

INCH-POUND

MIL-E-16400H (NAVY)
AMENDMENT 1
7 September 1990

MILITARY SPECIFICATION

ELECTRONIC, INTERIOR COMMUNICATION AND NAVIGATION EQUIPMENT,
NAVAL SHIP AND SHORE:
GENERAL SPECIFICATION FOR

This amendment forms a part of MIL-E-16400H, dated 13 July 1987, and is approved for use by the Department of the Navy and is available for use by all Departments and Agencies of the Department of Defense.

PAGE 1

1.1.1: Add as new paragraph:

"1.1.1 Preparation Requirements. This specification is to assist the acquisition manager in the preparation of an end item specification. It does not set forth requirements for "end-use" equipment; rather, it establishes general characteristics which should be selected for inclusion in the end item specification."

1.1.2: Add as new paragraph:

"1.1.2 Requirements assessment. This specification should not be invoked on a blanket basis but each requirement assessed in terms of the need of the end item equipment."

PAGE 2

2.1.1, Under FEDERAL SPECIFICATIONS, delete "QQ-C-530 - Copper-Beryllium Alloy Bar, Rod, and Wire (Copper Alloy Numbers 172 and 173)".

2.1.1, Under FEDERAL SPECIFICATIONS, delete "QQ-C-533 - Copper-Beryllium Alloy Strip (Copper Alloy Numbers 170 and 172)".

AMSC N/A

AREA GDRQ

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MIL-E-16400H(NAVY)
AMENDMENT 1

PAGE 4

2.1.1, Under MILITARY SPECIFICATIONS, delete "MIL-C-18388 - Coils, Tube Deflection; and Coils, Tube Focusing."

PAGE 6

2.1.1, Under MILITARY, after "MIL-STD-188-124 ... and Equipments" Add "MIL-STD-210 - Climatic Extremes For Military Equipment"

2.1.1, Under MILITARY, after "MIL-STD-242" delete "Part 5" and after "Standards," delete "Microcircuits and Semiconductors."

2.1.1, Under MILITARY, delete "MIL-STD-1364 - Standard General Purpose Electronic Test Equipment."

PAGE 7

2.1.1, Under MILITARY, add "Section 072 - Part 3 - Blast Environment, Nuclear Weapons."

2.1.1, Under MILITARY, delete "Section 103 - Electric Power, Alternating Current."

2.1.1, Under MILITARY, delete "DOD-STD-1686" and substitute "MIL-STD-1686".

2.1.1, Under MILITARY, delete "DOD-STD-2000" and substitute "MIL-STD-2000".

2.1.1, Under MILITARY, after "MIL-STD-2000 - Soldering Technology, High Quality/High Reliability." Add "DOD-STD-2003 - Electrical Plant Installation Standard Methods For Surface Ships And Submarines".

2.1.1, Under MILITARY, delete "MIL-HDBK-278 - Systems ... to shipboard systems." and substitute "MIL-HDBK-415 - Design Handbook for Fiber Optic Communications Systems."

2.1.1, Under MILITARY, after "MIL-HDBK-278 - System Design Guide for Applying Fiber Optic Technology to Shipboard Systems." add "MIL-HDBK-700 - Plastics."

MIL-E-16400H (NAVY)
AMENDMENT 1

2.1.2: Delete and substitute:

"2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation."

2.1.2, Under DRAWINGS, delete "803-5001027 - Cable End Preparation for Open Equipment, General Drawing."

2.1.2, Under DRAWINGS, delete "9000-S6202-73724 - Salt Spraying Machine."

PAGE 8

2.1.2, Under PUBLICATIONS, delete "0967-LP-597-1011 - Electronic Equipment Parts Application, and Reliability Information for Navy."

2.1.2, Under PUBLICATIONS, add "29 CFR 1910 - Combined Federal Regulations"

2.2: Delete and substitute:

"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 cited in the solicitation (see 6.2.1).

2.2, Under AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM), add "B194-84 - Copper-beryllium Alloy Plate, Sheet, Strip, and Rolled Bar, Specification for (DOD Adopted)".

2.2, Under AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM), add "B196-84 - Copper-Beryllium Alloy Rod and Bar, Specification for (DOD Adopted)".

2.2, Under AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM), add "B197-83 - Copper-Beryllium Alloy Wire, Specification for (Rev. B) (DOD Adopted)".

MIL-E-16400H(NAVY)
AMENDMENT 1

PAGE 9

2.3: Delete and substitute:

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

Additional conflicts shall be resolved with the following order of precedence:

- a). The Contract.
- b). The end item specification and documents referenced therein.
- c). This specification.
- d). Specifications referenced in this specification."

3.2.1, Line 2, delete "MIL-STD-242," delete "part 5".

3.2.11: Delete in its entirety.

3.2.1.4, Line 2, delete "in accordance with" delete "NAVSEA 0967-LP-597-1011" and substitute "requirement 18 of MIL-STD-454".

PAGE 10

3.2.1.8, Line 2, delete "DOD-STD-1686" and substitute "MIL-STD-1686".

Table I, Column heading, delete "MIL-STD-457" and substitute "MIL-STD-454".

PAGE 12

Table I, Under "Stuffing tubes", delete "Drawing 803-5001027" and substitute "DOD-STD-2003".

PAGE 13

Table I, Under "Transformers", delete "Coils, tube deflection and focusing" and "Coils shall conform to MIL-C-18388."

MIL-E-16400H(NAVY)
AMENDMENT 1

PAGE 14

3.2.10: Delete and substitute:

"3.2.10 Transformers. When equipment is required to operate at an internal operating temperature of 65 °C or higher, transformers and inductors shall meet the following constraints;

a. MIL-T-27 transformers and inductors shall be selected from Class S, T, U, or V.

b. MIL-T-27, Grade 4 transformers and inductors shall not be potted or liquid filled.

c. Items that are selected from Requirement 14 of MIL-STD-454 or any other source shall have an operating temperature of 130 °C or greater."

PAGE 15

Table II, Under Column heading "Item" for "Copper-beryllium alloy" delete "QQ-C-530, QQ-C-533" and substitute "ASTM B194-84, B196-84, B197-83".

PAGE 16

Table II, Under Column heading "Additional Requirements" for "Plastic" After "viewing windows." and before "Shall not be used" add "Shall be selected from MIL-HDBK-700."

PAGE 17

Table II, Under Column heading "Additional Requirements", After "Cadium," delete "where it may be necessary to heat it for soldering, brazing or welding during installation or repair" and substitute "Cadium-plated parts and fasteners, including washers, shall not be used in applications where they may be exposed to temperatures above 400 degrees F or where they will be in contact with fuel, lubricating oil, grease, and oil-based hydraulic fluid systems."

Table II, Under Column heading "Additional Requirements", After "Cellulose, nitrate" delete "Use of the following materials is prohibited:"

MIL-E-16400H (NAVY)
AMENDMENT 1

PAGE 18

Table II, Under Column heading "Additional Requirements", After "Unacceptable" add "Use of the following materials is prohibited:"

3.3.4.1, Line 2, delete "minimum linear dimension" and substitute "linear dimensions".

PAGE 19

3.3.5.1: Delete and substitute:

"3.3.5.1 Brittle material. Brittle material is material showing less than 10 percent elongation in 2 inches for the standard tensile test. For the static loading case (normal ship operation) brittle material is material being used below its NDT (Nil Ductility Transition) temperature as measured by the NIL drop weight test. Charpy V-notch impact and dynamic tear strength values may be used as criteria when these have been correlated with drop weight test results. Brittle material shall not be used unless specified otherwise herein, or where the Supervisor approves its use for a particular application."

PAGE 20

Table III, Under Column heading "Item" for "Soldering", delete "DOD-STD-2000 -1,-2,-3,-4,." and substitute "MIL-STD-2000".

PAGE 21

3.4.1.3, Line 1, delete "ordance" and substitute "ordnance".

PAGE 27

3.5.3, Lines 2 and 3, delete "within 30 minutes" and substitute "within five minutes".

PAGE 29

3.5.8, First sentence, delete "shall meet the requirement specified in DOD-STD-1399, section 300 and".

3.5.11, Line 1, delete "Emission control." and substitute "Emission monitor-control."

MIL-E-16400H (NAVY)
AMENDMENT 1

3.5.11, Line 2, delete "acoustic or electromagnetic energy" and substitute "acoustic, optical, or electromagnetic emissions".

3.5.12.1, Line 3, delete "2 watts" and substitute "6 watts".

3.5.12.2: Delete in its entirety.

3.5.12.3: Delete in its entirety.

PAGE 30

3.5.12.8, Add to the end of paragraph, "EMI reduction in power supply design shall be accomplished utilizing the guidance in MIL-HDBK-241."

3.5.12.11, Line 4, delete "55" and substitute "50".

PAGE 32

3.6.2.4: Delete in its entirety.

3.6.3: Delete and substitute:

"3.6.3 Enclosures. The equipment enclosures and the degree of enclosure shall be in accordance with MIL-STD-108 and MIL-E-2036 as specified in the end item specification (see 6.2.1)."

3.6.3.2: Delete in its entirety.

Table VI: Delete in its entirety.

Table VI, Statement below table: Delete in its entirety.

PAGE 38

3.7.2, Line 3, delete "and the part derating requirement of NAVSEA 0967-LP-597-1011."

3.7.3.1, Last sentence, delete "The temperature sensing devices shall be capable of being reset from the front panel." and substitute "The temperature sensing circuit shall be reset from the front panel."

3.11: Delete in its entirety.

MIL-E-16400H(NAVY)
AMENDMENT 1

PAGE 39

3.11.2: Delete in its entirety.

3.12.3, First sentence, delete "that is powered for an ac power source."

3.12.4, Line 2, delete "ac".

PAGE 40

3.12.5, Delete "single-phase" and after "that connect to" delete "ac".

3.12.8.1: Delete and substitute:

"3.12.8.1 Accident Prevention Signs. For equipment - with or without EMI filtering - whose leakage current is in excess of 5 mA, an accident prevention sign in accordance with 29 CFR 1910 shall be affixed to the front of the equipment and inscribed:

DANGER
SHOCK HAZARD
DO NOT ENERGIZE THIS EQUIPMENT UNLESS
THE FRAME AND ALL METAL PARTS ARE GROUNDED

3.13: Delete and substitute:

"3.13 Environmental service conditions The environmental service requirements shall be derived by defining the platform, the environment and the end item design requirements. MIL-STD-210 shall be used as a source to provide the climatic test values required by MIL-STD-810."

PAGE 41

3.13.2, Delete "not be degraded after ... 40,000 feet." and substitute "conform to the low pressure requirements of Method 500 of MIL-STD-810."

3.13.3, Line 2, delete "of 95 percent ... and frost." and substitute "test conforming to Method 507 of MIL-STD-810."

3.13.8: Delete and substitute:

"3.13.8 Icing. The exposed equipment, or portions thereof, shall withstand an ice load on exposed surfaces without structural damage. Moving junctions shall be housed or provided with heating elements to allow essential motion when subjected to icing conditions of Method 521 of MIL-STD-810."

MIL-E-16400H (NAVY)
AMENDMENT 1

PAGE 42

3.13.10: Delete and substitute:

"3.3.10 Greenwater loading. Equipment parts located external to the skin of the ship which are exposed to greenwater loading (wava slep) shall show no mechanical or electrical damage when the mean greenwater load is 6 pounds per square inch (lb/in²)."

3.13.12.3: Delete and substitute:

"3.13.12.3 Nuclear effects. When specified (see 6.2.1) in the individual equipment specification, the equipment, or portions thereof, exposed to the weather shall withstand a nuclear blast environment without impairment which would cause equipmewnt malfunction. The values for the peak overpressure, the peak dynamic pressure, the positive phase durations of figure 4, and the method of verification shall conform to the the interface requirements on MIL-STD-1399 Section 072 Part 3 and as specified (see 6.2.1) in the individual equipment specification."

3.13.15: Delete and substitute:

"3.13.15 Inclination (shipboard). The equipment shall operate in all altitudes encompassed by DOD-STD-1399, section 070 part 1 (see 4.6.8.15)."

PAGE 44

3.14.4, Line 2, after "MIL-P-15024" add "29 CFR 1910".

FIGURE 5: Delete and substitute:

| DANGER SHOCK HAZARD | | | |
|--|---------|-----------------|-----------------------|
| THIS UNIT ENERGIZED FROM MULTIPLE SOURCES, ENSURE THE FOLLOWING SWITCHES ARE IN THE OFF POSITION AND TAGGED-OUT BEFORE ATTEMPTING MAINTENANCE. | | | |
| CIRCUIT | VOLTAGE | SWITCH LOCATION | SWITCH IDENTIFICATION |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |

FIGURE 5. Electrical power source information plate."

MIL-E-16400H(NAVY)
AMENDMENT 1

3.15, Line 2, delete "MIL-HDBK-278" and substitute "MIL-HDBK-415".

PAGE 45

3.16.3: Delete in its entirety.

PAGE 49

Table IX, Column heading, "Examination and Tests", after "nuclear blast 3.13.12.3" delete "4.6.8.15.1" and substitute "DOD-STD-1399 072 Part 3".

PAGE 52

4.6.3.4, Line 4, delete "103" and substitute "300".

PAGE 59

4.6.8.4, Line 2, delete "an altitude of not less than 40,000 feet (12,000 kilometers) for not less than 8 hours" and substitute "the requirements of Method 500 of MIL-STD-810".

PAGE 60

4.6.8.6.1 (b), Fifth sentence, delete "on Drawing 9000-S6202-73724." and substitute "MIL-STD-810, Method 502.9, Section II".

4.6.8.12.1: Delete and substitute:

"4.6.8.12.1 Actual condition. The end item specification shall specify the test configuration and shall be tested with the standard charge in accordance with MIL-S-901."

PAGE 61

4.6.8.13, First sentence, delete "grade A, type A, class I". After "weighing more than" delete "600,000" and substitute "400,000".

PAGE 62

4.6.8.18.2 (e), delete "3" and substitute "8".

MIL-E-16400H (NAVY)
AMENDMENT 1

PAGE 63

4.6.8.18.3 (u): Delete and substitute:

"(u) Repeat high temperature voltage/frequency cycling test of 4.8.18.3(o) through (t) for not less than 59 cycles."

4.6.8.18.3 (v), Add after (u), "(v) Repeat high temperature voltage and frequency cycling tests of 4.6.8.18.3 (o) through (t) with relative humidity at 10 to 20 percent for not less than 15 cycles."

PAGE 67

6.1, Line 2, delete "It is intended to assist the acquisition manager in the preparation of end item specifications. MIL-E-16400 does not set forth requirements for "end-use" equipments; rather, it establishes general characteristics which should be selected for inclusion in an end item specification."

PAGE 68

6.2.1, After "(x)", delete "Cooling Water equipment (see 3.6.2.4) and substitute "Cooling water (see 3.7.1.2)".

PAGE 71

6.4.1, Under Column heading "Provision", delete "Maintenance design" and substitute "Maintainability design".

PAGE 76

6.4.3, Under Column heading "Additional information required", delete "60,000" and substitute "400,000".

PAGE 78

Table XII, Column heading "Vehicular, Mounted or Transported", delete "Tranported" and substitute "Transported".

PAGE 79

Table XII, Column heading "Examinations and Tests" for "Underwater explosion" move "4/" from "Installation, Shore, sheltered" to "Shipboard, unsheltered".

MIL-E-16400H(NAVY)
AMENDMENT 1

PAGE 80

6.6.1: Add as new paragraph:

"6.6.1 System Safety Program Requirements. The contracting activity will ensure that the appropriate System Safety Program Requirements and tasks of MIL-STD-882 are included in the CDRL of the equipment procurement.

6.7 (a), delete "Commnication" and substitute "Communication".

PAGE 81

30.1.1, delete "15" and substitute "12.7"

PAGE 82

30.1.2, Delete "Dimension of window table" and substitute the following table.

| <u>"Dimension of window</u> | <u>Thickness</u> | <u>Tolerance</u> |
|-----------------------------|------------------|------------------|
| Less than 178 | 6.35 | +0.406, -0 |
| 178 to 254 | 9.53 | +0.406, -0 |
| 254 to 381 | 12.70 | +0.787, -0 |
| Over 381 | 15.87 | +0.787, -0" |

30.1.8, Line 2, delete "1800" and substitute "1830".

30.1.9: Delete and substitute:

"30.1.9 Surface ship installation. Equipment intended for installation within internal surface ship spaces shall be capable of passage through a doorway 660 mm wide by 1143 mm high (reduced further by round corners on a 203 m radius) and through a hatch 762 mm long by 762 mm wide (reduced further by round corners on a 190.5 mm radius) (see 3.6.1.2.2)."

30.1.10: Delete and substitute:

"30.1.10 Submarine installation. Unless otherwise specified, equipment intended for installation within internal submarine spaces shall be capable of passage through a circular tube (submarine entrance hatch 625 mm high (reduced further by round corners on a 254 mm radius) (see 3.6.1.2.3)."

MIL-E-16400H (NAVY)
AMENDMENT 1

30.1.11: Delete in its entirety.

30.1.12, Line 2, delete "5" and substitute "4.8"

PAGE 83

30.1.13: Delete in its entirety.

30.1.14: Delete in its entirety.

30.1.15: Delete in its entirety.

30.1.17: Delete in its entirety.

40.1.1: Delete in its entirety.

40.1.2: Delete in its entirety.

40.1.3: Delete "5" and substitute "6.35".

PAGE 84

60.2.1, Column heading "Additional information required", delete "27,000" and substitute "181,436".

60.2.2, Paragraph title, delete "6.1.1" and substitute "6.5.1".

Preparing activity:
Navy - SH
(Project GDRQ-N093)

Review activities:
Navy - EC, AS, OS

User activity:
Navy - MC