



Bureau of Materials: Materials Approval Procedures

MAP Number: **134-18**

Effective Date: 6/15/2018

Approved By: Paul Hanczaryk

PROCEDURE FOR APPROVAL OF POLYMER STRUCTURAL MEMBERS

PURPOSE:

To establish a procedure to approve Polymer Structural Members for addition to the NJDOT Bureau of Material's Qualified Products List (QPL).

REFERENCES:

New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction
Section 916

NJDOT Bridges and Structures Design Manual

TERMINOLOGY:

Polymer Structural Members are defined as one of the following:

- Thermoset circular structural tubing.
- Thermoset polygonal structural tubing.
- Thermoplastic rectangular and circular structural members.
- Thermoplastic rectangular and circular structural members reinforced with solid glass fiber-reinforced polymer bars.

The terminology used: Characteristic value (ASTM D 7290), Matrix (ASTM D3878), Plastic (ASTM D883), Thermoplastic (ASTM D3878), Thermoset (ASTM D3878). When definitions of terms are conflicting, those of ASTM D 3878 shall have the precedence.

PROCEDURE:

A. Manufacturer's Request for Approval.

The manufacturer must request in writing the approval of the Polymer Structural Member. Include the following information in the request:

1. The name, address and contact information for the manufacturer.
2. The name or designation of the Polymer Structural Member that is to be evaluated.
3. The type of Polymer Structural Member as defined in Section 916.1
4. Certification and documentation from an independent testing facility showing the Polymer Structural Member has structural adequacy as defined in Section C.
5. Certification documentation from an independent testing facility showing the Polymer Structural Member meets the material requirements given in Section 916
6. Calculations and certifications showing the structural properties, including ultimate strength and flexural strength requirements that are specified in Section 916.02 through 916.08.
7. Catalog cuts, manufacturer's recommendations for design and construction, schedules, diagrams, performance charts, physical appearance, and other characteristics.

Mail the request for approval to the following:

Mailing Address (USPS):

Manager, Bureau of Materials (Thiokol Bldg. 4)
New Jersey Department of Transportation
P.O. Box 600
Trenton, NJ 08625-0600

Street Address (UPS, FedEx, etc.):

Manager, Bureau of Materials (Thiokol Bldg. 4)
New Jersey Department of Transportation
930 Lower Ferry Road
West Trenton, NJ 08628

B. Bureau of Structural Engineering Review.

The Bureau of Structural Engineering will review the manufacturer's submittal for completeness. If the submittal is incomplete, it will be rejected. The Bureau of Structural Engineering will review the submittal to verify that it meets Section 916.03 requirements and NJDOT design parameters. The Bureau of Structural Engineering will make the final determination on the approval of Polymer Structural Members for addition to the QPL.

PROJECT ACCEPTANCE REQUIREMENTS:

Qualification of the Polymer Structural Member and its addition to the QPL does not constitute a blanket approval. On a project to project basis, the use of the Polymer Structural Member must be submitted for approval according to the Working Drawing procedures of the NJDOT Standard Specifications.

DISQUALIFICATION:

The ME may remove a Polymer Structural Member listing from the QPL for non-conformance with design and construction specification requirements or for a documented history of poor field performance. The manufacturer must notify the ME, in writing, of any change in product formulation or design. Failure to notify the ME of changes in product formulation will result in disqualification.

REQUALIFICATION:

The ME will reevaluate a product which has been disqualified and removed from the QPL only after submission of a formal request along with acceptable evidence that the problems causing the disqualification have been resolved.

The ME may require the manufacturer to requalify the product for any of the following reasons:

1. To ensure that obsolete Polymer Structural Member listings are not kept on the list, the ME may request written confirmation from the manufacturer that the material is still available and has not changed formulation or design. Failure to respond to the Bureau's written request will result in the product being removed from the list.
2. If the formulation or design of the material has changed, the ME may require that the product be requalified.
3. If the NJDOT Standard Specifications or NJDOT Bridges and Structures Design Manual change or if any referenced ASTM or AASHTO specifications change, the ME may require requalification to ensure that the product meets new criteria.

C. Requirements for Structural Adequacy.

The structural adequacy of components specified is determined from center-load flexural tests with criteria established in this section.

1. Test Specimens:

The test specimens must consist of the structural component having a length greater than or equal to $16\sqrt{D/Q}$ where D and Q are the flexural and shear rigidities of the components. The flexural and shear rigidities can be estimated by rational analysis or by tests stipulated by the Registered Design Professional.

2. Loading Procedure:

The loading procedure consists of the two stages:

Stage 1: the structural component will be subjected to an increasing superimposed load equal to not less than two times the equivalent design load. The loading must be left in place for a period of 24 hours.

Stage 2: The load applied in Stage 1 is removed and the component must be reloaded and subjected to an increasing load until either: a failure occurs, the superimposed load is equal to three times the equivalent design load, or the deflection exceeds one tenth of the test span.

3. Test Passing Criteria:

A component is considered to have successfully met the test requirements if the following two criteria are satisfied:

- 1) The test component recovers not less than 75 percent of the maximum deflection within 24 hours after the removal of the test load in Stage 1-loading.
- 2) The test component reaches three times the equivalent design load without failure during Stage 2-loading.