



Bedford Reinforced Plastics, Inc.
 264 Reynoldsdale Road
 Bedford, PA 15522-7401
 Phone: (814) 623-8125
 Fax: (814) 623-6032
 E-mail: frpsales@bedfordplastics.com
www.bedfordplastics.com

This MANU-SPEC™ utilizes the Construction Specifications Institute (CSI) *Manual of Practice*, including *MasterFormat™*, *SectionFormat™* and *PageFormat™*. A MANU-SPEC is a manufacturer-specific proprietary product specification using the proprietary method of specifying applicable to project specifications and master guide specifications. Optional text is indicated by brackets []; delete optional text in final copy of specification. Specifier Notes typically precede specification text; delete notes in final copy of specification. Trade/brand names with appropriate symbols typically are used in Specifier Notes; symbols are not used in specification text. Metric conversion, where used, is soft metric conversion.

This MANU-SPEC specifies structural plastic shapes. These products are manufactured by Bedford Reinforced Plastics, Inc. Revise MANU-SPEC section number and title below to suit project requirements, specification practices and section content. Refer to CSI *MasterFormat* for other section numbers and titles.

SECTION 06510
STRUCTURAL PLASTIC SHAPES & PLATES

PART 1 GENERAL

1.01 SUMMARY

- A. Section Includes: Structural Plastic Shapes.

Specifier Note: Article below may be omitted when specifying manufacturer's proprietary products and recommended installation. Retain References Article when specifying products and installation by an industry reference standard. If retained, list standard(s) referenced in this section. Indicate issuing authority name, acronym, standard designation and title. Establish policy for indicating edition date of standard referenced. Conditions of the Contract or Division 1 References Section may establish the edition date of standards. This article does not require compliance with standard. It is a listing of all references used in this section.

1.02 REFERENCES

- A. General: Standards listed by reference, including revisions by issuing authority, form a part of this specification section to the extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.
- B. ASTM International:
1. ASTM D149 Standard Test Method for Dielectric Breakdown Voltage and Dielectric Strength of Solid Electrical Insulating Materials at Commercial Power Frequencies.
 2. ASTM D150 Standard Test Methods for AC Loss Characteristics and Permittivity (Dielectric Constant) of Solid Electrical Insulation.
 3. ASTM D256 Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics.
 4. ASTM D495 Test Method for High-Voltage, Low-Current, Dry Arc Resistance of Solid Electrical Insulation.
 5. ASTM D570 Standard Test Method for Water Absorption of Plastics.
 6. ASTM D635 Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.
 7. ASTM D638 Standard Test Method for Tensile Properties of Plastics.
 8. ASTM D695 Standard Test Method for Compressive Properties of Rigid Plastics.
 9. ASTM D696 Standard Test Method for Coefficient of Linear Thermal Expansion of Plastics Between -30°C and 30°C With a Vitreous Silica Dilatometer.

10. ASTM D732 Standard Test Method for Shear Strength of Plastics by Punch Tool.
11. ASTM D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
12. ASTM D792 Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement.
13. ASTM D2344 Standard Test Method for Short-Beam Strength of Polymer Matrix Composite Materials and Their Laminates.
14. ASTM D2583 Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
15. ASTM D3917 Standard Specification for Dimensional Tolerance of Thermosetting Glass-Reinforced Plastic Pultruded Shapes.
16. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.

Specifier Note: Article below should be restricted to statements describing design or performance requirements and functional (not dimensional) tolerances of a complete system. Limit descriptions to composite and operational properties required to link components of a system together, and to interface with other systems.

1.03 SYSTEM DESCRIPTION

- A. Design Requirements: Provide products/systems that have been manufactured, fabricated and installed to the following criteria: [Specify design requirements].
 1. Section Properties: [Specify section properties].
- B. Performance Requirements: Provide products/systems that have been manufactured, fabricated and installed to the following criteria: [Specify performance requirements].

Specifier Note: Article below includes submittal of relevant data to be furnished by Contractor before, during or after construction. Coordinate this article with Architect's and Contractor's duties and responsibilities in Conditions of the Contract and Division 1 Submittal Procedures Section.

1.04 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Product Data: Submit manufacturer's product data and installation instructions.
- C. Shop Drawings: Provide drawings indicating [Specify shop drawing requirements].
- D. Samples: Submit selection and verification samples. [Specify sample requirements].
- E. Quality Assurance/Control Submittals: Submit the following:
 1. Design Data: [Specify requirements].
 2. Test Reports: [Specify requirements].
 3. Certificates: Submit manufacturer's certificate that products meet or exceed specified requirements.
 4. Manufacturer's Field Reports: [Specify requirements].
- F. Closeout Submittals: Submit the following:
 1. Warranty documents specified herein.

Specifier Note: Article below should include statements of prerequisites, standards, limitations and criteria that establish an overall level of quality for products and workmanship for this section. Coordinate article below with Division 1 Quality Assurance Section.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Utilize an installer having demonstrated experience on projects of similar size and complexity.

Specifier Note: Paragraph below should list obligations for compliance with specific code requirements particular to this section. General statements to comply with a particular code are typically addressed in Conditions of the Contract and Division 1 Regulatory Requirements Section. Repetitive statements should be avoided.

- B. Regulatory Requirements and Approvals: [Specify applicable requirements of regulatory agencies].
1. [Code agency name].
 - a. [Report or approval number].

Specifier Note: Retain paragraph below if preinstallation meeting is required.

- C. Preinstallation Meetings: [Specify requirements for meeting].

Specifier Note: Article below should include specific protection and environmental conditions required during storage. Coordinate article below with Division 1 Product Requirements Section.

1.06 DELIVERY, STORAGE & HANDLING

- A. General: Comply with Division 1 Product Requirement Section.
- B. Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.
- C. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- D. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

Specifier Note: Coordinate article below with Conditions of the Contract and with Division 1 Closeout Submittals (Warranty) Section. Use this article to require special or extended warranty or bond covering the work of this section.

1.07 WARRANTY

- A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.
- B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under contract documents.

PART 2 PRODUCTS

Specifier Note: Retain article below for proprietary method specification. Add product attributes, performance characteristics, material standards and descriptions as applicable. Use of such phrases as "or equal" or "or approved equal" or similar phrases may cause ambiguity in specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining "or equal" products.

2.01 STRUCTURAL PLASTIC SHAPES

Specifier Note: Paragraph below is an addition to CSI *SectionFormat* and a supplement to MANU-SPEC. Retain, edit or delete paragraph below to suit project requirements and specifier practice.

- A. Manufacturer: Bedford Reinforced Plastics, Inc.
 1. Contact: 264 Reynoldsdale Road, Bedford, PA 15522-7401; Telephone: (814) 623-8125; Fax: (814) 623-6032; E-mail: fpsales@bedfordplastics.com; website: www.bedfordplastics.com.
- B. Proprietary Products/Systems: Structural plastic shapes, including the following:

Specifier Note: These structural components are available in 3 different resin types. Retain, edit or delete subparagraph below to suit project requirements and specifier practice.

1. [Standard Polyester (ST) Resin System].
2. [Fire Retardant Polyester (FR) Resin System].
3. [Fire Retardant Vinylester (VE) Resin System].
 - a. Material: Pultruded [Isophthalic] [Vinylester] resin.
 - b. Tensile Stress, Lengthwise (ASTM D638): 30,000 psi (207 MPa).
 - c. Tensile Stress, Crosswise (ASTM D638): 7000 psi (48 MPa).

- d. Tensile Modulus, Lengthwise (ASTM D638): 2.5×10^6 psi.
- e. Tensile Modulus, Crosswise (ASTM D638): 0.8×10^6 psi.
- f. Compressive Stress, Lengthwise (ASTM D695): 30,000 psi (207 MPa).
- g. Compressive Stress, Crosswise (ASTM D695): 15,000 psi (104 MPa).
- h. Compressive Modulus, Lengthwise (ASTM D695): 2.5×10^6 psi.
- i. Compressive Modulus, Crosswise (ASTM D695): 1.0×10^6 psi.
- j. Flexural Stress, Lengthwise (ASTM D790): 30,000 psi (207 Mpa).
- k. Flexural Stress, Crosswise (ASTM D790): 10,000 psi (69 MPa).
- l. Flexural Modulus, Lengthwise (ASTM D790): 1.8×10^6 psi.
- m. Flexural Modulus, Crosswise (ASTM D790): 0.8×10^6 psi.
- n. Modulus of Elasticity, E, Full Section: 2.8×10^6 psi.
- o. Shear Modulus: 0.450×10^6 psi.
- p. Short Beam Shear (ASTM D2344): 4500 psi (31 MPa).
- q. Punch Shear (ASTM D732): 10,000 psi (69 MPa).
- r. Notched Izod Impact, Lengthwise (ASTM D256): 25 ft-lb/in.
- s. Notched Izod Impact, Crosswise (ASTM D256): 4 ft-lb/in.
- t. Barcol Hardness (ASTM D2583): 45.
- u. 24 Hour Water Absorption (ASTM D570): 0.45% maximum.
- v. Density (ASTM D792): 0.062 - 0.070 lb/in³.
- w. Coefficient of Thermal Expansion, Lengthwise (ASTM D696): 8×10^{-6} in/in/deg F.
- x. Arc Resistance, Lengthwise (ASTM D495): 120 seconds.
- y. Dielectric Strength, Lengthwise (ASTM D149): 35 kv/in.
- z. Dielectric Strength, Perpendicular to Laminate Face (ASTM D149): 200 volts/mil.
- aa. Dielectric Constant, Perpendicular to Laminate Face (ASTM D150): 5@60 hz.
- bb. Color: [Specify color].

Specifier Note: Flat Sheet and Threaded Rod shapes have separate properties as listed in manufacturer's design guide. Retain, edit or delete subparagraph below to suit project requirements and specifier practice.

- cc. Shape: [Angle] [Channel] [I-Beam] [Wide Flange Beam] [Square Tube] [Round Tube] [Rectangular Tube] [Flat Sheet] [Threaded Rod] [Square Bar] [Rod] [Deck Board] [Handrail Components] [Special Shapes].

Specifier Note: Properties below apply to fire retardant profiles only.

- dd. Fire Retardant [Polyester] [Vinylester] Structural Profiles, Surface Burning Characteristics, Flamespread Index (ASTM E84): 25 maximum.
- ee. Fire Retardant [Polyester] [Vinylester] Structural Profiles, Flammability (ASTM D635): Nonburning.

Specifier Note: Edit Article below to suit project requirements. If substitutions are permitted, edit text below. Add text to refer to Division 1 Project Requirements (Product Substitutions Procedures) Section.

2.02 PRODUCT SUBSTITUTIONS

- A. Substitutions: No substitutions permitted.

Specifier Note: Describe items that must be shop manufactured, fabricated or assembled before being delivered to the site.

2.03 FABRICATION

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- A. Shop Assembly: [Specify requirements for shop assembly].

Specifier Note: Describe any shop or factory finishing.

2.04 FINISHES

- A. Shop Priming: [Specify requirements for shop priming].
B. Shop Finishing: [Specify requirements for shop finishing].
C. Factory Finishing: [Specify requirements for factory finishing].

Specifier Note: Specify requirements for quality control at offsite fabrication plants.

2.05 SOURCE QUALITY CONTROL

- A. Fabrication Tolerances: Comply with requirements of ASTM D3917.
B. Tests, Inspection: [Specify requirements for tests and inspections].

PART 3 EXECUTION

Specifier Note: Article below is an addition to the CSI *SectionFormat* and a supplement to MANU-SPEC. Revise article below to suit project requirements and specifier's practice.

3.01 MANUFACTURER'S INSTRUCTIONS

- A. Comply with the instructions and recommendations of the structural plastic shapes manufacturer.

Specifier Note: Specify actions to physically determine that conditions are acceptable to receive primary products of the section.

3.02 EXAMINATION

- A. Site Verification of Conditions:
1. Verify that site conditions are acceptable for installation of structural plastic shapes.
2. Do not proceed with installation of structural plastic shapes until unacceptable conditions are corrected.

Specifier Note: Specify actions required to physically prepare the surface, area or site or to incorporate the primary products of the section.

3.03 PREPARATION

- A. Protection: [Specify requirements for protection].
B. Surface Preparation: [Specify requirements for surface preparation].

Specifier Note: Coordinate article below with manufacturer's recommended installation requirements.

3.04 INSTALLATION

- A. Special Techniques: [Specify requirements for spacing, patterns, unique treatments].
B. Interface with Other Work: [Specify requirements for compatibility, transition, anchorage, separation, bonding].
C. Site Tolerances: [Specify allowable variation].

Specifier Note: Specify the tests and inspections required for installed or completed work.

3.05 FIELD QUALITY CONTROL

- A. Site Tests: [Specify requirements for site tests].
B. Inspection: [Specify requirements for inspection].

Specifier Note: Specify provisions for protecting work after installation but prior to acceptance by the owner. Coordinate article below with Division 1 Execution Requirements Section.

3.06 PROTECTION

- A. Protect installed work from damage due to subsequent construction activity on the site.

END OF SECTION