

NOT MEASUREMENT SENSITIVE

NOTICE OF  
CHANGEMIL-STD-11991  
NOTICE 1  
30 September 1992

## MILITARY STANDARD

ELECTRICAL, ELECTRONIC, AND ELECTROMECHANICAL  
EQUIPMENT, GUIDED MISSILE AND ASSOCIATED  
WEAPON SYSTEMS, GENERAL STANDARD  
FOR THE DESIGN OF

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MIL-STD-403	Preparation for and Installation of Rivets and Screws, Rocket and Missile Structures
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MIL-STD-490	Specification Practices
MIL-STD-785	Reliability Program for Systems and Equipment Development and Production
MIL-STD-810	Environmental Test Methods and Engineering Guidelines

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5.1.1.8.2 Felt. Wool felt shall be in accordance with C-F-206 and shall be given Type III treatment in accordance with MIL-F-2312. Hair felt shall conform to MIL-F-2312 and shall be mildew-proofed as specified therein.

5.1.1.8.3 Webbing. Webbing shall be in accordance with Requirement 44 of MIL-STD-454.

5.1.1.8.4 Thread. Thread shall be in accordance with Requirement 44 of MIL-STD-454.

5.1.1.8.5 Lacing twine, tape, and straps. Lacing twine, tape and straps for cable harnesses and other applications shall conform to MIL-T-713, Type P (waxed, MIL-T-43435, and MIL-S-23190, respectively).

5.1.1.8.6 Rope. Rope shall be in accordance with T-R-605 or A-A-50057. For severe outdoor use polyamide rope shall be used, subject to the approval of the procuring activity.

5.1.1.8.7 Cotton and linen. Cotton or linen shall not be used in the form of fabric or tape except as follows:

- a. In construction of rotating electrical machinery where no other tape of sufficient mechanical strength is available.
- b. On coils or parts such as inductors, transformers, and relays where the coils is subsequently completely encapsulated and covered against moisture and fungus.

\* 5.1.1.9 Metals. The use and selection of metals shall be in accordance with the CPC requirements of paragraph 5.3.1. Unless otherwise specified in the detailed specification of the individual equipment, applicable metal usage shall be as specified herein.

#### 5.1.1.9.1 Aluminum alloys.

5.1.1.9.1.1 Aluminum alloy structural parts. Aluminum alloys shall meet or exceed American Society for Testing and Materials (ASTM) standards. Aluminum alloy castings shall conform to QQ-A-591, QQ-A-596 or QQ-A-601 (alloy 43 temper F, alloy 356, or alloy 195). Aluminum alloy castings for high strength and high quality applications shall conform to MIL-A-21180. Structural parts that do not need to be grounded or electrically bonded shall be anodized in accordance with MIL-A-8625 or upon procuring activity approval be coated with a chemical film in accordance with MIL-C-5541.

\* 5.1.1.9.1.2 Aluminum alloy electrical parts. Aluminum alloy parts or assemblies used for electrical parts shall be constructed from corrosion resisting material and shall not be anodized. A chemical conversion coating in accordance with MIL-C-5541, class 1A shall be used.

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5.1.1.9.1.3 Aluminum foil. Aluminum foil shall conform to QQ-A-1876.

5.1.1.9.1.4 Aluminum pigment for paint. Aluminum pigment, powder or paste for paint shall conform to TT-P-320.

5.1.1.9.2 Brass. Brass parts and assemblies shall conform to QQ-B-613 or QQ-B-626, whichever is applicable.

5.1.1.9.3 Bronze. Bronze parts and assemblies shall conform to QQ-C-390, QQ-C-450, ASTM B 124, ASTM B 150, ASTM B 169, or ASTM B 283, whichever is applicable.

5.1.1.9.4 Copper. Copper parts and assemblies, except copper wire, shall conform to A-A-51144, QQ-C-502, QQ-C-571, QQ-C-576, QQ-CC-585, QQ-C-586, QQ-C-591, QQ-N-288, or ASTM B 196, whichever is applicable.

5.1.1.9.5 Nickel alloys. Nickel alloy parts and assemblies shall conform to QQ-N-281, QQ-N-286, QQ-N-290, ASTM B 166, or ASTM B 168, whichever is applicable.

5.1.1.9.6 Ferrous alloys. Ferrous alloys shall be used in accordance with Requirement 15 of MIL-STD-454. Iron and steel alloys shall be finished in accordance with MIL-STD-171 and MIL-STD-186, except that parts shall be electroplated when functioning necessary or when paint films are subject to removal in service.

5.1.1.9.7 Other metals and alloys. As necessary, other metals and alloys shall be finished in accordance with MIL-STD-171 and MIL-STD-186 to meet the corrosion resistance requirements of the detail specification (see 6.4).

5.1.1.9.8 Finishes for metals. Unless otherwise specified in the detail specification, finishes for parts and assemblies shall conform to requirements specified in MIL-STD-171, MIL-STD-186, MIL-STD-194 or MIL-F-14072, whichever is applicable. Bright finishes shall not be used as the top coat for exterior surfaces. MIL-C-22750 epoxy paint shall be used for the top coat for interior applications.

5.1.1.9.9 Solder. Solder, tin alloys, tin-lead alloy, and lead alloy shall conform to QQ-S-571 (see 5.1.1.21).

\* 5.1.1.10 Paint finishes. Paint finishes shall be in accordance with MIL-STD-171 and MIL-STD-186. The colors of paints shall be in accordance with FED-STD-595. Consideration shall be given to human factors, camouflage, and standardization in the specification of paint colors in accordance with applicable requirements in MIL-STD-1472.



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5.1.1.19.1 Plywood. Plywood shall be Group A - (CS-35) Hardwood plywood or Group B - (PS-1) Softwood plywood, construction and industrial, in accordance with NN-P-530. Plywood shall be treated with Type A preservative for moisture and fungus resistance for interior or exterior usage, whichever is applicable, in accordance with MIL-W-18142.

5.1.1.20 Electrical wire.

5.1.1.20.1 Hookup wire. Hookup wire shall be in accordance with Requirement 20 of MIL-STD-454.

5.1.1.20.2 Magnet wire. Magnet wire shall conform to J-W-1177.

5.1.1.20.3 Wiring and cabling. Unless otherwise specified in the detail specification, wiring and cabling shall be in accordance with MIL-W-8160, MIL-E-45782, MIL-C-45224 and Requirement 69 of MIL-STD-454, as applicable.

5.1.1.20.4 Electrical connections. Crimped and wire wrapped electrical connections shall be made in accordance with Requirement 69 of MIL-STD-454.

5.1.1.21 Flux for nonelectrical joints. Flux used for the joining of parts to make a nonelectrical connection in the process of soldering shall conform to O-F-506, QQ-S-571, MIL-F-12784, or MIL-F-14256 as applicable.

5.1.2 Processes.

5.1.2.1 Soldering.

\* 5.1.2.1.1 Soldering electrical and electronic connections. Soldering to make electrical and electronic connections to terminals, wires, cables, connectors, printed wiring boards and like parts shall conform to MIL-STD-2000. Only types R and RMA soldering flux shall be used in manual soldering.

5.1.2.1.2 Nonelectrical joints. Mechanical soldering of nonelectrical (structural) joints shall conform to DOD-STD-1866. In no case shall DOD-STD-1866 be used for soldering electrical and electronic connections.

5.1.2.1.3 Solder splice joints. Solder splice joints shall be made in accordance with MIL-S-83519.

5.1.2.2 Brazing. Brazing of steels, copper, copper alloys, nickel alloys, aluminum, and aluminum alloys shall be in accordance with Requirement 59 of MIL-STD-454.

5.1.2.3 Welding. Welding shall be in accordance with Requirement 13 of MIL-STD-454.

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5.1.2.3.1 Cleaning after welding. Welded assemblies shall be cleaned to remove rust, scale, oxidation products, and excess flux by sandblasting, wire brushing, or other suitable means. Prior to painting, steel parts that have been arc welded or acetylene welded shall, in accordance with MIL-C-10578. Acid used for cleaning shall be completely neutralized and removed.

5.1.2.3.2 Welding process. Preheating shall be employed where distortion is likely to result from welding. Welds shall have thorough penetration and good fusion and shall be free from scabs, blisters, abnormal pock marks, and other harmful defects. Where undesirable internal stresses are likely to result from welding, welded items shall be stress-relieved. Inert-gas shielded arc welding shall be used, when practical, for welding of aluminum magnesium or stainless steel.

5.1.2.3.3 Resistance welds for electrical interconnections. Resistance welds for electrical interconnections shall be in accordance with Requirement 24 of MIL-STD-454.

5.1.2.4 Electrostatic discharge control. Electrostatic discharge control shall be in accordance with MIL-STD-1686.

5.1.2.5 Environmental stress screening. A cost effective environmental stress screening program shall be established during the development phase of the product and implemented into the production process. This shall include temperature cycling and random vibration at the component assembly and system level. This program shall allow for detection and correction of all latent defects in the product prior to customer acceptance.

5.1.2.6 Glass coating. All optical or nonoptical glass requiring anti-reflective coatings shall be treated in accordance with MIL-C-675.

5.1.3 Parts. Unless otherwise specified herein, parts for guided missile and associated tactical equipment shall be selected from the Government Furnished Baseline as a first priority, and be from a military Qualified Products List (QPL) and of military specification established reliability (ER) types to the maximum extent possible.

5.1.3.1 Bearings. Bearings shall be in accordance with Requirement 6 of MIL-STD-454.

5.1.3.2 Capacitors. Capacitors shall conform to Requirement 2 of MIL-STD-454. For missile and associated tactical mission essential equipment, capacitors shall be, as a minimum, established reliability (ER) failure rate level "P" for exponential or level "B" for weibul. When a capacitor used is not covered by a military specification (see 4.1.7) and a new specification or drawing is prepared, the nearest appropriate military specification for the type of capacitor shall be used as a guide and the product assurance requirements shall be specified to assure a minimum life failure rate level of 0.1% per 1,000 hours.

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\* 5.1.3.18 Printed wiring assemblies. The attachment of parts and component mounting shall be in accordance with MIL-STD-2000. When documentation is prepared, MIL-STD-2000 shall be specified on the top drawing. Printed circuit boards or printed wiring boards shall be designed to allow for automatic insertion of components where packaging density or system configuration permits. The printed wiring board materials, processes and the methods used to mount leadless chip carriers on printed wiring boards shall be approved by the procuring activity.

5.1.3.19 Selenium rectifiers. Selenium rectifiers of the open-construction type shall conform to MIL-R-11050 or MIL-R-14224, whichever is applicable. Selenium rectifiers shall not be used in new design without prior approval of the procuring activity.

5.1.3.20 Relays. Relays shall be of the hermetically sealed type and shall conform to Requirement 57 of MIL-STD-454. Relays which are not of the solid state high reliability or established reliability types shall not be used without prior approval of the procuring activity.

5.1.3.21 Resistors and thermistors. Resistors and thermistors shall conform to Requirement 33 of MIL-STD-454. For missile and associated tactical mission essential equipment, resistors shall be, as a minimum, established reliability (ER) failure rate level "P". When a resistor used is not covered by a military specification (see 4.1.7) and a new specification or drawing is prepared, the nearest appropriate military specification for the type of resistor shall be used as a guide and the product assurance requirements shall be specified to assure a minimum life failure rate level of 0.1% per 1,000 hours. Variable resistors shall not be used in new design without prior approval of the procuring activity.

5.1.3.22 Rivets and riveting. Rivets shall not be used to mount parts which may require removal for maintenance of the equipment. Rivets, when used, shall conform to requirements specified in the detail specification. Riveting shall be accomplished in accordance with requirements specified in MIL-STD-403.

5.1.3.23 Shock and vibration isolators. Shock and vibration isolators shall not be used unless it is impractical to design and construct the equipment to meet the shock and vibration requirements specified in the detail equipment specification (see 6.4).

5.1.3.23.1 Design of isolators. The isolators may be of resilient material or metallic type and may employ viscous damping. The design of the isolators shall be such that failure of the resilient material will not set the supported component free.

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5.1.3.23.2 Resilient materials for isolators. The resilient material used in isolators shall be ozone resistant and capable of giving the required performance when exposed to any temperature within the range specified herein under the environmental conditions.

5.1.3.23.3 Installation of isolators. All isolators shall be readily replaceable without a major disassembly of the equipment. All electrical connections between a resilient supported component and its foundation shall be flexible. Sufficient clearance shall be provided between parts to preclude the possibility of a cushioned part striking any other part.

5.1.3.23.4 Electrical bypass of shock mounts. All shock mounted assemblies shall be electrically bypassed by a flexible bonding strap of copper at least one inch wide by 1/16 inch thick, except in such cases where a strap of this size would impair the action of the shock mount. Deviations from this requirement are subject to the approval of the procuring activity.

5.1.3.24 Springs. Springs shall be in accordance with Requirement 41 of MIL-STD-454.

5.1.3.25 Switches. Switches shall be in accordance with Requirement 58 of MIL-STD-454.

5.1.3.26 Access interlock switches. Access interlock switches shall be designed and constructed to conform to Requirement 1 of MIL-STD-454.

5.1.3.27 Servomotors, synchros, resolvers, and tachometer generators. Servomotors, synchros, resolvers, and tachometer generators shall be in accordance with Requirement 56 of MIL-STD-454.

5.1.3.28 Terminals. Terminals, boards and strips shall be in accordance with Requirement 19 of MIL-STD-454.

5.1.3.29 Transformers, inductors, and coils. Transformers, inductors and coils shall be in accordance with Requirement 14 of MIL-STD-454.

5.1.3.30 Transmission lines. Transmission lines and fittings shall be in accordance with Requirement 53 of MIL-STD-454.

5.1.3.31 Radio frequency cables. Radio frequency cables shall be in accordance with Requirement 65 of MIL-STD-454. Unless otherwise specified, cables for use in general purpose applications shall have a nominal impedance of 50 to 93 ohms.

5.1.3.32 Multiconductor cables.

5.1.3.32.1 Interconnection cables. External cables used for interconnecting fire control instruments, generator units, weapons in anti-aircraft and guided missile systems shall conform to Requirement 71 of MIL-STD-454.

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5.1.3.32.2 Internal multiconductor cables. Multiconductor cables used in electronic equipment shall be in accordance with Requirement 66 of MIL-STD-454.

5.1.3.33 Radio frequency connectors. Radio frequency connectors shall be in accordance with Requirement 10 of MIL-STD-454.

5.1.3.34 Waveguides and fittings. Waveguides and fittings shall conform to Requirement 53 of MIL-STD-454.

5.1.3.34.1 Absorbers. Absorbers shall conform to requirements specified in the detail specification of the individual equipment (see 6.4).

5.1.3.35 Directional couplers. Directional couplers shall be in accordance with Requirement 53 of MIL-STD-454.

5.1.3.36 Microcircuits, semiconductor devices and electron tubes.

\* 5.1.3.36.1 Microcircuits shall comply with MIL-STD-454, Requirement 64. When a non-standard microcircuit device is approved for use, and a MIL-STD-35 specification or Defense Electronics Supply Center (DESC) Standardized Military Drawing cannot be established, a new drawing or specification shall be prepared that complies with MIL-STD-883, MIL-M-38510, MIL-H-38534, and MIL-I-38535, as applicable, except that country of manufacture shall not apply. Certification shall be performed by the acquiring activity and qualification requirements shall be specified in the drawing. Unless otherwise approved by the acquiring activity, custom complex monolithic microcircuits shall be subjected to the tests in MIL-STD-883, Method 5006, prior to drawing approval. Only hermetically sealed devices shall be used.

5.1.3.36.1.1 Hybrid microcircuits. A parts list shall be generated for each hybrid microcircuit listing each unique element and the quantity of each contained within the package. Each unique element shall be traceable to the drawing. Each unique element shall comply with the specification for that part type. Adhesives used inside hybrid microcircuits shall comply with MIL-STD-883, Method 5011.

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5.1.3.36.1.2 Discrete semiconductor and integrated circuit chips. The order of precedence in selecting discrete chips for use in hybrid or multichip microcircuits shall be as follows:

a. Chips from wafers manufactured on a government certified line and electrically probed to the same criteria used for processing dice to be fabricated as Qualified Product Listing devices.

b. Chips from wafers 100 percent electrically probed to the requirements used for the vendor's MIL-STD-883, Class B microcircuits.

c. Chips procured to a detail specification approved by the procuring activity.

5.1.3.36.1.3 Leadless chip carriers (LCC). Leadless chip carriers shall conform to the requirements of MIL-M-38510, including the package configurations of Appendix C.

5.1.3.36.1.4 Ceramic capacitor chips. Ceramic capacitor chips shall meet requirements of MIL-C-55365.

\* 5.1.3.36.1.5 Tantalum capacitor chips. Tantalum capacitor chips shall meet the requirements of MIL-C-55365.

5.1.3.36.1.6 Resistor chips. Chip resistors shall meet the requirements of MIL-R-55342.

\* 5.1.3.36.1.7 Coil chips. Chip coils shall meet the requirements of MIL-C-83446.

5.1.3.36.2 Semiconductor devices. Semiconductor devices, including light-emitting diodes, shall comply with Requirement 30 of MIL-STD-454. All semiconductor devices shall be JANTX, JANTXV or JANS types. All nonstandard (non-JAN) semiconductors shall comply with MIL-S-19500 for JANTX devices except requirements associated with placement of a part on the qualified part list (QPL) are deleted. Only hermetically-sealed semiconductors shall be used. When a required device is not covered by MIL-S-19500 and a new drawing is prepared (see 4.1.7), the nearest appropriate MIL-S-19500 specification sheet shall be used as a guide.

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**5.2.8.3 Electromagnetic environmental control.** Electromagnetic environment control shall be compatible with the systems requirement in MIL-E-6051.

**5.2.9 Run-time indicators.** Run-time indicators shall be installed in each piece of equipment that has a mean-time-between-failure (MTBF) requirement or as required by the detail equipment specifications (see 6.4).

**5.2.10 Removable covers.** Front panels or removable cover plates shall employ captive type screws or similar devices for retention. The captive fasteners shall employ slotted heads or knurled and slotted heads and shall be designed to be capable of definitive individual loosening prior to movement of the part to which they are captive. Design and construction shall be such as to provide for their self-alignment with their retaining nuts, blocks, or inserts without sticking and without damage to their threads. A chain shall be used on removable covers for which no convenient location for depositing the cover is expected to be available during maintenance. Captive fasteners shall be painted or otherwise marked in a conspicuous manner to effect high visual contrast with the removable cover unless equipment requires camouflaging for concealment. Access covers and panels shall be interlocked in accordance with Requirement 1 of MIL-STD-454.

**5.2.11 Cooling.** Adequate means shall be employed to maintain parts within their maximum permissible operating temperature under all operating conditions. Exhaust fans and blowers shall be designed for operation from the applicable ac power supply if possible (see 5.2.16).

\* **5.2.12 Moisture pockets.** Control of moisture pockets shall be in accordance with Requirement 31 of MIL-STD-454.

\* **5.2.13 Test equipment.** New test equipment shall be designed in accordance with MIL-T-28800. Soldering shall be in accordance with MIL-STD-2000, and for class 2 equipment, Task G of MIL-STD-2000 shall apply.

**5.2.13.1 External test equipment.** The equipment shall be designed to provide for connections for such test equipment as may be required for its installation, maintenance, calibration and repair. The equipment shall be designed in such a manner as to permit the use of test equipment generally available to the Armed Services to accomplish all necessary tests.

**5.2.13.2 Test points.** Criteria for design and application of test points shall be in accordance with 5.2.2.

**5.2.13.3 Built-in test (BIT) equipment.** The BIT equipment shall be incorporated to the fullest practicable extent to permit monitoring of performance on a go/no-go basis. Techniques shall be included for assessment of overall performance of the entire equipment. The BIT equipment shall enable rapid assessment of performance by semi-skilled personnel. Checking techniques which provide information regarding anticipated failure shall be



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incorporated to the fullest extent possible. The BIT equipment shall enable test and evaluation of all modules and plug-in components except electron tubes and transistors. Modules aligned while operating with inputs from BIT equipment shall not require realignment when installed in their proper position within the operating equipment.

5.2.13.4 Accuracy. When test instruments are built into equipment, they shall be required to maintain their accuracy under all electrical, mechanical and other environmental conditions to which the equipment may be subjected.

5.2.13.5 Accessibility (test points and terminals). Access to test points and terminals of each article of equipment for required circuit checking shall be in accordance with Requirement 36 of MIL-STD-454.

#### 5.2.14 Tools.

5.2.14.1 Standard tools. Requirements as to type and quantity of standard tools for use with the equipment shall be kept to a minimum.

5.2.14.2 Special tools. Special tools shall be in accordance with Requirement 63 of MIL-STD-454.

5.2.15 Tropicalization. Tropicalization for protection against moisture and fungus shall be accomplished by conforming to MIL-T-152 and requirements specified in the detail specification for the equipment. The detail specification shall specify either Type I or II treatments and identify the parts or assemblies that require treatment (see 6.4).

5.2.16 Electrical power source. Electrical power sources shall be in accordance with Requirement 25 of MIL-STD-454.

5.2.17 Thermal design. Thermal design shall conform to Requirement 52 of MIL-STD-454 (see 5.2.11).

5.2.18 Enclosures. Enclosures for electric and electronic equipment shall be in accordance with Requirement 55 of MIL-STD-454.

5.2.19 Hydraulics. The design and installation of hydraulic systems shall be in accordance with Requirement 49 of MIL-STD-454 or as specified in the detail specification (see 6.4).

5.2.20 Grounding, bonding, and shielding. Unless otherwise specified by the procuring activity, ground, bonding, and shielding shall be in accordance with Requirement 74 of MIL-STD-454.

5.2.20.1 Single point grounding. To minimize degradation of performance and safety caused by circulating ground currents, each missile system shall use a single point grounding system in which the various ground planes (power, signal, earth, etc.) are electrically connected at only one point.



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5.2.21 Substitutability. Unless otherwise specified by the procuring activity, substitutability of parts shall be in accordance with Requirement 72 of MIL-STD-454.

### 5.3 Environmental.

5.3.1 Corrosion prevention and control (CPC). Unless otherwise specified by the procuring activity, corrosion prevention and control shall be in accordance with MIL-STD-186, MIL-STD-1568, and MIL-STD-1250.

5.3.1.1 CPC design prohibitions. The following design practices are not acceptable:

- a. Crevices susceptible to moisture collection.
- b. Unsealed fasteners.
- \* c. Galvanic metal couples with over 100 mV potential difference. (Exceptions allowed in accordance with table X of MIL-STD-186.)
- d. Printed circuit assemblies without conformal coating.
- e. Moisture tight designs without proper seals.
- f. Unprotected bearings.
- g. Untested adhesively bonded designs (stress and humidity tests).
- h. Metallic construction if nonmetallic is acceptable.
- i. Hardware requiring field maintenance for corrosion control.
- \* j. Inadequate consideration for acid fumes in battery locations.

5.3.1.2 CPC materials prohibitions. The following materials are not acceptable:

- a. Aluminum alloys 2024-T3 or T4; use T8 or 5000/6000 series.
- b. Aluminum alloys 7001-T6, 7278-T6 and 7075-T6, use T73 temper or 7050-T73 alloy.
- c. Magnesium.
- d. Precipitation hardened steels in H900, H950, or H1100 tempers.
- e. Graphite lubricants.
- f. PVC plastics.
- g. Corrosive type RTV adhesive/sealants.
- h. Rubber that is susceptible to ozone damage.
- \* i. Silver plated copper wire (Red Plague corrosion problem with copper) unless thickness equals or exceeds 80 microinches (use of tin or nickel plated wire is acceptable).
- \* j. Class 3 conversion coating on aluminum (use Class 1A in accordance with MIL-C-5541).
- \* k. Type 1 cadmium or zinc plating.
- l. Gold plated electrical contacts without nickel undercoating.
- m. Silver plated electrical contacts.
- n. Potting and foam material that are reversion prone.
- o. Bare corrodible metal surface.
- p. Materials that are not inherently moisture and fungus resistant.
- q. Nickel plated aluminum constructions.
- \* r. Polyimide insulated copper and copper alloy wire (MIL-W-81381).

5.3.2 Protection against electrolytic corrosion. Where it is necessary for any combination of dissimilar metals to be assembled, they shall be selected and protected in accordance with Requirement 16 of MIL-STD-454, MIL-STD-171, MIL-STD-186 and MIL-STD-1250, as applicable.

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**5.3.3 Altitude.** Unless otherwise specified in the detail specification, the equipment shall be capable of withstanding, without discernible damage to the equipment, the applicable test specified in MIL-STD-810, Method 500, Low Pressure.

**5.3.3.1 Pressurization.** Whenever pressurization of the electronic equipment is required by the detailed specification, the following provisions shall be met:

- a. The case shall have sufficient strength to withstand the applicable pressure differences. A means shall be provided for determining the effectiveness of the seal. This may consist of a suitable fitting to permit use of an air pump for increasing the pressure approximately 5 pounds per square inch above sea level pressure.
- b. The case shall be of a type that will permit ready opening and clearing for access to the equipment for repair and maintenance. The equipment shall be completely operable after removal from the case, and alignment shall be unaffected by replacement in the case.
- c. When possible and advantageous, external points shall be provided for checks without removing equipment from the case.
- d. Sealing instructions shall be placed on one side of the case.
- e. Pressurized equipment shall be capable of withstanding pressures developed under external operating conditions, after initial pressurization on the ground, so no arcing, or loss of power due to corona, occurs at more than 5 pounds per square inch gage (psig) at -20° C to 50° C.
- f. Unless specified or permitted in the detail specification, pressure shall be maintained without the need for a pressurization pump.

**5.3.4 Temperature.** Unless otherwise specified in the detail specification, the equipment shall be capable of operating under and withstanding, without discernible damage to the equipment, the applicable test specified in MIL-STD-810, Method 501, High Temperature, and Method 502, Low Temperature.

**5.3.5 Relative humidity.** Unless otherwise specified in the detail specification, the equipment shall be capable of operating under and withstanding, without discernible damage to the equipment, the applicable test specified in MIL-STD-810, Method 507, Humidity.

**5.3.6 Dust and sand.** Unless otherwise specified in the detail specification, the equipment shall be capable of operating under and withstanding, without discernible damage to the equipment, the applicable test specified in MIL-STD-810, Method 510, Dust.

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