
* INCH-POUND *

RR-L-2847

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SUPERSEDING

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FEDERAL SPECIFICATION

LOAD-TRANSFER DEVICES (FOR CONCRETE SLABS AND PAVEMENTS)

This specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers load-transfer devices to transfer loads across contraction and expansion joints in concrete slabs or pavement.

1.1.1 Measurement conversion. Values used herein in the inch-pound system are converted to the metric system (see 6.7).

1.2 Classification. Load-transfer devices will be of the following groups, types, grades, and classes as specified (see 6.2).

Group CJ - Contraction joints

Type I - Steel dowel bars

Grade A - Steel dowel bars

Grade B - Polyethylene-coated dowel bars

Grade C - Epoxy-coated dowel bars

Beneficial comments (recommendations, additions, deletions) and any pertinent
 *data which may be of use in improving this document should be addressed to: *

*Commanding Officer (Code 156), Naval Construction Battalion Center, *

*1000 23rd Avenue, Port Hueneme, CA 93043-4301, by using the Standardization *

*Document Improvement Proposal (DD Form 1426) appearing at the end of this *

*document or by letter. *

AMSC N/A

FSC 3630

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Type II - Steel dowel bars in baskets

Grade A - Steel dowel bars

Grade B - Polyethylene-coated dowel bars

Grade C - Epoxy-coated dowel bars

Class 1 - All welded construction

Class 2 - Dowel bars held by mechanical means

Group EJ - Expansion joints

Type II - Steel dowel bars in baskets

Grade A - Steel dowel bars

Grade B - Polyethylene-coated dowel bars

Grade C - Epoxy-coated dowel bars

Class 1 - All welded construction

Class 2 - Dowel bars held by mechanical means

1.2.1 Part or identifying number (PIN). The load-transfer devices furnished under this specification shall be identified by a PIN consisting of the prefix and basic specification number, followed by a code number. The code number identifies the group, type, grade, and class components as shown in the following example (see 6.5):

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Example:  RRL2847 - CJ II B 1
           *      *  *  *  *----- Class
           *      *  *  *----- Grade
           *      *  *----- Type
           *      *----- Group
           *----- Specification number

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The above example identifies a group CJ (contraction joint), type II (steel bars and baskets), grade B (polyethylene-coated dowel bars), class 1 (all welded construction) load-transfer device.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

Federal Specifications

L-C-530 - Coating, Pipe, Thermoplastic Resin

PPP-B-601 - Boxes, Wood, Cleated-Plywood

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Military Specification

MIL-P-116 - Preservation, Methods of

Military Standards

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes

MIL-STD-129 - Marking for Shipment and Storage

MIL-STD-147 - Palletized Unit Loads

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Other publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

American Association of State Highway and Transportation Officials (AASHTO):

AASHTO M254 - Corrosion Resistant Coated Dowel Bars

(Application for copies should be addressed to the American Association of State Highway and Transportation Officials, 444 N. Capitol St., NW, Suite 225, Washington, D.C 20001)

ASTM:

ASTM A510	- General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel
ASTM A615/A615M	- Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM A616/A616M	- Rail-Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A617/A617M	- Axle-Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A659/A659M	- Steel, Carbon (0.16 Maximum to 0.25 Maximum Percent), Hot-Rolled Sheet and Strip, Commercial Quality
ASTM A663/A663M	- Steel Bars, Carbon, Merchant Quality, Mechanical Properties
ASTM A706/A706M	- Low Alloy Steel Deformed Bars for Concrete Reinforcement
ASTM A853	- Steel Wire, Carbon, for General Use
ASTM B117	- Salt Spray (Fog) Testing
ASTM C31	- Making and Curing Concrete Test Specimens in the Field
ASTM C39	- Compressive Strength of Cylindrical Concrete Specimens
ASTM C109	- Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or 50-mm Cube Specimens)
ASTM C150	- Portland Cement
ASTM C192	- Making and Curing Concrete Test Specimens in the Laboratory
ASTM C470	- Molds for Forming Concrete Test Cylinders Vertically
ASTM D3951	- Commercial Packaging

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(Applications for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103.)

(Non-Government standards and other publications are normally available from the organizations which prepare or which distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification takes precedence. Nothing in this specification, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Description. Load-transfer devices (referred to herein as "devices") shall be suitable for use in providing load-transfer across joints in concrete slabs or pavements. Group CJ devices shall limit tensile stresses in the concrete pavement and transfer the vertical load at the joints. Group CJ, type I, shall consist of dowel bars, coated or uncoated, that are usually embedded into the pavement by mechanical vibration during pouring operations. Group CJ, type II shall be made up of dowel bars and baskets (see figure 1 for example). The dowel bars shall be similar to type I dowel bars. The baskets are made of bent reinforcing rod, bar, wire, or fabricated from steel plate and manually placed to hold the dowel bars in proper location until the pavement is poured and set. Group EJ devices shall provide space for expansion of the pavement and thereby prevent the development of compressive stresses of damaging magnitude, in addition to transferring the vertical load at the joints. Group EJ, type II devices shall be similar to type II of group CJ, except that the baskets shall provide a means of holding the fibrous or elastomeric joint material in proper position, as well as holding the devices.

3.2 Standard commercial product. The load-transfer device shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this specification, but which are a part of the manufacturer's standard commercial product shall be included in the load-transfer device being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs, or brochures, and represents the latest production model.

3.3 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.2.1 and 6.2).

3.4 Materials. Materials used shall be free from defects which would adversely affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice. Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this specification are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without

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jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specified.

3.5 Interchangeability. All units of the same classification furnished with similar options under a specific contract shall be identical to the extent necessary to insure interchangeability of component parts, assemblies, accessories, and spare parts.

3.6 Design. The device shall be designed to withstand strains, jars, vibrations, and other conditions incidental to shipping, storage, and installation. When type II devices of group CJ and EJ are required, the devices shall be suitable for the specified installation (see 6.2).

3.6.1 Engineering drawings. A complete set of engineering drawings and associated data used to manufacture, test, and install the load transfer devices shall be provided (see 6.2). The contractor's standard drawing practices shall apply (see 4.5.7).

3.6.2 Assembly and installation instructions. Assembly and installation instructions shall be provided so that engineers on the construction project can properly use the load transfer devices in the intended application (see 4.5.7 and 6.2).

3.7 Performance. Performance of the load-transfer devices for all grades and classes shall be based on tests performed on dowel bars, 1.125 inches in diameter by 18 inches long, constructed of the materials and coatings specified herein. The dowel bars and baskets shall be tested when embedded in concrete test specimens as described in 4.5.3. When subjected to the tests specified in 4.5, the devices shall meet the following requirements, as indicated for the various designated types and grades.

3.7.1 Type I, grade A. Deflections across each joint of the load-deflection test specimen shall be not greater than 0.01 inch at a load of 8,000 pounds (lb) when tested in accordance with 4.5.3.

3.7.2 Type I, grade B. The performance of type I, grade B load-transfer devices shall meet the following requirements:

- a. Deflections across each joint of the load-deflection test specimen shall be not greater than 0.01 inch at a load of 8,000 lb when tested in accordance with 4.5.3.
- b. The initial and post freeze-thaw bond strengths for each pull-out test specimen shall be not greater than 60 pounds per square inch (lbf/in²) for the 0.5 inch of movement when tested in accordance with 4.5.4. The bond strength in lbf/in² will be determined by dividing the embedded surface area of the dowel into the maximum tensile load.
- c. The depth of abrasion of any coating shall be not greater than 0.01 inch when subjected to the abrasion tests of 4.5.5.
- d. The coated dowels shall show no apparent corrosion when viewed under five power magnification when tested in accordance with 4.5.6.

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3.7.3 Type I, grade C. The performance of type I, grade C devices shall meet the following requirements:

- a. Deflections across each joint of the load-deflection test specimen shall be not greater than 0.01 inch at a load of 8,000 lb when tested in accordance with 4.5.3.
- b. The coated dowels shall show no apparent corrosion when viewed under five power magnification when tested in accordance with 4.5.6.

3.7.4 Baskets and dowel bars for type II devices. The physical quality of construction for the baskets and dowel bars of Type II devices shall be sufficiently strong and rigid to withstand the forces imposed by transportation, handling, installation, and concrete placement when tested in accordance with 4.5.7. When installed and ready for concrete placement, all dowel bar sliding surfaces of the completed joint assembly shall have no more than 0.375 inch per foot maximum allowable vertical and horizontal displacement. The misalignment of one end of a completed device, with respect to the other end in achieving a perpendicular alignment with the longitudinal axis of the pavement, shall be not greater than 1 inch.

3.8 Construction.

3.8.1 Dowel bars. The diameter, length, and spacing of the dowel bars shall be in accordance with table I for the pavement thickness specified (see 6.2). The free ends of the dowel bars shall be saw-cut and free from burrs or projections that would restrict movement. Grade B and grade C dowel bars shall be coated with a material resistant to the penetration of oil and salt solutions (see 3.8.1.2 and 3.8.1.3). The coating shall be tightly bonded to the dowel bar so that no loops or folds occur due to movement of the joint. When specified in the contract, a bond breaker shall be provided not to exceed 50 or 200 pound pullout force as specified (see 6.2)

TABLE I. Minimum dowel bar requirements.

* Pavement thickness (inches) *	* Dowel bar diameter (inches) *	* Dowel bar length (inches) *	* Dowel bar spacing (inches) *
* 6 *	* 0.75 *	* 18 *	* 12 *
* 7 *	* 1 *	* 18 *	* 12 *
* 8 *	* 1 *	* 18 *	* 12 *
* 9 *	* 1.125 *	* 18 *	* 12 *
* 10 *	* 1.125 *	* 18 *	* 12 *
* 11 *	* 1.25 *	* 20 *	* 15 *
* 12 *	* 1.25 *	* 20 *	* 15 *
* 13 *	* 1.25 *	* 20 *	* 15 *
* 14 *	* 1.25 *	* 20 *	* 15 *
* 15 *	* 1.25 *	* 20 *	* 15 *
* 16 to 20 *	* 1.5 *	* 24 *	* 15 *

3.8.1.1 Grade A - steel dowel bars. Steel dowel bars shall be in accordance with ASTM A615, A616, A617, A663, or A706 as specified in the contract, having a yield strength of not less than 40,000 lbf/in², and shall be coated to pass a 1,500 hour salt spray test of ASTM B117.

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3.8.1.2 Grade B - polyethylene-coated dowel bars. Polyethylene-coated dowel bars shall be in accordance with AASHTO M254 Type A, grade 40, 60, or 75 steel as specified in the contract. The coating material shall be a high-density polyethylene and shall be self-lubricating, nonbondable to the concrete. The adhesive-thermoplastic resin system coating shall be in accordance with L-C-530, type I, except that the following shall apply:

- a. The thickness of polyethylene equal to 0.017 inch +/-20 percent.
- b. A tensile strength of not less than 3,000 lbf/in².
- c. An elongation of not less than 100 percent.
- d. A nominal adhesive thickness of 0.004 inch.

3.8.1.3 Grade C - epoxy-coated dowel bars. Epoxy-coated dowel bars shall be in accordance with AASHTO 254, Type B, conforming to grade 40, 60, or 75 steel as specified in the contract. The thermosetting epoxy system coating shall be in accordance with L-C-530, type II, unless otherwise specified in the contract (see 6.2).

3.8.2 Basket assemblies. Unless otherwise specified in the contract (see 6.2), when a paving lane is 16 feet wide or wider, the length of each basket assembly shall be 50 percent of the width of the paving lane. When the paving lane is less than 16 feet wide, the basket assembly length shall be equal to the paving lane width. Manufacturer's standard tolerances on end clearance and length of the unit shall apply. The dowel bars shall be assembled and spaced transversely to the joint as specified in table I. The longitudinal axis of each dowel bar shall be aligned and placed both vertically and horizontally parallel on the cross-section centerline of the pavement. The maximum allowable vertical and horizontal displacement of a given dowel shall be as specified in 3.7.4. When group EJ assemblies are required, means shall be provided to hold the joint filler material in the center of the assembly in a vertical position. Any damage resulting when dowel bars are welded or mechanically attached to the basket assemblies, shall not extend greater than 1 inch in from the weld or point of fixation. The free end of group EJ dowel bars shall be provided with a cap for installation (see 3.8.3). No less than one steel stake for each 2 feet of basket length shall be furnished with each assembly.

3.8.2.1 Baskets with welded dowel bars. Baskets of arc or resistance welded construction shall be of rounded steel bars or wire conforming to ASTM A510 or A853 suitable for welding and bending without surface cracks (see 6.2). No less than two side bars or wires to each side, of not less than 0.3 inch in diameter shall be used the full length of the basket. Alternate ends of the dowel bars shall be welded to the basket. When sheet steel fabrications are used, they shall conform to ASTM A659, or better.

3.8.2.2 Baskets with dowel bars held mechanically. Baskets with dowel bars held by mechanical means shall be made of round wire suitable for bending without surface cracks conforming to ASTM A510 or A853 (see 6.2). Only two wires 0.3 inch in diameter on the bottom of the basket need be welded to the formed upright wires. The formed upright wires shall hold the dowel bars by mechanical means. When formed sections are used, steel conforming to ASTM A659 or better shall be used.

3.8.3 Expansion joint caps. A loosely fitting cap suitable for use with the dowel bars in type II assemblies shall be made of steel or plastic. Caps will

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be designed so that they will not collapse when embedded in concrete. The cap shall extend a length equal to two to three times the diameter of the dowel bar, with a closed end. To provide free expansion of the dowel bar, the closed end of the cap shall be held not less than one diameter from the end of the dowel bar by a stop or other suitable means. One cap for each dowel bar shall be provided.

3.9 Workmanship. Devices shall be processed in such a manner as to be uniform in quality and shall be free of burrs, grazing, cracks, voids, dimples, chips, blisters, pinholes, sharp cutting edges, and any other defects that will adversely affect life or serviceability.

3.9.1 Steel fabrication. The steel used in fabrication shall be free from kinks, sharp bends, and other conditions which would be deleterious to the finished product. Manufacturing processes shall not reduce the strength of the steel to a value less than intended by the design. Manufacturing processes shall be done neatly and accurately. All bends shall be made by controlled means to insure uniformity of size and shape.

3.9.2 Welding. Unless otherwise specified in the contract (see 6.2), arc or resistance welding procedures shall be in accordance with a nationally recognized welding code. The surface of parts to be welded shall be free from rust, scale, paint, grease, or other foreign matter. Welds shall be of sufficient size and shape to develop the full strength of the parts connected by the welds. Welds shall transmit stress without permanent deformation or failure when the parts connected by the weld are subjected to proof and service loadings.

3.9.3 Certificate of compliance (COC). When specified (see 6.2) a COC shall be provided with the finished product to assure the Government that the product meets or exceeds all the requirements of this specification and applicable references. This data shall include but not be limited to the specified performance characteristics, materials, coatings and the suitability of the product to meet its intended use.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is

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an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Material inspection. The contractor is responsible for insuring that supplies and materials are inspected for compliance with all the requirements specified herein and in applicable referenced documents.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.2.1).
- b. Quality conformance inspection (see 4.2.2).

4.2.1 First article inspection. The first article inspection shall be performed on the number of devices specified in table II when a first article is required (see 3.3 and 6.2). This inspection shall include the examination of 4.4 and the applicable tests specified in table II. The first article may be either a first production item or a standard production item from the supplier's current inventory provided the item meets the requirements of the specification and is representative of the design, construction, and manufacturing technique applicable to the remaining items to be furnished under the contract.

4.2.2 Quality conformance inspection. The quality conformance inspection shall include the examination of 4.4, the tests of 4.5, and the packaging inspection of 4.6. This inspection shall be performed on the samples selected in accordance with 4.3.

4.3 Sampling. Sampling and inspection procedures shall be in accordance with MIL-STD-105. The unit of product shall be one complete device. All devices offered for delivery at one time shall be considered a lot for the purpose of inspection. If an inspection lot is rejected, the contractor may rework it to correct the defects, or screen out the defective units, and resubmit for a complete reinspection. Resubmitted lots shall be reinspected using tightened inspection. If the rejected lot was screened, reinspection shall be limited to the defect causing rejection. If the lot was reprocessed, reinspection shall be performed for all defects. Rejected lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

4.3.1 Sampling for examination. Examination shall be based on inspection level S-3.

4.3.2 Sampling for tests. Tests shall be based on inspection level S-3.

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TABLE II. Schedule of required first article tests.

-----	*-----*	*-----*	*-----*	*-----*	*-----*
* Test/Test Paragraph	* Type I * Grade A	* Type I * Grade B	* Type I * Grade C	* Type II Basket * Assemblies, all Grades * and Classes	*-----*
* Test Cylinder	*	*	*	*	*
* Compressive	*	*	*	*	*
* Strength/4.5.2	* X	* X	* X	*	*
* Load Deflection/	*	*	*	*	*
* 4.5.3	* X	* X	* X	*	*
* Pull-out/4.5.4	*	* X	*	*	*
* Abrasion/4.5.5	*	* X	*	*	*
* Corrosion/4.5.6	*	* X	* X	*	*
* Transportation and	*	*	*	*	*
* Installation/4.5.7	*	*	*	* X	*
* Number of Devices	*	*	*	*	*
* Required for	*	*	*	* 1 assembly consisting	*
* First Article	* 6	* 12	* 9	* of 12 dowel bars	*

4.4 Examination. Each device shall be examined for compliance with the requirements in section 3 of this specification. This element of inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirement shall constitute one defect.

4.5 Tests.

4.5.1 Test conditions. The following conditions shall be met for the tests required in 4.5.2 through 4.5.6, as applicable:

- Cement used for test cylinders and test specimens shall be type III Portland cement in accordance with ASTM C150.
- Standard 6- by 12-inch test cylinders shall be made from the same concrete batch used to make the required test specimens.
- The test cylinders and specimens shall be made and cured in accordance with ASTM C31, C192, and C470.
- Grade A and Grade C dowel bars, to be embedded for testing, shall be greased 60 percent of their length before casting.

4.5.2 Test cylinder compressive strength test. The standard cylinders required in 4.5.1 shall be tested in accordance with ASTM C39 when they have cured a total of 7 days. Failure of a cylinder to withstand a compressive force of 3,500 lbf/in² shall be cause for rejection of the corresponding test specimen poured for the tests of 4.5.3 and 4.5.4.

4.5.3 Load-deflection test. Dowel bars selected in accordance with 4.3 shall be embedded in concrete test specimens as shown in figure 1. Three complete specimens shall be tested. Contraction joints shall be formed by two-piece plates, 0.375 inch thick. A universal test machine shall be used to apply an 8,000 lb uniform load to the unsupported center of each specimen as shown in figure 2. The relative deflection between the center and end sections shall be measured with dial indicator gages to the nearest 0.001 inch. Measured deflections greater than 0.01 inch with an 8,000 lb load shall be cause for rejection of the associated device.

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4.5.4 Pull-out test. Grade B dowel bars, selected in accordance with 4.3, shall be axially centered and embedded 50 percent of their length in standard concrete test cylinders. Three test cylinders with dowel bars shall be tested. The concrete shall be consolidated by the vibration method of ASTM C192. The test shall be conducted following curing for a total of 4 days. A universal test machine shall be used to determine the concrete-dowel bar bond strength. The tensile loading shall be applied to the bar at a rate that produces an increasing bond stress of 50 lbf/in² per minute. After the first 0.5 inch of movement, the corrosion test of 4.5.6 shall be conducted. At the completion of the corrosion test, the dowel shall be pulled an additional 0.5 inch as before. The concrete shall then be chipped away from the dowel bar. Any bond strength in excess of 60 to 200 pounds pull out as specified (see 3.8.1 and 6.2), or any torn or perforated coating, shall be cause for rejection of associated dowel bars.

4.5.5 Abrasion test. Three Grade B dowel bars selected in accordance with 4.3 shall be abraded by an abradometer which shall be operated between 60 and 70 double strokes per minute using a 4-inch long stroke with a 4-inch long abrading block. The abrading block shall be made of Portland cement and sand mortar in accordance with ASTM C109. The mortar shall be cast to fit over one-third of the cross-sectional perimeter of the test dowel bars. The test load shall be the 90-ounce weight of the abrading assembly. Each dowel bar shall be tested for a total of 10,000 double strokes. The corrosion test of 4.5.6 shall be applied at the completion of the abrasion test. Any protective coating worn away, perforated, or wrinkled, or any depth of abrasion greater than 0.01 inch shall be cause for rejection of the associated dowel bars.

4.5.6 Corrosion test. The cylinders and dowel bars used in the pull-out test of 4.5.4, dowel bars from the abrasion test of 4.5.5, and Grade C dowel bars selected in accordance with 4.3 shall be subjected to the salt spray test of ASTM B117 for 1,500 hours. Any protective coating perforations or wrinkles, or corrosion apparent under five-power magnification shall be cause for rejection of the associated dowel bars.

4.5.7 Transportation and installation test. A transportation and installation test shall be conducted on one type II assembly. A basket assembly with not less than 12 dowel bars shall be supplied and shall be furnished unassembled. At the test site, the components shall be assembled and welded as per instructions, loaded on a truck and transported to a simulated installation site. At the installation site, the unit shall be offloaded, hand-carried not less than 100 feet and installed. Any failure of the welding or alinement not in accordance with 3.7.4 shall be cause for rejection of the load-transfer device.

4.6 Inspection of packaging. Except when industrial packaging is specified, the sampling and inspection of the preservation and interior package marking shall be in accordance with groups A and B quality conformance inspection requirements of MIL-P-116. The sampling and inspection of the packing and marking for shipment and storage shall be in accordance with the quality assurance provisions of the applicable container specification shown in Section 5 and the marking requirements of MIL-STD-129. The inspection of industrial packaging shall be as specified in the contract (see 6.2).

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5. PACKAGING

5.1 Preservation and packing. Preservation and packing shall be level A or Commercial as specified (see 6.2).

5.1.1 Cleaning and drying. Surfaces shall be cleaned by process C-1 and dried by any applicable procedure of MIL-P-116.

5.1.2 Level A. Devices shall be preserved method III in accordance with MIL-P-116 and packed in a box conforming to PPP-B-601, overseas type.

5.1.3 Commercial. The devices shall be packaged in accordance with ASTM D3951.

5.2 Palletization. Material shall be palletized in accordance with MIL-STD-147, when the following criteria are met:

- a. Load to consist of four or more unskidded containers; and,
- b. Load shall utilize a minimum of 80 percent of the pallet base.

5.3 Marking. Marking shall be in accordance with MIL-STD-129.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Load-transfer devices covered by this specification are intended for use in concrete runways and in concrete road pavements to limit the tensile and compressive stress in the concrete and to transfer the vertical loads at the joints.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Group, type, grade, and class of the load-transfer device (see 1.2).
- c. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- d. When first article and inspection sample is required (see 3.3 and 4.2.1).
- e. When type II load-transfer devices of groups CJ and EJ are required, the following information is furnished (see 3.6):
 - (1) Width of pavement.
 - (2) Width of paving lane.
 - (3) Pavement thickness.
 - (4) Edge thickening, if required.
 - (5) Depth of cut or seal space.
 - (6) Camber or crown in pavement, if required.
 - (7) Joint width (joint filler thickness).
 - (8) Distance from edge of paving lane to center of first dowel bar (shall be equal from both paving lane edges).

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- f. When layout drawings of the devices are required (see 3.6.1)
- g. Installation instructions required (3.6.2)
- h. Pavement thickness, when bond breaker is required, and pullout force (see 3.8.1)
- i. Type of steel and coating required (see 3.8.1.1, 3.8.1.2 and 3.8.1.3)
- j. Width of basket assembly (see 3.8.2)
- k. Type of material required for baskets (see 3.8.2.1 and 3.8.2.2)
- l. Welding specified (see 3.9.2)
- m. When a COC is required (see 3.9.3)
- n. Inspection method for industrial packaging (see 4.6)
- o. Level of preservation and packing required (see 5.1)

6.3 First article. When a first article inspection is required, the item will be tested and should be a first production item or it may be a standard production item from the contractor's current inventory as specified in 4.2.1. The first article should consist of the specified number of load-transfer devices (see table II). The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract.

6.4 Part or identifying number. The PIN for the devices specified herein are assigned the PIN code number as shown in table III.

TABLE III. PIN code numbers.

*		*		*		*		PIN	*
*	GROUP	*	TYPE	*	GRADE	*	CLASS	*	CODE NUMBER
*		*		*		*			*
*	CJ	*	I	*	A	*	N/A 1/	*	CJIA
*	CJ	*	I	*	B	*	N/A	*	CJIB
*	CJ	*	I	*	C	*	N/A	*	CJIC
*		*		*		*		*	
*	CJ	*	II	*	A	*	1	*	CJIIA1
*	CJ	*	II	*	A	*	2	*	CJIIA2
*		*		*		*		*	
*	CJ	*	II	*	B	*	1	*	CJIIB1
*	CJ	*	II	*	B	*	2	*	CJIIB2
*		*		*		*		*	
*	CJ	*	II	*	C	*	1	*	CJIIC1
*	CJ	*	II	*	C	*	2	*	CJIIC2
*		*		*		*		*	
*	EJ 2/	*	II	*	A	*	1	*	EJIIA1
*	EJ	*	II	*	A	*	2	*	EJIIA2
*		*		*		*		*	
*	EJ	*	II	*	B	*	1	*	EJIIB1
*	EJ	*	II	*	B	*	2	*	EJIIB2
*		*		*		*		*	

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TABLE III. PIN code numbers (continued).

* GROUP	* TYPE	* GRADE	* CLASS	* PIN	* CODE NUMBER	*

* EJ	* II	* C	* 1	* EJIIC1	*	*
* EJ	* II	* C	* 2	* EJIIC2	*	*

1/ N/A - Not applicable. Class 1 and class 2 devices are not available with group CJ, type I load-transfer devices.

2/ Type I is not available with group EJ load-transfer devices.

6.5 Subject term (key word) listing.

Contraction joints

Dowel bars

Expansion joints

6.6 Cross-reference. The classification of the devices covered by this specification does not differ from the classification of the superseded revision. The following is for historical purposes only:

MIL-L-17202C(YD)	MIL-L-17202D(YD)	RR-L-2847
Group CJ	Group CJ	Group CJ
Type I	Type I	Type I
Grade A	Grade A	Grade A
Grade B	Grade B	Grade B
Grade C	Grade C	Grade C
Type II	Type II	Type II
Grade A	Grade A	Grade A
Grade B	Grade B	Grade B
Grade C	Grade C	Grade C
Class 1	Class 1	Class 1
Class 2	Class 2	Class 2
Group EJ	Group EJ	Group EJ
Type II	Type II	Type II
Grade A	Grade A	Grade A
Grade B	Grade B	Grade B
Grade C	Grade C	Grade C
Class 1	Class 1	Class 1
Class 2	Class 2	Class 2

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6.7 Measurement conversion. Numerical values used herein are converted to metric values using FED-STD-376 as indicated below:

Inch-pound		Metric
Linear		
0.001 inch		0.0254 millimeters (mm)
0.004 inch		0.1016 mm
0.009 inch		0.2286 mm
0.01 inch		0.254 mm
0.017 inch		0.4318 mm
0.125 inch		3.175 mm
0.25 inch		6.35 mm
0.3 inch		7.62 mm
0.375 inch		9.525 mm
0.5 inch		12.7 mm
0.75 inch		19.05 mm
1 inch		25.4 mm
1.125 inches		28.575 mm
1.25 inches		31.75 mm
1.5 inches		38.1 mm
4 inches		0.1016 meters (m)
6 inches		0.1524 m
7 inches		0.1778 m
8 inches		0.2032 m
9 inches		0.2286 m
10 inches		0.254 m
11 inches		0.2794 m
12 inches		0.3048 m
13 inches		0.3302 m
14 inches		0.3556 m
15 inches		0.381 m
16 inches		0.4064 m
18 inches		0.4572 m
20 inches		0.508 m
24 inches		0.6096 m
16 feet		4.877 m
100 feet		30.48 m
7 mils		0.1778 mm
Force		
90 ounces (5.625 pounds)		2550 grams (25.02 newtons (N))
50 pounds		222 N
60 pounds		267 N
200 pounds		889 N
8,000 pounds		36 kilonewton (kN)

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Force per square inch

50	lbf/in ²	344.8	kilopascal (kPa)
60	lbf/in ²	413.7	kPa
3,000	lbf/in ²	20 684	kPa
3,500	lbf/in ²	24 131	kPa
40,000	lbf/in ²	275 790	kPa

6.8 Supersession data. This specification replaces military specification MIL-L-17202D(YD) dated 30 September 1988.

MILITARY INTERESTS:

Custodians

Army - ME
Navy - YD1
Air Force - 99

Review Activities

Air Force - 84
DLA - GS

CIVIL AGENCY COORDINATING ACTIVITIES:

DOT - FAA
GSA - FSS (7FXE)

PREPARING ACTIVITY:

Navy - YD1
(Project 3630-0010)

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[FIGURE 1. Load deflection test specimen.] - GRAPHIC NOT INCLUDED

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[FIGURE 2. Load deflection test load application.] - GRAPHIC NOT INCLUDED