MIL-P-24175(SHIPS)
15 September 1967
SUPERSEDING
(See 6.3)

MILITARY SPECIFICATION

PANELS, POWER SUPPLY AND CONTROL FOR

NAVIGATION LIGHTS, GENERAL SPECIFICATION FOR

1. SCOPE

1.1 Scope.- This specification covers the general requirements for navigation light supply and control panels intended for use on Naval ships. For the controls for these panels, see MIL-C-24174.

1.2 Classification.- Panels shall be of the types and sizes specified on the individual specification sheet (figure 1 is typical) (see 3.2 and 6.1).

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of the specification to the extent specified herein.

SPECIFICATIONS

MILITARY

MIL-M-14 - Molded Plastics, and Molded Plastic Parts, Thermosetting.
MIL-S-901 - Shock Tests, H. I. (High Impact), Shipboard Machinery, Equipment and Systems; Requirements for.
MIL-E-917 - Electric Power Equipment, Basic Requirements for (Naval Shipboard Use).
MIL-E-2036 - Enclosures for Electric and Electronic Equipment, Naval Shipboard.
MIL-T-7928 - Terminals, Lug and Splice, Crimp Style, Copper.
MIL-Q-9858 - Quality Program Requirements.
MIL-P-15024 - Plates, Identification, Information, and Marking for Identification of Electrical, Electronic, and Mechanical Equipment.
MIL-P-15037 - Plastic Sheet, Laminated, Thermosetting, Glass Cloth, Melamine - Resin.
MIL-P-15137 - Provisioning and Technical Documentation for Repair Parts for Electrical and Mechanical Equipment (Naval Shipboard Use).
MIL-E-17555 - Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery of.

STANDARDS

MILITARY

MIL-STD-167 - Mechanical Vibrations of Shipboard Equipment.
MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.
MIL-STD-740 - Airborne and Structureborne Noise Measurements and Acceptance Criteria of Shipboard Equipment.

See Supplement-1 for list of applicable specification sheets.

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications.- The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

NATIONAL BUREAU OF STANDARDS
Handbook H28 - Screw-Thread Standard for Federal Services.

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, D. C. 20401.)

UNIFORM CLASSIFICATION COMMITTEE
Uniform Freight Classification Rules.

(Application for copies should be addressed to the Uniform Classification Committee, 202 Union Station, 516 West Jackson Boulevard, Chicago, Illinois 60606.)

AMERICAN WELDING SOCIETY (AWS)
Welding Handbook.

(Application for copies should be addressed to the American Welding Society, United Engineering Center, 345 East 47th Street, New York, N. Y., 10017.)

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
IC4 - Enclosures for Industrial Controls.

(Application for copies should be addressed to the National Electrical Manufacturers Association, 155 East 44th Street, New York, N. Y. 10017.)

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
70 - National Electrical Code.

(Application for copies should be addressed to National Fire Protection Association, 60 Batterymarch Street, Boston, Massachusetts 02110.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

3. REQUIREMENTS

3.1 Preproduction sample.- Prior to beginning production, a sample of each type and size panel shall be tested as specified in 4.2 (see 6.2).

3.1.1 The preproduction sample panel shall be furnished complete, as illustrated by figure 1, including mounting bases, subbases, buswork, lugs (when required), terminals and assemblies, switches, and so forth.

3.2 Specification sheets.- The individual panel requirements shall be as specified herein and in accordance with the applicable specification sheets. In the event of any conflict between requirements of this specification and the specification sheets, the latter shall govern.

3.3 Materials.- Materials shall be as specified (see 6.1). Materials not definitely specified shall be of the quality best suited for the purpose intended.

3.3.1 Restricted material.-

3.3.1.1 Cast iron (gray iron) or other brittle material shall not be used.

3.3.1.2 Flammable or explosive material, or material which can produce toxic or suffocating fumes, shall not be used.

3.3.2 Insulating materials.-

3.3.2.1 Plastics, laminated.- Laminated plastic material shall be a glass cloth bonded with melamine resin, type GML, in accordance with MIL-P-15037.

3.3.2.2 Plastics, molded.- Materials for molded parts shall conform to MIL-M-14.

3.4 Dimensional tolerances.- The following tolerances shall apply:

(a) Fractional tolerances: ± 1/64 inch.
(b) Decimal tolerances: ± 0.005 inch.

Wider tolerances will be permitted where interchangeability of parts, electrical or operational conditions are not affected.

3.5 Drilling, countersinking or tapping of metal parts shall be accomplished before plating or finish is applied.

3.6 Threads.- Threads shall be right-hand, class 2 and shall conform to Handbook H28.

3.6.1 Locking devices shall be used to secure mechanical assemblies to provide continuous satisfactory operation under conditions of heat, shock and vibration specified herein.

3.6.2 Self-tapping devices and sheet metal screws shall not be used in the assembly of these panels.

3.7 Welding.- Welding and allied processes used in fabrication shall be in accordance with AWS Welding Handbook.

3.8 Stress relief.- All metals used in fabrications and assembly shall be suitably treated or heat-treated to prevent deterioration or failure due to stresses or other conditions resulting from working, forming, welding and so forth, during the fabrication process. Peening after welding will accomplish stress relieving (see Welding Handbook).

3.9 Enclosures.- The dimensions and degree of enclosure shall be as specified on the applicable specification sheet. Enclosures shall conform to the requirements of NEMA 104.

3.9.1 Submersible enclosures larger than 60 cubic inches shall have a moisture drain on the bottom. The opening shall be closed with a 1/4-inch or larger pipe plug.

3.9.2 Enclosures shall be so designed that all necessary cables of adequate size can be brought into the enclosure through either top or bottom.

3.10 Limitations.-

3.10.1 Size limitations.- Panels shall be as small and light as practicable, and shall be sufficiently rugged to withstand mechanical shock so that damage or distortion will not be of sufficient magnitude as to impair continued operation of the panel.

3.10.2 Mounting dimensions shown on specification sheets shall be maintained and maximum overall dimensions shall not be exceeded.

3.11 Mechanical details.-

3.11.1 Diagrams and identification plates.-

3.11.1.1 Connection diagram.- Each panel shall include a connection diagram. The information shall be printed by a process that is nonfading, protected by transparent plastic, and secured to the enclosure door or cover in accordance with MIL-E-2036. The preferred method is to laminate the diagram between two layers of polyester film by a heat process.

3.11.1.2 Identification plate.- The identification plate shall conform to MIL-P-15024 and shall contain the following information:

(a) Manufacturer.
(b) Contract number.
(c) Specification sheet number.
(d) Date of manufacture (year).

3.12 Electrical details.-

3.12.1 Clearances.- Minimum electrical creepage and clearances shall be as required by NFPA 70.

3.12.2 Lugs and terminals shall be in accordance with MIL-T-7928.

3.12.3 Wiring space.- Adequate cabling space shall be provided for both power input cable as well as branch circuit cabling in accordance with the requirements of NFPA 70.

3.13 Painting.-

3.13.1 Painting and protection against corrosion shall be in accordance with MIL-E-917 or as specified (see 6.1).

3.13.2 The exterior and interior surfaces of all enclosures shall be painted. The order of operations shall be as follows:

(a) Complete all fabricating operations, such as welding, machining, drilling, tapping, and stress relieving.
(b) Remove all rust and other visible corrosion products.
(c) Remove all grease, oil and dirt by solvent wiping, vapor degreasing, or caustic washing and rinsing.
(d) Apply primer pretreatment coating or chemical treatment and primer.
(e) Apply enamel.

3.14 Operational requirements.-

3.14.1 Inclination.- The panels shall operate at a rated voltage when inclined to an angle of 45 degrees from the vertical in any direction and not malfunction when inclined to an angle of 60 degrees from the vertical in any direction.

3.14.2 Vibration.- The panels shall be designed to withstand the type I vibration tests of MIL-STD-167, without mechanical damage or malfunction.

3.14.3 Shock.- The panels shall satisfactorily withstand the shock test for grade A, class 1, shockproofness specified in MIL-S-901 without damage or loosening of parts.

3.14.4 Corrosion.- The panels shall satisfactorily withstand the salt spray test specified in 4.2.5.

3.14.5 Noise.- The noise generated by the panels shall not exceed the noise limitation for equipment in accordance with grade A, airborne noise and type B, structureborne noise requirements of MIL-STD-740.

3.15 Drawings.- Drawings shall consist of manufacturer's drawings certified by the cognizant Government inspector as complying with the requirements of this specification. The certification shall be documented on the drawing as a matter of record. Drawings shall carry manufacturer's numbers and the number of the applicable specification sheet. (Formal approval and validating signatures by the Naval Ship Engineering Center (NAVSEC) for manufacturer's drawings will not be required nor will NAVSEC drawing numbers be assigned.)

3.15.1 Manufacturer's drawings shall be furnished by the panel manufacturer and shall include the following minimum data:

(a) Outline, not necessarily to scale, of the front, side and top views of the enclosure, giving dimensions and other essential details. In the interest of clarity, views in addition to those required may be shown.
(b) Outline, not necessarily to scale, of the front of the enclosure, showing the outlines of all components and shall reference the components to piece numbers in the list of material. Outlines of the equipment within the enclosure may be incorporated with the enclosure outline, provided that clarity of detail is not impaired.
(c) List of materials, which shall include the enclosure and all components used in the fabrication and assembly of the panel. The manufacturer's identification or drawing number for the component or subassembly shall also be referenced.
(d) A cross-sectional view, showing arrangement, clearances and details of insulating strips, bussing, barriers or shields, mounting brackets, subbases, and so forth.
(e) Descriptive data of the equipment, which shall include degree of enclosure, permissible ambient, type of insulation, type of switch, and so forth, manufacturer's identification, (catalog or part) number.
(f) Weight of the equipment.
(g) A schematic wiring or connection diagram, showing the bussing and branch circuit arrangement.
(h) A list of notes and references pertinent to the basic design of the equipment.
(i) A list of notes pertinent to the tests conducted in accordance with this specification.
(j) Title block.

3.15.2 Drawing distribution.- The manufacturer, upon being advised that his preproduction sample has been approved, shall immediately place on record a set of the drawings used for manufacturing the panels with the following:

(a) One set for file with the local Government inspector.
(b) One set for file with the Naval Ship Engineering Center, Department of the Navy, Washington, D. C. 20360.
(c) One set for file with the Commanding Officer, U. S. Navy Ships Parts Control Center, Mechanicsburg, Pennsylvania.
(d) One set for contracting officer if other than 3.15.2(c).

3.16 Repair parts.- Repair parts shall be furnished and processed in accordance with MIL-P-15137, as specified (see 6.1).

3.17 Workmanship.- Workmanship shall be first class in every respect.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection.- Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to 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 assure supplies and services conform to prescribed requirements.

4.1.1 Quality program requirements.- The supplier shall provide and maintain a quality program acceptable to the Government. The program shall be in accordance with MIL-Q-9858. The supplier is in no way relieved of the final responsibility to furnish panels meeting the requirements of this specification.

4.2 Preproduction inspection.- The preproduction sample shall be subjected to the examination and tests specified in 4.4 and 4.5 and the tests specified in 4.2.1 through 4.2.5.

4.2.1 Shock.- The preproduction sample shall be subjected to the HI-shock tests specified in MIL-S-901 for grade A, class I equipment. Panel components (that is, switches and so forth) which have previously successfully passed the HI-shock requirements need not be retested. In lieu thereof, a simulated component may be substituted for the purpose of testing. The manner of mounting shall simulate the actual mounting on shipboard. The sample being tested shall not be reconditioned or adjusted during the testing. The specimen being tested shall be considered as failing the test in event parts are damaged or loosened.

4.2.2 Vibration.- The preproduction sample shall be subjected to type I vibration tests up to and including the frequency range of 15 cycles per second as required by MIL-STD-167. The manner of mounting shall simulate the actual mounting on shipboard. The use of resilient mounting shall not be permitted. Acceptability shall be contingent upon the ability of the equipment to withstand the specified tests and perform its principal functions during and after such tests. Failure of the equipment to function satisfactorily after testing shall be considered cause for rejection.

4.2.3 Noise.- The preproduction sample shall be subjected to the noise level tests specified for the equipment in accordance with MIL-STD-740 (see 3.14.5).

4.2.4 Heat test.- The preproduction sample shall be subjected to heat testing. The heat testing shall be made under simulated conditions equivalent to normal operating conditions employing maximum rated voltage, maximum load and rated frequency. The test shall be conducted continuously until the temperatures have remained constant for one hour. Temperature rise in current carrying parts, (bus bars, connection points, fuse clips, terminals, and so forth) shall not exceed 45°C. above an ambient room temperature of 40°C. The air temperature within the panel shall not exceed 65°C.

4.2.5 Corrosion.- The preproduction sample shall be subjected to the salt spray tests specified in MIL-STD-202, method 101A, condition A. The salt solution concentration shall be 20 percent.

4.2.6 Redesign of panel.- Redesign of a panel, once the manufacturer has established the panel design as a matter of record, shall require resubmission of a sample for preproduction testing.

4.3 Sampling.-

4.3.1 Lot.- For the purpose of sampling, a lot shall be considered to be the identical number of panels of each type in the contract or order.

4.3.2 Sampling for examination and effectiveness of enclosure and dielectric test.- A random sample of panels of each type shall be selected in accordance with table I from each inspection lot and shall be subjected to the examination specified in 4.4 and the tests specified in 4.5. Any

panel containing one or more defects and any panel failing in one or more tests shall not be offered for delivery. If the number of such defective panels in any sample exceeds the acceptance number for the sample, the lot represented by the sample shall not be offered for delivery.

Table I - Sampling for examination and effectiveness of enclosure and dielectric tests

Number of panels in inspection lot	Number of panels in sample	Acceptance number	Rejection number
2 to 10	All	--	--
11 to 15	10	0	1
16 to 25	13	0	1
26 to 40	17	0	1
41 to 65	22	0	1
66 to 110	28	1	2
111 to 180	35	1	2
181 to 300	45	2	3
301 to 500	55	2	3
501 and over	70	3	4

4.4 Examination.- The panels shall be examined to determine general compliance to the requirements of this specification which do not require tests. Alignment of parts shall be observed to determine that components are in good working order and that the requirement for interchangeability of parts is realistic.

4.5 Tests.-

4.5.1 Effectiveness of enclosure.- Each sample selected in accordance with 4.3.2 shall be tested to determine the effectiveness of the enclosure in accordance with NEMA 104.

4.5.2 Dielectric.- Each sample selected in accordance with 4.3.2 shall be subjected to dielectric testing. The sample shall be subjected, for one minute to a dielectric test voltage, the effective potential of which is twice rated voltage plus 1000 volts, (except low voltage panels such as 24-30 volts for which twice rated voltage plus 500 volts is applicable), applied between points of opposite polarity and between live parts and ground. The frequency of the voltage shall be 60 cycles root mean square a.c. and shall approximate a true sine wave.

4.6 Inspection of preparation for delivery.- The packaging, packing, and marking shall be inspected for compliance with section 5 of this document.

5. PREPARATION FOR DELIVERY

5.1 Domestic shipment and early equipment installation and for storage of onboard repair parts.-

5.1.1 Panels.-

5.1.1.1 Preservation and packaging.- Preservation and packaging which may be the supplier's commercial practice, shall be sufficient to afford adequate protection against corrosion, deterioration and physical damage during shipment from the supply source to the using activity and until early installation.

5.1.1.2 Packing.- Packing shall be accomplished in a manner which will insure acceptance by common carrier at the lowest rate and will afford protection against physical or mechanical damage during direct shipment from the supply source to the using activity for early installation. The shipping containers or method of packing shall conform to the Uniform Freight Classification Rules or other carrier regulations as applicable to the mode of transportation and may conform to the suppliers commercial practice.

5.1.1.3 Marking.- Shipment marking information shall be provided on interior packages and exterior shipping containers in accordance with the contractor's commercial practice. The information shall include nomenclature, Federal stock number or manufacturer's part number, contract or order number, contractor's name and destination.

5.1.2 Onboard repair parts.- Onboard repair parts shall be preserved and packaged by level A, packed by level C and marked by level A and C respectively in accordance with MIL-E-17555.

5.2 Domestic shipment and storage or overseas shipment.- The requirements, and levels of preservation, packaging, packing and marking for shipment shall be specified by the procuring activity (see 6.1).

(5.2.1 The following provides various levels of protection during domestic shipment and storage or overseas shipment, which may be required when procurement is made:

5.2.1.1 Preservation and packaging, packing and marking.- The equipment and accessories, and onboard repair parts shall be preserved and packaged by level A or C; packed by level A or B and marked in accordance with MIL-E-17555).

6. NOTES

6.1 Ordering data.- Procurement documents should specify the following:

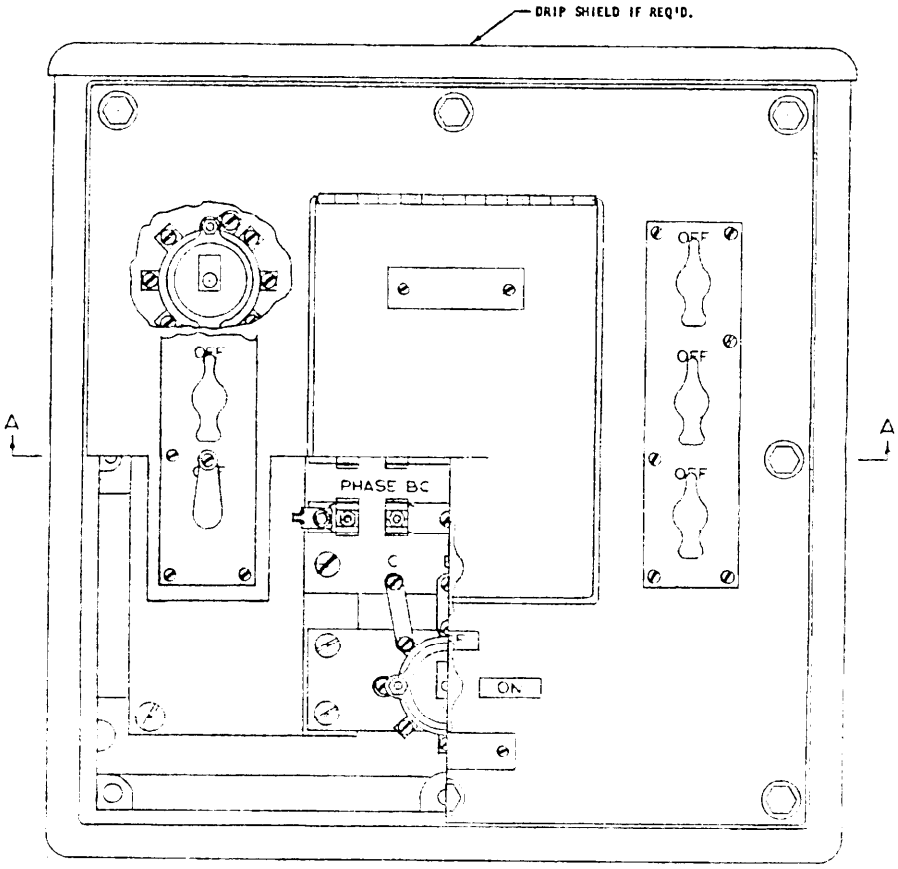
(a) Title, number and date of this specification and applicable specification sheet.
(b) Type and size required (see 1.2).
(c) Material required (see 3.3).
(d) Painting required, if other than as specified in 3.13.1.
(e) Repair parts (see 3.16).
(f) Level of preservation, packaging, packing and marking required if other than as specified in 5.1 (see 5.2).

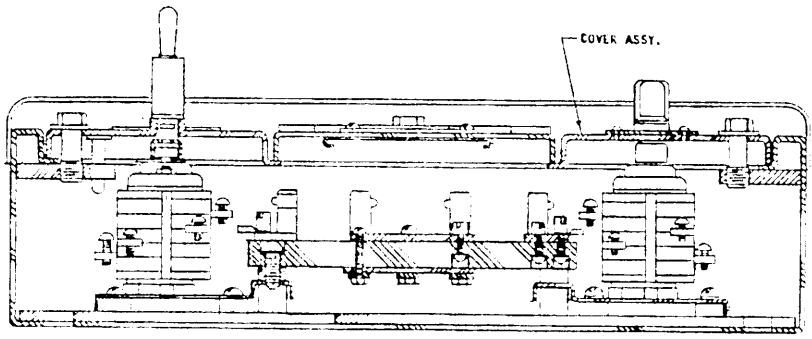
6.2 Preproduction.- Invitations for bids should provide that the Government reserves the right to waive the requirement for preproduction samples as to those bidders offering a product which has been previously procured or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending procurement.

6.3 Replacement data.- Panels covered in the associated specification sheets of this specification replaces those covered in the following drawings:

Specification Sheet		Drawing
MIL-P-24175/1(SHIPS)	replaces	9000-S6405-74437
MIL-P-24175/2(SHIPS)	replaces	9-S-5080-L
MIL-P-24175/3(SHIPS)	replaces	9000-S6405-73043
MIL-P-24175/4(SHIPS)	replaces	9-S-5204-L
MIL-P-24175/5(SHIPS)	replaces	815-1197131

Preparing activity:
Navy - SH
(Project 6110-N097)





SH9276

SECTION A-A

NOTE:
Mounting bolts shall be 1/2" - 13, HEX HEAD.

Figure 1 - A typical navigation light supply and control panel.

and Ships).

SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 119-R004

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity *(as indicated on reverse hereof)*.

SPECIFICATION

ORGANIZATION *(Of submitter)*

CITY AND STATE

CONTRACT NO.

QUANTITY OF ITEMS PROCURED

DOLLAR AMOUNT
$

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES ☐ NO IF "YES", IN WHAT WAY?

4. REMARKS *(Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)*

SUBMITTED BY *(Printed or typed name and activity)*

DATE

DD, FORM 1 APR 63 1426 REPLACES NAVSHIPS FORM 4863, WHICH IS OBSOLETE
(NAVSHIPS OVPRT 12-66)

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