

**POST-INSTALLED ANCHOR SYSTEMS FOR STRUCTURAL APPLICATIONS IN
CONCRETE ELEMENTS.**

(REV 9-23-14)

SECTION 937 is deleted and the following substituted:

**SECTION 937
POST-INSTALLED ANCHOR SYSTEMS FOR
STRUCTURAL APPLICATIONS IN CONCRETE ELEMENTS.**

937-1 General.

Post-installed anchor systems intended for structural applications in concrete elements consist of adhesive-bonded anchor systems or undercut anchor systems.

937-2 Approved Product List (APL).

Manufacturers of adhesive-bonded anchor systems may apply for inclusion of individual products on the Approved Product List. The application shall be made in accordance with Section 6 and shall include certified test reports from an independent testing laboratory which shows the material system meets all the requirements of this Section.

937-3 Certification.

The Contractor shall provide the Engineer with certification from the manufacturer of the anchor system, confirming that the requirements of this Section are met. The certification shall conform to the requirements of Section 6. Each certification shall cover only one LOT of anchoring materials.

937-4 Adhesive Bonding Material Systems.

937-4.1 General: 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.

Do not use material from containers which are damaged or have been previously opened. Use only full packages of components. Combining of adhesive bonding components from bulk supplies is not permitted.

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

937-4.2 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 HV	Type HSHV
Confined Tension	2,290 psi	3,060 psi
Damp-Hole Installation	1,680 psi	1,830 psi
Elevated Temperature	2,290 psi	3,060 psi

Uniform Bond Stress		
	Type HV	Type HSHV
Horizontal Orientation	2,060 psi	2,060 psi
Short Term Cure	1,710 psi	1,710 psi
Specified Bond Strength	1,080 psi	1,830 psi
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 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.

(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.

937-4.3 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.

937-4.4 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.

937-5 Undercut Anchor Systems.

937-5.1 General: The undercut anchor system shall be constructed of Type 316 stainless steel.

The undercut anchor sleeve shall form a cone shaped undercut or expand into a preformed cone or reverse cone shaped undercut. Anchors using only self-cutting teeth that are expanded to form the undercut are not permitted.

Undercut anchors with a marked setting indicator not requiring a specified setting torque are permitted. The marked setting indicator shall indicate the displacement of the anchor bolt relative to the anchor sleeve and must be visible above the concrete surface after setting operation is complete.

Requirements provided in this Section are not applicable for anchoring conduit(s) unless specifically called for in the Plans.

937-5.2 Minimum Performance Requirements: Use undercut anchor systems designed in accordance with ACI 318, Appendix D. Use only undercut anchor systems qualified for use in cracked concrete, meeting the assessment criteria of Qualification of Post-Installed Mechanical Anchors in Concrete (ACI 355.2) as specified in ACI 318, Appendix D. Use only Category 1 undercut anchors as defined in ACI 318, Appendix D.

937-5.3 Packaging and Marking: The undercut anchor systems shall be delivered to the project site in packaging with the manufacturer's label identifying the product.

Each package or anchor shall be clearly marked with the following information:

- Manufacturer's name and address
- Product Name
- Anchor material grade
- LOT Identification Number

Include the manufacturer's instructions for installation of the anchor with each package or anchor with the following information, as a minimum:

- Diameter and depth of drilled holes for applicable anchor sizes,
- Cleaning and preparation procedures for drilled holes,
- Description of tools permitted or required for installation.