

**SECTION 937
ADHESIVE BONDING MATERIAL SYSTEMS
FOR STRUCTURAL APPLICATIONS**

937-1 General Requirements.

Adhesive bonding material systems for structural applications shall consist of pre-packaged 2-part chemical components. The material systems shall be specifically intended for use in structural applications for bonding anchors and dowels to hardened concrete. Applications are limited to anchors and dowels installed in positions ranging from vertically downward to horizontal.

Material systems for Type V materials may be supplied in two pre-proportioned containers with one container sized to allow the contents of the second container to be added and mechanically mixed. The two components shall be distinctly pigmented so that mixing produces a third color similar to the color of concrete. Do not use material from containers which are damaged or have been previously opened. Use only full packages of components. Combining of epoxy bonding components from bulk supplies is not permitted.

Material systems for Type HV and HSHV shall be pre-packaged to automatically proportion and mix the materials for use. Manual proportioning of the components will not be permitted.

937-1.1 Type V Adhesives: Use Type V adhesive bonding materials for constructing doweled pile splices in concrete piles. Type V adhesives may not be substituted for Type HV or HSHV adhesives.

937-1.2 Type HV Adhesives: Use Type HV adhesive bonding materials for all horizontal installations and vertical installations other than constructing doweled pile splices, except when Type HSHV is required. Type HV adhesives may not be substituted for Type HSHV adhesives.

937-1.3 Type HSHV Adhesives: Use higher strength Type HSHV adhesive bonding materials for installation of traffic railing barrier reinforcement and anchor bolts into existing concrete bridge decks and approach slabs. Type HSHV adhesives may be substituted for Type V or Type HV adhesives.

937-2 Qualified Products List.

Manufacturers of adhesive bonding material systems may apply for inclusion of individual products on the Qualified Products List. The application shall be made in accordance with 6-1 and shall include certified test reports from an independent testing laboratory which shows the material system meets all the requirements specified herein.

937-3 Minimum Performance Requirements (FM 5-568).

When tested in accordance with FM 5-568, the adhesive bonding material system, for general use, shall meet the following requirements:

Uniform Bond Stress			
	Type V	Type HV	Type HSHV
Confined Tension	2,290 psi [15.8 Mpa]	2,290 psi [15.8 MPa]	3,060 psi [21.1 Mpa]
Damp-Hole Installation	1,680 psi [11.6 Mpa]	1,680 psi [11.6 MPa]	1,830 psi [12.6 Mpa]
Elevated Temperature	2,290 psi [15.8 Mpa]	2,290 psi [15.8 MPa]	3,060 psi [21.1 Mpa]
Horizontal Orientation	Not Applicable	2,060 psi [14.2 MPa]	2,060 psi [14.2 Mpa]
Short Term Cure	1,710 psi [11.8 Mpa]	1,710 psi [11.8 MPa]	1,710 psi [11.8 Mpa]
Specified Bond Strength	1,080 psi [7.5 Mpa]	1,080 psi [7.5 MPa]	1,830 psi [12.6 Mpa]

Maximum Coefficient Of Variation for Uniform Bond Stress 20%

Long Term Load (Creep):

- (1) The rate of displacement shall decrease during the 42 day application of load.

(2) At 42 days the total displacement due to creep (with load still applied) shall be less than 0.03 inch [0.75 mm] and during the last 14 days of the 42 day load duration, the total displacement due to creep shall be less than 0.003 inch [0.075 mm].

(3) After removal of the 42 day load, the uniform bond Stress from a subsequent Confined Tension Test shall not be less than 1,826 psi [12.6 MPa].

937-4 Product Identification (Fingerprint) Properties (FM 5-569).

References for comparison including Infrared Absorption, Density or Average Weight, Gel Time or Setting Time, and Bond Strength shall be determined in accordance with FM 5-569.

937-5 Packaging and Marking.

The adhesive bonding material system shall be delivered to the project site in original unopened containers with the manufacturer's label identifying the product. Each package shall be clearly marked with the following information:

- Manufacturer's name and address
- Product Name
- Date of Manufacture
- Expiration Date
- LOT Identification Number
- Storage and Handling Requirements

Each package shall include the manufacturer's instructions for anchor and dowel installation. The instructions shall include the following information:

- Diameters of drilled holes for applicable anchor and dowel sizes.
- Cleaning procedure for drilled holes, including a description of permitted and prohibited equipment and techniques.
- Allowable temperature ranges for storage, installation and curing.
- Identification of acceptable mixing/dispensing nozzles.
- Fabrication requirements for anchors and dowels.
- Description of tools permitted or required for installation.
- Method of identifying properly proportioned and mixed adhesive materials.
- Time and temperature schedule for initial set and full-strength cure.
- Special requirements for special installation conditions such as damp holes, or horizontal or near horizontal orientation of the anchor or dowel.