

W-F-408E
December 20, 1989
TO SUPERSEDE
W-F-408D
30 March 1984

FEDERAL SPECIFICATION

FITTINGS FOR CONDUIT, METAL, RIGID
(THICK-WALL AND THIN-WALL (EMT) TYPE)

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 raintight, concrete tight, and miscellaneous fittings for rigid metal conduit and electrical metallic tubing. This document does not cover fittings designed specifically to meet the requirements of the National Electrical Code for use in hazardous locations or cast metal outlet bodies and floor boxes.

1.2 Classification.

1.2.1 Types, classes, kinds, styles, sizes, and materials. Fittings furnished under this document will be of the following types, classes, styles, materials, and sizes, as specified (see 6.2).

NOTE: Classes, kinds, styles, and materials of the type I and type II fittings are identical except for type II, kind G.

Type I - Raintight (see 6.3).

Class 1 - Fittings for thick-wall conduit.

Kind A - Coupling, electrical conduit threadless.

Kind B - Box connector, electrical, straight, threadless.

Style 1 - Uninsulated.

Style 2 - With insulated throat.

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, Port Hueneme, CA 93043-5000, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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(Types, classes, kinds, styles, sizes, and materials continued)

Kind X - Box connector, (hub), electrical, straight, threaded.

Style 1 - Uninsulated.

Style 2 - With insulated throat.

Kind C - Box connector, electrical, 90 degrees (deg.), threaded.

Style 1 - Uninsulated.

Style 2 - With insulated throat.

Kind D - Box connector, electrical, 45 deg., threaded.

Style 1 - Uninsulated.

Style 2 - With insulated throat.

Kind E - Box connector, electrical, 90 deg., threadless.

Style 1 - Uninsulated.

Style 2 - With insulated throat.

Kind F - Box connector, electrical. 45 deg., threadless.

Style 1 - Uninsulated.

Style 2 - With insulated throat.

Kind H - Adapter, electrical conduit.

Style 3 - Enlarger.

Style 4 - Reducer.

Kind J - Offset connector, electrical conduit, threaded.

Style 5 - External to internal.

Style 6 - External to external.

Class 2 - Threadless fittings for thin-wall conduit (EMT).

Kind K - Coupling, electrical conduit.

Kind L - Box connector, electrical, straight, with single locknut.

Style 1 - Uninsulated.

Style 2 - With insulated throat.

Kind M - Box connector, electrical, 90 deg.

Style 1 - Uninsulated.

Style 2 - With insulated throat.

Kind N - Box connector. electrical, 45 deg.

Style 1 - Uninsulated.

Style 2 - With insulated throat.

Kind Y - Offset connector, electrical conduit.

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(Types, classes, kinds, styles, sizes, and materials continued)

Type II - Concrete tight (see 6.3).

Class 1 - Fittings for thicken conduit.

Kind 6 - Union, electrical conduit.

Type III - Miscellaneous fittings.

Class 1 - Fittings for thick-wall conduit.

Kind P - Locknut, electrical conduit.

Kind Q - Bushing, electrical conduit, metal.

Style 1 - Uninsulated.

Style 2 - With insulated throat.

Style 7 - Capped.

Style 8 - Grounding.

Style 9 - Grounding, insulated.

Kind R - Bushing, electrical conduit, nonmetallic.

Kind S - Bushing, electrical conductor, nonmetallic.

Kind T - Chase nipple, conduit. metal.

Style 1 - Uninsulated.

Style 2 - With insulated throat.

Class 2 - Threadless fittings for thin-wall conduit (EMT).

Kind U - Bushing, electrical conduit, metal.

Style 1 - Uninsulated.

Style 2 - With insulated throat.

TABLE I. Sizes.

Size Code	Size
01	0.50 - 1/2 inch
02	0.75 - 3/4 inch
03	1.00 - 1 inch
04	1.25 - 1-1/4 inch.
05	1.50 - 1-1/2 inch
06	2.00 - 2 inch
07	2.50 - 2-1/2 inch
08	3.00 - 3 inch.
09	3.50 - 3-1/2 inch
10	4.00 - 4 inch

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TABLE II. Materials.

<u>Material Code</u>	<u>Material</u>
A	Aluminum Alloy
C	Cast Iron
M	Malleable Iron
S	Steel
Z	Zinc Alloy

1.2.2 Part or Identifying Number (PIN). A specification-based PIN to identify types and sizes of items is included in Section 6.1

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specification and standards. The following specification and standards form a part of this document 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).

SPECIFICATION

MILITARY

MIL-E-17555 - Electronic and Electrical Equipment, Accessories, and Repair Parts: Packaging and Packing of.

STANDARDS

FEDERAL

FED-STD-123 - Marking for Shipment (Civil Agencies).

MILITARY

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

MIL-STD-129 - Marking for Shipment and Storage.

(Unless otherwise indicated, copies of specifications and standards are available from Military Specifications and Standards, Bldg. 4B, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

(Copies of military specifications and standards required by contractors in connection with specific acquisition functions should be obtained from the procuring activity or as directed by the contracting officer.)

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2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents which is current on the date of the solicitation (see 6.2).

ASTM

ASTM 8 86 - Standard Specification for Zinc-Alloy Die Castings.

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

UNDERWRITERS LABORATORIES INC. (UL)

UL 467 - Standard for Grounding and Bonding Equipment.

UL 514B - Fittings for Conduit and Outlet Boxes.

(Application for copies should be addressed to the Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062.)

(Non-Government standards and other publications are normally available from the organizations which prepare or that 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 document and the references cited herein (except for associated detail specifications, specifications 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 Codes and standards. The fittings shall conform to the requirements of UL 467 and UL 514B as applicable.

3.1.1 Compliance. Prior to approval of the first shipment, the contractor shall submit to the contracting officer, or his authorized representative, satisfactory evidence that the fittings the proposed to furnish under this specification meets the requirements of UL 467 and UL 514B as applicable.

3.1.2 Underwriters Laboratories, Inc. Acceptable evidence of meeting the requirements of UL 467 and UL 514B shall be the UL certification symbol or label, listing in the Listing File, or a certified test report from a

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recognized independent testing laboratory indicating the fittings has been tested and conforms to UL 467 and UL 514B. Such evidence must be acceptable to the contracting officer.

3.2 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 document are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without 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. Unless otherwise specified, none of the above shall be interpreted to mean that the use of used or rebuilt products are allowed under this specification.

3.2.1 Metallic materials. Fittings and component parts of fittings shall be made of steel, malleable iron, cast iron, or non-ferrous metals as specified. Fittings made from die-cast zinc material shall conform to ASTM B 86.

3.2.2 Insulating material. Insulating material used for fittings and component parts of fittings shall be suitable for use in concrete, and shall conform to the requirements of UL 514B.

3.3 Standard commercial product. The conduit fittings shall, as a minimum, be in accordance with the requirements of this document 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 conduit fittings 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.

3.4 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.

3.5 Electrical continuity. A fitting shall join with other parts of the raceway system in such a manner as to provide continuous electrical conductivity when tested for Electrical Continuity in accordance with 4.6.

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3.6 Grounding and bonding. Fittings and accessories furnished under this specification shall meet all the applicable requirements stated in UL 467.

3.7 Identification marking. Each fittings and accessory shall be marked in accordance with the requirements set forth in UL 467 and UL 514B.

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 document 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 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. Quality conformance inspection (see 4.3).
- b. Preparation for delivery inspection (see 4.7).

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

4.4 Sampling. Sampling and inspection procedures shall be in accordance with MIL-STD-105. The unit of product shall be one fitting. All fittings offered for delivery at one time shall be considered a lot for the purpose of inspection. Sampling for examination (see 6.4).

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4.4.1 Sampling for examination. Examination shall be based on inspection level II and an Acceptable Quality Level (AQL) of 1.5 percent defective.

4.4.2 Sampling for tests. Tests shall be based an inspection level S-4 and an AQL of 1.0 percent defective (see 6.4).

4.5 Examination. Each fitting shall be examined for compliance with the requirements specified in section 3 of this document. Any redesign or modification of the contractor's standard product to comply with specified requirements, or any necessary redesign or modification following failure to meet specified requirements shall receive particular attention for adequacy and suitability. This element of inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirements or presence of one or more defects preventing or lessening maximum efficiency shall constitute cause for rejection.

4.5.1 Standards compliance. The contractor shall make available to the contracting officer or his authorized representative evidence of compliance with the applicable standards cited in 3.1.

4.6 Tests. Each sample selected in accordance with 4.4 shall be tested in accordance with UL 467 and UL 514B as applicable for type specified.

4.7 Preparation for delivery inspection. The preservation, packaging, and packing of the item shall be inspected to verify compliance to the quality conformance inspection requirements of MIL-E-17555.

5. PREPARATION FOR DELIVERY

5.1 Preservation and packing. Preservation and packing shall be in accordance with the requirements of MIL-E-17555 with the level of preservation and the level of packing as specified (see 6.2).

5.2 Marking.

5.2.1 Civil agencies. Shipments to civil agencies shall be marked in accordance with FED-STD-123.

5.2.2 Military agencies. Shipments to military agencies shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. Raintight fittings are intended for outdoor use. Concrete tight fittings are intended for embedment in fresh concrete. A raintight fitting is also considered to be concrete tight. Raintight and concrete tight fittings are suitable for general use.

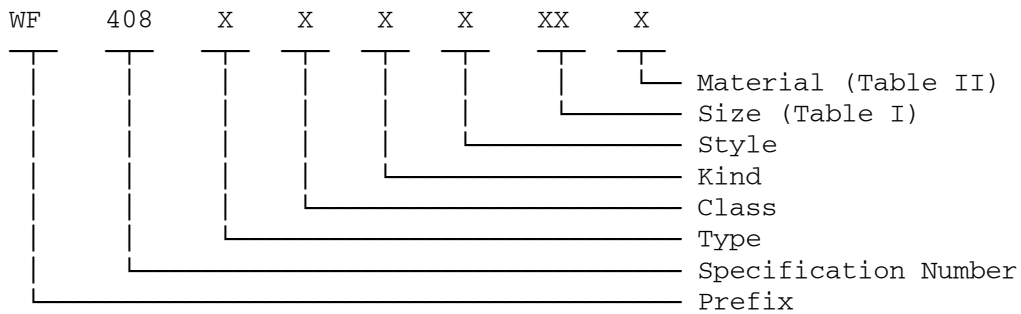
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6.2 Ordering data. Purchasers should select the preferred options permitted herein, and include the following information in procurement documents:

- a. Title, number, and date of this specification.
- b. Type, class, kind, style, size, and material of fittings required (see 1.2.2).
- 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. Level of preservation and level of packing required (see 5.1).

6.2.1 Part or Identifying Number (PIN). The PINs to be used for items acquired to this specification are created as follows:

W-F-408 - 1 - 1- A - 2 - 03 - S, represents a Type 1, Class 1, Kind A, Style 2, Size 03, and Material S (see 1.2.1 and 1.2.2).



6.3 Definitions.

Raintight fitting. A raintight tight fitting is one so designed that, when assembled in the intended manner and exposed to a beating rain, it will not permit the entrance of water into the interior of the fitting.

Concrete tight fitting. A concrete tight fitting is one so designed that, when assembled in the intended manner and embedded in freshly mixed concrete, it will not permit the entrance of cement into the interior of the fitting.

6.4 Sampling procedures.

6.4.1 Sampling for examination. Recommended Inspection Level is II and Acceptable Quality Level is 1.5 percent defective (see 4.4).

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6.4.2 Sampling for tests. Recommended Inspection Level is S-4 and AQL is 1.0 percent defective (see 4.4).

MILITARY INTERESTS:

CIVIL AGENCY COORDINATING ACTIVITIES:

Custodians

GSA-FSS, PBS

Army - ME

PREPARING ACTIVITY:

Navy - YD

Air Force - 85

Navy - YD

Review Activities

DoD project 5975-1049

Air force - 99

DLA - GS

User Activities

Army - CE

Navy - MC

Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein.