

**D. Materials Warranty**

General Provisions 101 through 150.

## Section 837—Polymer Concrete

**837.1 General Description**

This section includes the requirements for polymer concrete.

**837.1.01 Related References****A. Standard Specifications**

General Provisions 101 through 150.

**B. Referenced Documents**

AASHTO T 97

ASTM C 109 or C 31

ASTM C 140

ASTM C 531

ASTM C 807

**837.2 Materials****837.2.01 Polymer Concrete****A. Requirements**

## 1. Type

Use a methyl methacrylate (MMA) or polyester polymer concrete that bonds to the substrate with the manufacturer's recommended primer.

- a. Use a polymer concrete that combines a two-component, solvent-free resin and selected clean, dry aggregate.
- b. Use a primer that is a two-component system recommended by the polymer concrete manufacturer. After mixing, apply it with brushes or another suitable method.
- c. Use a primer that is tack-free within one hour of mixing.
- d. Before adding dry aggregate at the job site to increase yield, get approval from the Office of Materials and Research.

## 2. Physical Characteristics

Use a polymer concrete similar in color to Portland cement concrete.

- a. Use a polymer that can be mixed and placed like Portland cement concrete.
- b. Ensure that the polymer concrete meets the following requirements:

Characteristic	Requirement
Initial setting time	12 minutes minimum
Final setting time	60 minutes maximum
Flexural strength	1,100 psi (7.5 MPa) minimum in 24hours
Minimum compressive strength, 75 °F, ± 5 °F (25 °C, ±3 °C), at:	Compressive Strength—psi (MPa)
2 hours	2,000 psi (15 MPa)
24 hours	5,000 psi (35 MPa)
7 days (air cure)	6,000 psi (40 MPa)
7 days (moist cure)	6,000 psi (40 MPa)

Characteristic	Requirement
Water absorption	4% maximum
Shrinkage	0.13% maximum
Shear bond strength	200 psi (1.5 MPa) in 24 hrs. minimum

## B. Fabrication

1. Packaging and Storage
  - a. Package polymer concrete in strong, moisture-proof paper bags or other suitable containers capable of withstanding shipping, normal handling, and storage without breakage.
  - b. Clearly label each container of the components of the polymer concrete system with the following information:
    - Component designation
    - Manufacturer's batch number
    - Mixing instructions
  - c. Display potential hazards and precautions according to the Federal Hazardous Products Labeling Act.

## C. Acceptance

The tests below include procedures to create specimens for the shear bond strength test.

1. When performing acceptance tests, follow the mixing instructions of the manufacturer.
2. Air-cure all test specimens except for the 7-day moist-cure compressive strength cubes.
3. Test as follows:

Test	Method
Setting time	ASTM C 807
Flexural strength	AASHTO T 97 [3 x 3 x 16 in (75 x 75 x 400 mm)] specimens
Compressive strength	ASTM C 109 or C 31, whichever is applicable
Shear bond strength	See procedures below
Absorption	ASTM C 140
Shrinkage	ASTM C 531

### 4. Shear Bond Strength Procedures

The shear bond strength in psi (MPa) equals the load in pounds (newtons) divided by the interfacial area of the patch in square inches (square millimeters). Test as follows:

- a. Cast a 8 x 2 x ½ in (200 x 50 x 13 mm) polymer patch on an air-cured 3 x 3 x 8 in (75 x 75 x 200 mm) concrete mortar base.
- b. Saw the base and polymer patch into 2 in (50 mm) segments for testing.
- c. Use a holding device and plunger to apply a load at a rate of 0.05 in (1.3 mm) per minute to the patch until failure occurs.

## D. Materials Warranty

Use a polymer concrete with a minimum storage life of 6 months under storage conditions of 40 °to 100 °F (4 °to 38 °C) and a maximum relative humidity of 90 percent.