FRP Closed continuous stirrup/tie: an FRP bent shape fabricated as a continuous loop without end- joints. 2.7.5.3 FRP spirals: continuously wound FRP reinforcement in the form of a cylindrical or polygonal helix.

Response: "Pultruded" has been deleted; and the following sentence has been added: Bars shall be manufactured using pultrusion, variations of pultrusion, or other suitable processes noted in the producer's Quality Control Plan, subject to the approval of the State Materials Office. Change made.
