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W-P-115C
March 14, 1990
SUPERSEDING
W-P-115B
June 8, 1984

FEDERAL SPECIFICATION

PANEL, POWER DISTRIBUTION

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 panelboards for the control and protection of power circuits, including feeder distribution panelboards; electric lighting and/or appliance branch circuits; and other units specifically designed for panelboard assembly.

1.2 Classification.

1.2.1 Types and classes. Panelboards furnished under this specification shall be of the following types and classes, as specified (see 6.2).

Types:

Type I - Circuit breaker equipped
Type II - Fusible switch equipped
Type III - Fuse equipped

Classes:

Class 1 - Panelboard
Class 2 - Load center

NOTE 1: Class 1 panelboards are panelboards with mains ratings up to 1,200 amperes maximum and enclosure requirements as indicated in 3.8.2, 3.8.7 and 3.8.8.

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* 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. *

FSC 6110

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NOTE 2: Class 2 load center are panelboards with mains ratings up to 200 amperes maximum and enclosure requirements as indicated in 3.8.2, 3.8.7 and 3.8.9.

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).

Federal Standard

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

Military Specification

MIL-E-17555 - Electronic and Electrical Equipment, Accessories, and Repair Parts, Packaging and Packing 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 Military Specifications and Standards Center, Bldg 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are Department of Defense (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).

National Electrical Manufacturers Association (NEMA)

PB 1 - Panelboards

(Application for copies should be addressed to the National Electrical Manufacturers Association, 2101 L Street, N.W., Washington, DC 20037.)

Underwriters Laboratories Inc. (UL)

Electrical Construction Materials Directory
UL 50 - Electrical Cabinets and Boxes
UL 67 - Electric Panelboards

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UL 489 - Molded Case Circuit Breakers and Circuit Breaker Enclosures
UL 512 - Fuseholders

(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 specification and the references cited herein, 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 Standard commercial product. The panelboards 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 panelboards 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.

3.2 Description. The requirement covers panelboards for the control and protection of electrical lighting and appliance branch circuits, and power circuits, including feeder distribution panelboards. They also cover units specifically designed for panelboard assembly.

3.3 First article. When specified (see 6.2), the contractor shall furnish one panelboard for first article inspection (see 4.2.1 and 6.4).

3.4 Materials. Materials shall be as specified herein and in applicable specifications and standards, and other referenced documents. Materials not specified shall be selected by the contractor and shall be subject to all provisions of this specification. Materials shall be free of defects which adversely affect performance or serviceability of the finished product.

3.5 Codes and standards. Panelboards shall conform to UL 50, UL 67, and NEMA PB1.

3.5.1 Compliance. Prior to approval of the first article, or prior to approval of the first shipment, the contractor shall submit satisfactory evidence to the contracting officer or his authorized representative that the panelboards he proposed to supply under this specification meets the requirements of UL 50, UL 67, and NEMA PB 1.

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3.5.2 UL certification. Acceptable evidence of meeting the requirements of UL 50, UL 67, UL 489, and UL 512 shall be the UL label, listing in the UL Electrical Construction Materials Directory, or a certified test report from a nationally recognized independent testing laboratory, acceptable to the contracting officer, stating that the panelboard offered has been tested and conforms to UL 50, UL 67, UL 489, and UL 512.

3.6 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.

3.7 Identification marking. Identification shall be permanently and legibly marked directly on the panelboard or on a corrosion-resisting metal plate securely attached to the panelboard at the source of manufacturer. Identification shall include the manufacturer's model and serial number, name and trademark to be readily identifiable to the manufacturer.

3.8 Construction.

3.8.1 Panelboards. Panelboard assemblies shall be mounted in a box and shall be provided with fronts and doors, in accordance with paragraphs 3.8.2 and 3.8.7, and as specified (see 6.2).

3.8.2 Steel cabinets. All steel cabinets (boxes, fronts, and doors) shall be supplied by the manufacturer of the panelboard assembly and shall be surface mounted or flush mounted design as specified (see 6.2). Boxes, either flush or mounted, shall be fabricated from either galvanized sheet steel or sheet steel treated as specified for fronts, in accordance with UL 50.

3.8.3 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.

3.8.4 Bolted connections. Bolt holes shall be accurately punched or drilled and shall have the burrs removed. Washers or lockwashers shall be provided in accordance with good commercial practice, and all bolts, nuts, and screws shall be tight.

3.8.5 Riveted connections. Rivet holes shall be accurately punched or drilled and shall have the burrs removed. Rivets shall be driven with pressure tools and shall completely fill the holes. Rivet heads, when not countersunk or flattened, shall be of approved shape and of uniform size for the same diameter of rivet. Rivet heads shall be full, neatly made, concentric with the rivet holes, and in full contact with the surface of the member.

3.8.6 Welding. 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

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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.

3.8.7 Fronts and doors. Fronts, including doors, shall be flat full-finished steel. A directory holder suitable for glass or heavy-gauge plastic covering over the directory card shall be securely affixed on the inside of the door.

3.8.8 Class 1 panelboards. Unless otherwise specified (see 6.2), class 1 panelboards shall be equipped with flush combination lock and latch.

3.8.9 Class 2 load center. Class 2 load center covers shall be attached with screws. Unless otherwise specified (see 6.2), doors with a spring catch shall be furnished on all class 2 panelboards which have 12 or more pole positions. Class 2 load centers with less than 12 pole positions shall have doors equipped with lock and latch as specified in paragraph 3.8.8.

3.8.10 Panelboard removal. All panelboard units shall be removable from the front of the panelboard for inspection or replacement after the removal of the cabinet front, without removing the panelboard from cabinet or disturbing adjacent units.

3.8.11 Finish. Cabinet fronts and doors shall be thoroughly cleaned, given a rust-inhibiting treatment, and finished with manufacturers standard finish. Cabinet boxes shall be fabricated from either galvanized sheet steel or sheet steel treated as specified for fronts, in accordance with UL 50.

3.8.12 Panelboard handles. When there are two vertical rows of switches or circuit breakers actuated by horizontally moving toggle handles on a panelboard, it shall be standard practice for the handles to move toward the center of the panelboard to close the switch.

3.8.13 Panelboard mounting. The panelboard section units shall be mounted as a single panel upon a suitable steel support (class 2 panelboards manufactured of high-performance plastic need not use steel supports). The entire assembly shall be designed for easy mounting in the cabinet. When required to insure proper dead front and panelboard orientation, means shall be provided for adjustment of the interior in flush-mounted installations.

3.8.14 Mains. Unless otherwise specified (see 6.2), the mains of the panelboards shall be furnished with lugs only.

3.8.15 Panelboard supports. Panelboards of such a length that there is a possibility of buckling, shall in addition to mounting blocks at ends, have additional supports.

3.8.16 Bus connections. Bus connections for type I, class 1 panelboards having any single-pole breakers shall be arranged such that adjacent single-pole breakers shall be of opposite polarity; and that in any vertical row two single-pole breakers could be replaced by a two-pole breaker and three single-pole breakers could be replaced by a three-pole breaker.

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3.9 Electrical. The panelboards shall perform properly under the following operating parameters (see 6.2):

a. POWER SYSTEM REQUIREMENTS: Type current, volts, phase, frequency, number of wires
b. INPUT QUANTITY: Number of mains, main loads, amperage rating
c. NEUTRAL REQUIREMENTS: With or without neutrals
d. BRANCH CIRCUITS REQUIRED: Number of circuits, amperage rating, number of poles

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 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 Component and material inspection. Components and materials shall be inspected in accordance with all the requirements specified herein and in applicable referenced documents.

4.1.3 Standards compliance. The contractor shall make available to the contracting officer or his authorized representative evidence of compliance with the applicable standards cited in 3.5.

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).
c. Preparation for delivery inspection (see 4.6).

4.2.1 First article inspection. The first article inspection shall be performed on one panelboard when a first article is required (see 3.3 and 6.2). This inspection shall include the examination of 4.4, the tests of 4.5, and, when specified, the preproduction pack inspection of 4.6 (see 4.6 and 6.2). The

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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. When specified (see 6.2), sampling and inspection procedures shall be in accordance with MIL-STD-105. All panelboards of the same type and class 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 separated from new lots, and shall be clearly identified as reinspected lots. Sampling requirements may be waived by the contracting officer when panelboards are certified in accordance with 3.5.

4.4 Examination. Each panelboard shall be examined for compliance with the requirements specified in section 3 of this specification. 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 requirement shall constitute one defect.

4.5 Tests. Each panelboard selected shall be tested as specified in UL 50 and UL 67. Testing requirements may be waived by the contracting officer when panelboards are certified in accordance with 3.5.

4.6 Preparation for delivery inspection. The inspection of the preservation, packing, palletization, and marking shall be in accordance with the requirements of section 4 of MIL-E-17555. The inspection shall consist of the quality conformance inspection; and, when specified (see 6.2), a first article pack shall be furnished for examination and test within the time frame required (see 6.2).

5. PREPARATION FOR DELIVERY

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

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

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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.

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

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

6. NOTES

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

6.1 Intended use. Panelboards are used for the control, distribution, and protection of electrical power circuits.

6.2. Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Type and class of panelboards (see 1.2.1).
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 is required for inspection and approval (see 3.3, 4.2.1, and 6.4)).
e. Type of mounting required for panelboard assemblies (see 3.8.1).
f. Whether surface mounted or flush mounted, cabinet design is required (see 3.8.2).
g. Type of lock or latch required for class 1 panelboards (see 3.8.8).
h. When other than a spring catch door shall be furnished for class 2 panelboards (see 3.8.9).
i. Mains attachments, if other than specified (see 3.8.14).
j. Number of branches, branch loads as specified, voltage, phase, with or without neutral, frequency, number of mains, loads on mains, average ratings, (see 3.9).
k. When sampling is required (see 4.3).
l. When a first article pack inspection is required and time frame required for submission (see 4.2.1 and 4.6).
m. Level of preservation and level of packing required (see 5.1).
n. When palletization is required (see 5.2).

6.3 Data requirements. When this specification is used in an acquisition and data are required to be delivered, the data requirements shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved Contract Data Requirements List (CDRL), incorporated into the contract. When the provisions of DOD FAR Supplement, Part 27, Sub-Part 27.475-1 (DD Form 1423) are invoked and the DD Form 1423 is not used, the data should be delivered by the contractor in accordance with the contract or purchase order requirements.

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6.4 First article. When a first article inspection is required (see 3.3, 4.3, and 6.2), the item will be tested and should be a first article sample 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 one unit. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examination, test, and approval of the first article.

6.5 Sampling procedures

6.5.1 Sampling for examination. Recommended Inspection Level is II and Acceptable Quality Level is 4.0% (See 4.3).

6.5.2 Sampling for tests. Recommended Inspection Level is II and Acceptable Quality Level is 4.0% (See 4.3).

6.6 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

MILITARY INTERESTS:

Custodians

Navy - YD
Army - ME
Air Force - 99

Review Activities

Navy - SH
Air Force - 80

User Activity

Navy - MC

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA - FSA - PCD

PREPARING ACTIVITY:

Navy - YD

(Project 6110-0333)

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