

MIL-S-29435B(MC)
1 March 1994
MIL-S-29435A(MC)
20 January 1988

MILITARY SPECIFICATION

SHELTER, ELECTRONICS MAINTENANCE COMPLEX (EMC);
10 FOOT, ELECTROMAGNETIC INTERFERENCE,
20 FOOT, ELECTROMAGNETIC INTERFERENCE,
10 FOOT, RIGID
20 FOOT, RIGID

This specification is approved for use within U.S. Marine Corps, Department of the Navy, and is available for use by all departments and agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification establishes the requirements for manufacture, acceptance and configuration for four types of EMC shelters.

1.2 Classification. EMC Shelters shall be of the type specified (see 6.2):

Type I	- 10 Foot, Electromagnetic Interference
Type II	- 20 Foot, Electromagnetic Interference
Type III	- 10 Foot, Rigid
Type IV	- 20 Foot, Rigid

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue for the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Program Support Directorate (PSE-C), MARCORSYSCOM, 2033 Barnett Ave., Suite 315, Quantico, VA 22134-5010 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 5411

DISTRIBUTION STATEMENT A. Approved for public release;
distribution is unlimited.

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SPECIFICATIONS

STANDARDS

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-129 - Marking for Shipment and Storage.
- MIL-STD-130 - Identification Marking of U.S. Military Property
- MIL-STD-285 - Attenuation Measurements for Enclosures, Electromagnetic Shielding, for Electronic Test Purposes, Method of.
- MIL-STD-372 - Welding, Gas Metal-Arc and Gas Tungsten-Arc, Aluminum Alloys, Readily Weldable for Structures, Excluding Armor.
- MIL-STD-2073-1A- DoD Material Procedures for Development and Application of Packaging Requirements.
- MIL-STD-2219 - Fusion Welding for Aerospace Application

2.1.2 Other Government documents, drawings, and publications.
The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

DRAWINGS

U.S. Marine Corps Logistics Base, Albany, GA

- Type I - 82A5049A0000 - Shelter, 10 Foot EMI, Electronics Maintenance Complex (EMC)
- Type II - 82A5048A0000 - Shelter, 20 Foot EMI, Electronics Maintenance Complex (EMC)
- Type III - 87036A0000 - Shelter, 10 Foot, Rigid, Electronics Maintenance Complex (EMC)
- Type IV - 82A5050A0000 - Shelter, 20 Foot, Rigid, Electronics Maintenance Complex (EMC)
- All - 82A5048A1193 - Bracket, Mounting, Installation
- 82A5048A1194 - Bracket, Mounting
- 82A5048A1301 - Frame Assembly
- 82A5050A0100 - Rail Assembly and Installation, Mounting, Floor
- 82A5050A0150 - Rail Assembly and Installation, Mounting, Wall

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PUBLICATIONS

TM 5411-14/1 - Marine Corps Expeditionary Shelter System
(MCESS) (Small Shelter Family) Operation and
Maintenance Instructions

(Copies of specifications, standards, handbooks, drawings, publications and other Government documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.2 Other publications. The following document(s) form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issue of documents not listed in the DODISS shall be the issue of the nongovernment documents which is current on the date of the solicitation

AMERICAN NATIONAL STANDARDS INSTITUTE

ANSI/AWS A2.4-93 - Welding, Brazing and Nondestructive
Examination, Standard Symbols For.
ANSI/AWS A3.0-89 - Brazing, Soldering Thermal Spraying and
Thermal Cutting, Welding Terms and
Definitions Including Terms For

(Application for copies should be addressed to the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018.)

(Nongovernment standards and other publications are normally available from the organizations which prepare or which 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 (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

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3. REQUIREMENTS

3.1 General. The EMC shelters shall be in accordance with the drawings, this specification and other specifications as directed by the contracting officer.

3.2 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.3 and 6.4).

3.3 Materials. The materials and components shall be certified to conform to the applicable specification and standards as listed on drawing packages 82A5049A0000, 82A5048A0000, 82A5050A0000 and 87036A0000 (see 2.1.2) as applicable or required herein. The materials used may include reclaimed materials provided such materials will not jeopardize its intended use and performance. The reclaimed materials shall have been reprocessed, remanufactured, or recycled in a manner which will restore them to the same chemical composition and physical properties as the materials originally selected for use as specified herein.

3.4 Design. The EMC Shelters shall be of the design specified on drawing packages 82A5048A000, 82A5049A000, 82A5050A0000 and 87036A0000 (see 2.1.2) as applicable.

3.5 Construction. The EMC Shelters shall be of the construction and physical dimensions specified of drawing packages 82A5049A0000, 82A50480000, 82A505A0000 and 87036A0000 (see 2.1.2) as applicable.

3.5.1 Shelter. The EMC Shelters shall be fabricated from materials as specified on the drawings. Their dimensions shall be as indicated, and shall be capable of accepting the model frame as illustrated in Figure 1.

3.5.2 Interior lighting. Interior lighting shall be arranged as shown on the drawings.

3.5.3 Shelter electrical system. The EMC Shelters shall have all the equipment, cabling and other hardware necessary to receive 208 V, 60 Hz, 3 phase, 5 wire power and 28 V dc power, except for the type III shelter which does not have 28 V dc capability. The power shall be distributed to lighting fixtures, connectors and receptacles as indicated on the applicable drawings. The type II shelter shall have the capability of distributing internally generated 120 V ac 400 Hz power.

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3.5.4 Air conditioning. The shelter shall be equipped to accept standard Marine Corps skid mounted air conditioning ducting as indicated in Marine Corps Expeditionary Shelter System (MCESS) (Small Shelter Family) Operation and Maintenance Instructions (TM 5411-14/1).

3.5.5 Electromagnetic Interference (EMI). Each Type I and II shelter shall provide EMI shielding characteristics. The outside to inside shielding properties of the shelters shall provide a minimum of 60 db radio frequency interference (RFI)/EMI attenuation at the following frequencies with installed power and services:

Magnetic fields	150 KHz and 1.5 MHz
Electric fields	1.5 MHz and 400 MHz
Plane waves	400 MHz, 1 GHz and 10 GHz

3.6 Interchangeability. All parts having the same part number shall be functionally and dimensionally interchangeable. Interchangeable parts are defined as two or more like parts possessing such functional and physical characteristics as to be equivalent in performance and durability, and capable of being exchanged one for the other without alteration of the parts themselves or adjoining parts without selection for fit or performance.

3.7 Workmanship

3.7.1 General. The shelter shall meet all design, fabrication, assembly and finish requirements of this specification. All parts and assemblies shall be constructed and finished with particular attention given to removal of burrs and sharp edges, accuracy of dimensions, thoroughness of soldering, and the tightness of screws, bolts, etc. Gaskets shall not be torn or split and shall be free of paint. Failure to ensure these measures have been taken will be considered adequate basis for rejection of items being of inferior quality for the purpose intended.

3.7.2 Riveting. Riveted joints shall be tight. The joined parts shall be undamaged, and the rivet heads shall be properly seated and tight against the bearing surfaces. All exterior surface rivets shall be weather sealed.

3.7.3 Welding. Welded joints shall be such that grinding of the finished weld shall not be a requirement except when specified on the drawings. Spot, stitch, and seam welds shall be as indicated on the drawings. All surfaces to be welded shall be free from scale, paint, grease, and other foreign materials. Welds shall have thorough penetration, good fusion and shall be free from scabs, blisters, abnormal pock marks, cracks, voids, slag inclusions, and other harmful defects. Welded assemblies

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shall be cleaned to remove any scale, oxidation products, and excess flux. Any acid used in cleaning shall be completely neutralized and removed.

3.8 Finish.

3.8.1 Cleaning. After fabrication, parts and assemblies shall be cleaned as specified on the drawings.

3.8.2 Priming. After metal surfaces have been cleaned as required they shall be primed as specified on the drawings.

3.8.3 Painting. Coatings shall level out to an adherent, continuous and uniform film without runs, wrinkles, streaks, or areas of no film. Any coating damaged during assembly or examination shall be touched up. There shall be no areas of rust. Finish shall be free of blistering, peeling and chips.

3.8.4 Paint and color. Surfaces shall be of the color, treatment, and finish as specified on the drawings.

3.9 Nameplates and product markings. All markings shall be in accordance with MIL-STD-130 and conform to the drawings. Each shelter shall be serially numbered as directed by the contracting officer, and provided with a nameplate in accordance with applicable drawings (see 6.2).

3.9.1 Interior markings. Interior markings shall be as shown and in the locations shown on the applicable drawings.

3.9.2 Exterior markings. The shelter shall be provided with specific exterior markings as shown on the applicable drawings.

4. QUALITY ASSURANCE PROVISIONS

4.1 General. All tests and inspections shall be conducted on the finished EMC Shelters.

4.2 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements 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 assure supplies and services conform to prescribed requirements.

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4.2.1 Responsibility for compliance. All items must meet all requirements of section 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 assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.2.2 Test equipment and inspection facilities. When specified (see 6.2) the contractor shall ensure that the test and inspection facilities of sufficient accuracy, quality and quantity are established and maintained to permit performance of required inspections.

4.3 Classification of inspections. The inspections specified herein are classified as follows:

a. First article inspection. First article inspection consists of examinations and tests performed on sample(s) which are representative of the production item after award of contract to determine that the production item conforms to the requirements of this specification (see 4.4).

b. Quality conformance inspection. Quality conformance inspection consists of examinations and tests performed on individual products to determine conformance of the products with the requirements set forth in this specification (see 4.5).

c. Visual inspection. Visual inspection consists of examinations to determine conformance with the requirements set forth in this specification (see 4.6).

4.4 First article inspection. The first article inspection of the EMC Shelters shall consist of examination and tests for all the requirements of this specification.

4.4.1 First article sample. Unless otherwise specified as soon as practical after the award of the contract, the contractor shall submit quantity(s) specified in the contract for EMC Shelters. The First Article sample(s) shall be representative of the construction, workmanship, components, and materials used during production. Approval of the first article inspection sample(s) or the waiving of the first article inspection does not preclude the requirements for performing the quality conformance inspection. The first article inspection sample(s) shall be

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furnished to the Government as directed by the Contracting Officer (see 6.2).

4.4.2 Sample disposition. Upon completion of the first article inspection, sample(s) will be disposed of in accordance with Government shipping instructions.

4.4.3 First article inspection routine. First article inspection shall consist of those items listed in Table I.

TABLE I. Tests and Inspection.

Requirement	Requirement Paragraph	Requirement Paragraph
Dimensional check	3.5.1	4.5.1
Condition and certification of materials	3.5.1	4.5.2
Frame acceptance	3.5.1	4.5.3
Interior lighting	3.5.2	4.5.4
Shelter electrical system	3.5.3	4.5.5
Air conditioning	3.5.4	4.5.6
Electromagnetic Interference	3.5.5	4.5.7
Riveting	3.7.2	4.5.8
Welding	3.7.3	4.5.9
Painting	3.8.3	4.5.10
Packaging	5.1, 5.2	4.5.11

4.5 Quality conformance inspection. Quality conformance inspections shall be conducted in accordance with MIL-STD-105 and consist of those items listed in Table I.

4.5.1 Dimensional examination. The EMC Shelters shall be examined for conformance to dimensions specified on the drawings.

4.5.2 Condition and certification of materials. Material used in construction of the EMC Shelters shall be certified to be of the specified material that has no etching, scaling or pitting. Fabricated pieces shall not have sharp edges or burrs. Material shall not be cracked, malformed or split.

4.5.3 Frame acceptance. Wall and floor rail assemblies shall be tested to accept a model frame at each module position as illustrated in Figure I.

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4.5.4 Interior lighting. Interior lighting shall be inspected for proper operation.

4.5.5 Shelter electrical system. The shelter electrical system shall be tested for compliance with the requirements.

4.5.6 Air conditioning. The input ducting shall be inspected for compliance with the requirements of TM 5411-14/1.

4.5.7 EMI shielding. Type I and II EMC Shelters shall be subjected to EMI shielding tests in accordance with MIL-STD-285.

4.5.8 Riveting. All rivet joints shall be inspected for tightness against the bearing surfaces and proper seating with all surface rivets weather sealed.

4.5.9 Welding. Welding areas shall be inspected for cleanliness and be free of dirt, sand, scale and oil prior to welding. All welds shall be inspected for compliance with ANSI/AWS A3.0-89, A2.4-93 and MIL-STD-285 or MIL-STD-2219 as applicable.

4.5.10 Painting. Coatings shall be inspected to have a level adherent continuous and uniform film without runs, wrinkles, streaks, or areas of no film.

4.5.11 Packaging. Packaging shall be inspected for conformance with MIL-STD-2073-1A.

4.6 Visual inspection. The EMC Shelters shall be examined for defects listed in Table II. The defects shall be classified as indicated in Table II.

TABLE II. Classification of Defects for Visual Inspection.

Examine	Defect	Classification	
		Major	Minor
Metal fasteners, bolts, nuts, screws, studs Rivets	Missing, not type specified		
	broken, stripped, or loose	X	
	Lockwasher missing where required		X
	Missing	X	
Marking	Not type specified	X	
	Not drawn sufficiently tight		X
	Missing, incomplete, not legible, not specified type or size,		
	misplace		X

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TABLE II: Classification of Defects for Visual Inspection (Cont.)

Examine	Defect	Classification Major/Minor	
Instruction plate, nameplate	Missing, incomplete, not legible	X	
Construction and workmanship	Component of part fractured, split, punctured, dented, or malformed	X	
	Component missing, inoperative, or will not operate as intended	X	
	Component not properly assembled or secured	X	
	Any functioning component which requires abnormal force to operate		X
	Burr, rough or sharp edges, or sliver which may be injurious to personnel or cargo	X	
	Removal of excess potting material from installed inserts	X	
	Gaskets torn or split	X	
	Gaskets or seals painted		X
	Visible gaps between aluminum faces or extruded edges or panel cutout edge members		X
Metal fasteners, bolts, nuts, screws, studs	Missing, not type specified	X	
	broken, stripped, or loose		
	Lockwashers missing where required		X
Rivets	Missing	X	
	Not type specified	X	
	Not drawn sufficiently tight		X
Marking	Missing, incomplete, not legible, not specified type or size, misplaced		X
Instruction plate, nameplate	Missing, incomplete not legible	X	

5. PACKAGING

5.1 Preservation. Preservation shall be level A in accordance with MIL-STD-2073-1A.

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5.1.1 Level A. All hardware necessary for erection and operation of the EMC Shelter shall be secured within the shelter as specified on the drawings. The parts in the shelter shall be secured and padded, as required, to insure that no damage shall occur to the parts, or to the shelter during shipment. All exterior electrical connections shall be covered and all mechanisms (handles, latches, etc.) shall be secured.

5.2 Packing. Packing shall be level A in accordance with MIL-STD-2073-1A.

5.2.1 Level A packing. The EMC Shelters shall be closed into their container mode and secured by means provided. Mechanical seals shall be placed on the doors to deter unauthorized entry to the shelters during initial transport to the user.

5.3 Marking. In addition to the marking required by 3.9, each EMC Shelter shall be marked for shipment in accordance with the requirements of MIL-STD-129.

6. NOTES

6.1 Intended use. The EMC Shelters will provide a highly mobile family of shelters that will facilitate the electronic maintenance. These shelters will be furnished with modules to suit the users needs. Dependent upon the modules installed within the shelter it may be used for testing, fault isolation and repair of electronic equipment; a technical reference library; spare parts and equipment stowage; maintenance management and administration. The shelter(s) shall be transportable by helicopter and amphibious shipping, additionally it shall be compatible with both tactical and commercial motor transport and material handling equipment.

6.1.1 Adaptation. EMC Shelters are designed to be incorporated into the following shelter assemblies:

<u>Type</u>	<u>Shelter</u>	<u>Specification</u>
I	10 Foot EMI	MIL-S-29411 (MC)
II	20 Foot EMI	MIL-S-29411 (MC)
III	10 Foot Rigid	MIL-S-29434 (MC)
IV	20 Foot Rigid	MIL-S-29410 (MC)

6.2 Ordering data

6.2.1 Acquisition requirements. Procurement documents shall specify the following:

- a. Title, number, and date of this specification.

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- b. Type of EMC Shelter required (see 1.2).
- c. Quantity desired.
- d. When first article testing is required (see 3.2).
- e. When test equipment and inspection facilities are required (see 4.2.2).
- f. When quality conformance testing is required (see 4.5).
- g. Name and address of the first article inspection facility.
- h. Level of preservation and packing required (see section 5).
- i. Whether any special markings are required (see 3.9).

6.3 Data requirements. When this specification is used in an acquisition which incorporates a DD Form 1423, Contract Data Requirements List (CDRL) the data requirements identified below shall be developed as specified by an approved Data Item Description (DD Form 1664) and delivered in accordance with the approved CDRL incorporated into the contract. When the provisions of DoD FAR Supplement, Part 27, Sub-Part 27.410-6 are invoked and the DD Form 1423 is not used, the data specified below shall be delivered by the contractor in accordance with the contract or purchase order requirements. Deliverable data required by this specification is cited in the following paragraphs.

<u>Data Requirements</u>	<u>Applicable DID Number</u>	<u>Options</u>
First Article Inspection Procedure	DI-T-4901	_____
First Article Inspection Report	DI-T-4902	_____
Production/Acceptance Inspection Procedures	DI-T-4903	_____
Production Inspection Report	DI-T-4904	_____

(Copies of DID's required by the contractors in connection with specific acquisition functions should be obtained from Naval Publications and Forms Center or as directed by the contracting officer.)

6.4 First article. The first article is to be examined and tested for approval at the contractor's plant or at an independent commercial testing laboratory acceptable to the procuring activity. First article tests shall be witnessed by a Government representative of the Procuring activity. Approval of the first articles shall be by the procurement contracting officer.

6.5 Subject term (Key word) listing. The following subject term (key word) listing is furnished for retrieval searches.

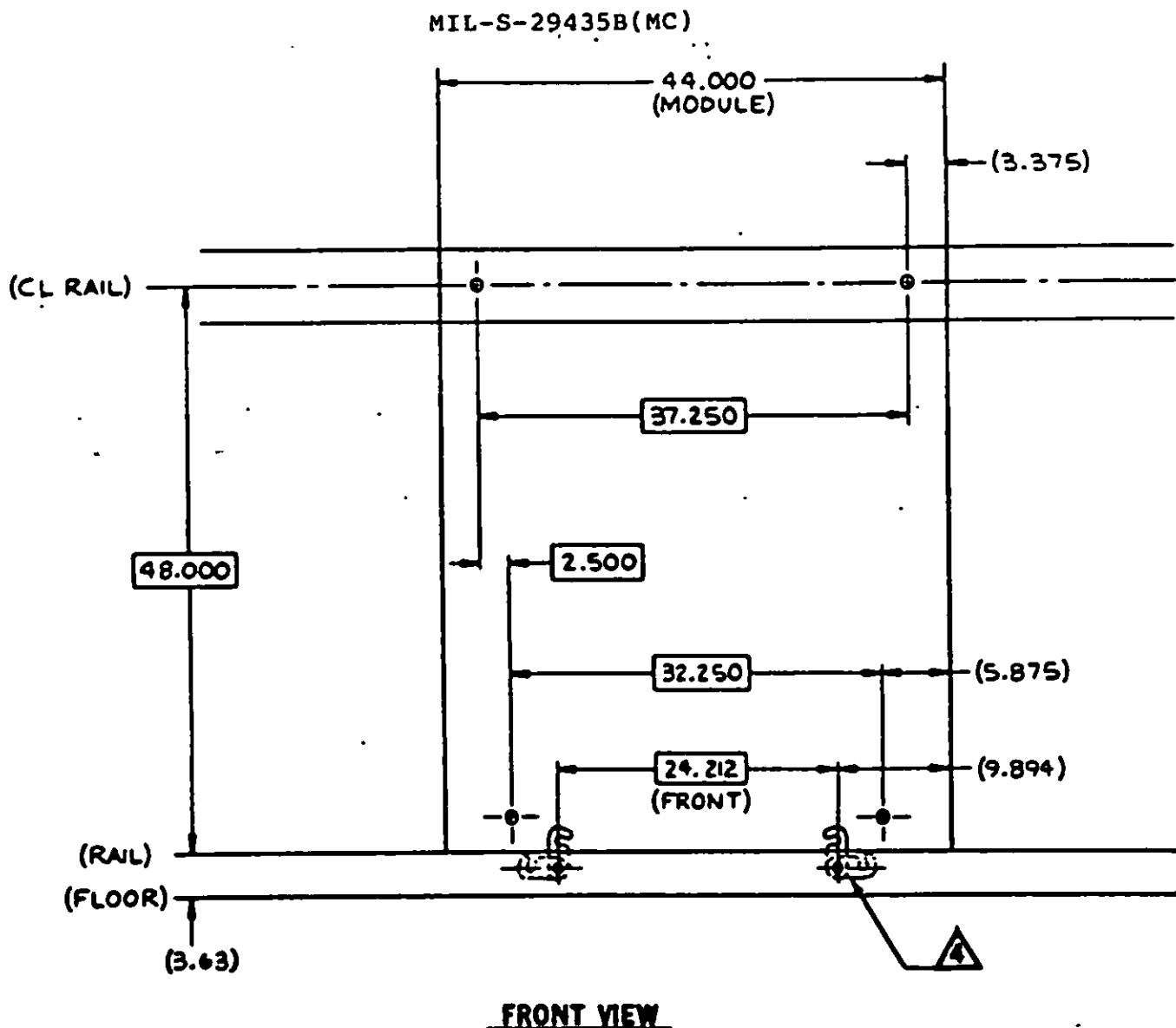
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Shelter, Electronics Maintenance Complex, 10 foot, EMI
Shelter, Electronics Maintenance Complex, 20 foot, EMI
Shelter, Electronics Maintenance Complex, 10 foot, Rigid
Shelter, Electronics Maintenance Complex, 20 foot, Rigid

Preparing activity:

Navy-MC

Project No. 5411-N043

**NOTES:**

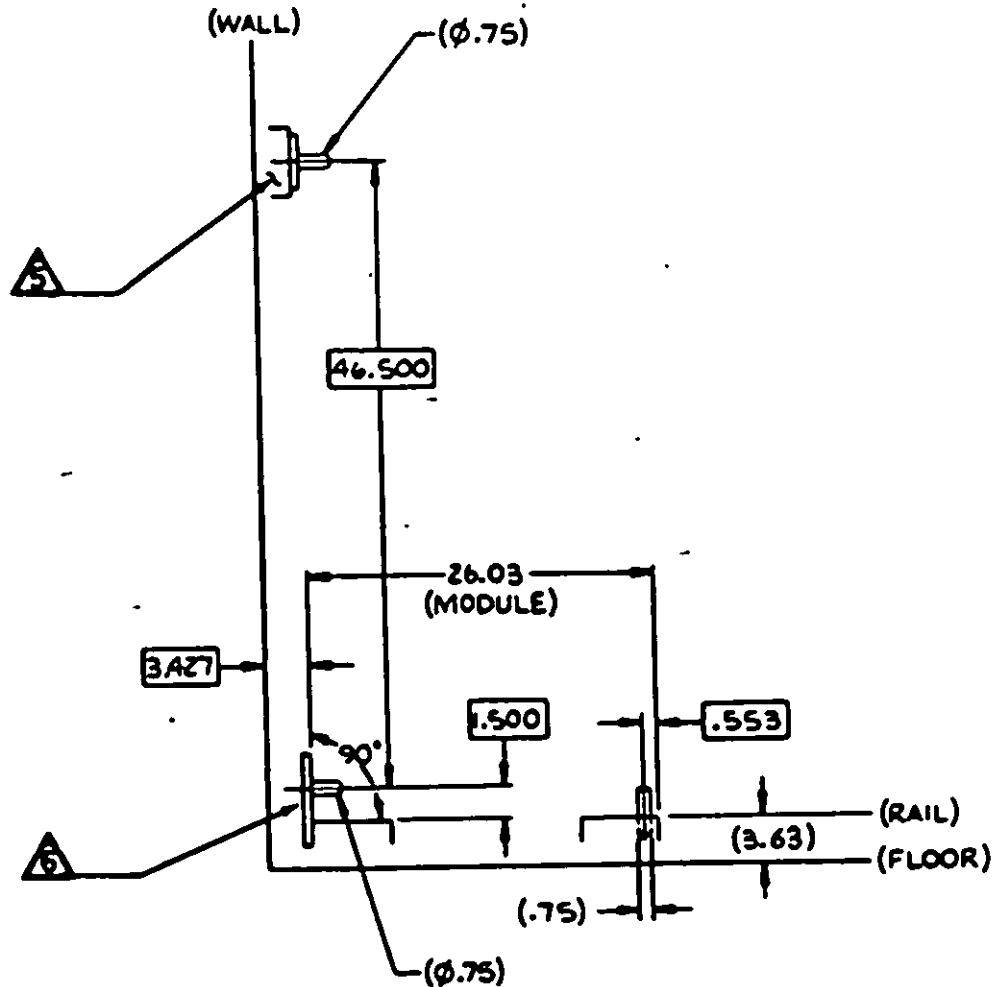
- 1 Dimensions are in inches.
- 2 Unless otherwise specified, tolerance is .XX \pm .03, XXX \pm .010.
- 3 Perpendicularity equals $\pm 1^\circ$.

△ REF DWGS: 82A5050A0100 (RAIL ASSEMBLY AND INSTALLATION, MOUNTING, FLOOR)

82A5050A0132 (BAR, LOCK)
 82A5050A0138 (SHAFT, LATCH)
 82A5050A0140 (HEAD, LATCH)
 82A5050A0142 (HANDLE, LATCH)
 82A5050A0144 (LATCH)

Figure 1. (Page 1 of 2)
Module Assembly Footprint

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SIDE VIEW

- 5 REF DWGS: 82A5050A0150 (RAIL ASSEMBLY AND INSTALLATION, MOUNTING, WALL)**
82A5050A0160 (POST ASSEMBLY, MOUNTING)
- 6 REF DWGS: 82A5050A0100 (RAIL ASSEMBLY AND INSTALLATION, MOUNTING, FLOOR)**
82A5050A0110 (PEG ASSEMBLY, MODULAR ALIGNMENT)

Figure 1. (Page 2 of 2)
Module Assembly Footprint

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:		1. DOCUMENT NUMBER MIL-S-29435B(MC)	2. DOCUMENT DATE (YYMMDD) 1 MARCH 94
3. DOCUMENT TITLE SHELTER, ELECTRONICS MAINTENANCE COMPLEX (EMC)			
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)			
5. REASON FOR RECOMMENDATION			
6. SUBMITTER			
a. NAME (Last, First, Middle Initial)		b. ORGANIZATION	
c. ADDRESS (Include Zip Code)		d. TELEPHONE (Include Area Code)	
		(1) Commercial (2) AUTOVON (If applicable)	
		7. DATE SUBMITTED (YYMMDD)	
8. PREPARING ACTIVITY			
a. NAME COMMANDER		b. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (912) 439-6560 567-6560	
c. ADDRESS (Include Zip Code) MARINE CORPS LOGISTICS BASES (CODE 855) 814 RADFORD BOULEVARD ALBANY GA 31704-1128		IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	