NOTE: This draft dated 19 February 2000 prepared by NAVSEA Dahlgren has not been approved and is subject to modification. DO NOT USE PRIOR TO APPROVAL (Project xxxx).

METRIC

MIL-STD-2042-3B(SH)

SUPERSEDING
MIL-STD-2042-3A(SH)
11 September 1996
MIL-STD-2042-3(SH)
7 July 1993

DEPARTMENT OF DEFENSE
STANDARD PRACTICE

FIBER OPTIC CABLE TOPOLOGY INSTALLATION STANDARD METHODS FOR NAVAL SHIPS (CABLE PENETRATIONS)

(PART 3 OF 7 PARTS)

AMSC N/A AREA GDRQ

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

FOREWORD

1. This Department of Defense Standard Practice is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

2. Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 53G, 2531 Jefferson Davis Highway, Arlington, VA 22242-5160 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

3. This standard practice provides detailed information and guidance to personnel concerned with the installation of fiber optic cable topologies (optical fiber cabling and associated components) on Naval surface ships and submarines. The methods specified herein are not identifiable to any specific ship class or type, but are intended to standardize and minimize variations in installation methods to enhance the compatibility of the installations on all Naval ships.

4. In order to provide flexibility in the use and update of the installation methods, this standard practice is issued in eight parts; the basic standard practice and seven numbered parts as follows:

Part 1 Cables
Part 2 Equipment
Part 3 Cable Penetrations
Part 4 Cableways
Part 5 Connectors and Interconnections
Part 6 Tests
Part 7 Pierside Connectivity Cable Assemblies and Interconnection Hardware

CONTENTS

CONTENTS

1.SCOPE

1.1 Scope. This standard practice provides detailed methods of optical fiber cable penetrations through ship structure and equipment via stuffing tubes, swage tubes, multiple cable penetrators, chafing collars and nipples.

1.1.1 Applicability. These criteria apply to installations on specific ships when invoked by the governing ship specification or other contractual document. They are intended primarily for new construction; however, they are also applicable for conversion or alteration of existing ships. The rapidly changing state of the art in fiber optic technology makes it essential that some degree of flexibility be exercised in enforcing this document. When there is a conflict between this document and the ship specification or contract, the ship specification or contract shall take precedence. Where ship design is such that the methods herein cannot be implemented, users shall submit new methods or modifications of existing methods to NAVSEA 05 for approval prior to implementation.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4 and 5 of this standard practice. This section does not include documents cited in other sections of this standard practice or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements documents cited in sections 3, 4 and 5 of this standard practice, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

GGG-W-646	-	Wrench, Open End, Ratchet (TAC Pattern), for Tube Fittings, Electric Cable Terminals and Stuffing Tube Gland Nuts.

DEPARTMENT OF DEFENSE

MIL-I-3064	-	Insulation, Electrical, Plastic-Sealer.
MIL-PRF-15624	-	Gasket Material, Rubber, 50 Durometer Hardness (Maximum).
MIL-P-16685	-	Packing, Material and Packing Preformed (Stuffing Tube for Electrical Cables).
MIL-S-24235	-	Stuffing Tubes, Metal and Packing Assemblies for Electric Cables, General Specification for.
MIL-S-24235/1	-	Stuffing Tube, Metal, and Packing Assemblies for Electric Cables, Bulkhead, Pressureproof.
MIL-S-24235/9	-	Stuffing Tubes, Metal and Packing Assemblies for Electric Cables, Brass and Steel, for Decks and Bulkheads with Pipe Protection.
MIL-S-24235/10	-	Stuffing Tubes, Metal and Packing Assemblies for Electric Cables, Steel, for Decks and Bulkheads without Pipe Protection.
MIL-S-24235/17	-	Stuffing Tube, Metal, and Packing Assemblies for Electric Cables, Swage Type, Steel and Aluminum, for Deck and Bulkheads with Pipe Protection.
MIL-S-24235/18	-	Stuffing Tube, Metal, and Packing Assemblies for Electric Cables, Swage Type, Reduced Diameter, Steel and Aluminum, for Deck and Bulkheads with Pipe Protection.
MIL-S-24235/19	-	Stuffing Tube, Metal, and Packing Assemblies for Electric Cables, Swage Type, Steel and Aluminum, for Deck and Bulkheads with Pipe Protection.
MIL-P-24705	-	Penetrators, Multiple Cable, for Electric Cables, General Specification for.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-2003	-	Electric Plant Installation Standard Methods for Surface Ships and Submarines.

MIL-STD-2003-3 - Electric Plant Installation Standard Methods for Surface Ships and Submarines (Penetrations).

MIL-STD-2042-2 - Fiber Optic Topology Installation Standard Methods for Naval Ships (Equipment)(Part 2 of 7 Parts).

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Documents Order Desk, 700 Robbins Ave, Building 4D, Philadelphia, PA, 19111-5094.)

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

DOCUMENTS

DDS 100-1 - Reinforcement of Openings in Structure of Surface Ships Other than in Protective Plating.

DDS 100-2 - Openings in Decks and Bulkheads for Stuffing Tubes and Pipe.

(Copies of the above documents should be obtained from the contracting activity or as directed by the contracting officer.)

2.3 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).

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z136.2 - Safe Use of Optical Fiber Communication Systems Utilizing Laser Diode and LED Sources

(Application for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018-3308.)

ELECTRONICS INDUSTRY ASSOCIATION/TELECOMMUNICATIONS INDUSTRY ASSOCIATION

EIA/TIA-440 - Fiber Optic Terminology.

(Application for copies should be addressed to Global Engineering Documents, 1990 M Street NW, Suite 400, Washington, DC 20036.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. DEFINITIONS

3.1 General fiber optics terms. Definitions for general fiber optics terms used in this standard practice are in accordance with EIA/TIA-440. Definitions for other terms as they are used in this standard practice are given in the following paragraphs.

3.2 Chafing collar. A chafing collar is a round or oval banding that protects two or more cables that penetrate structure from crimping and wear caused by rubbing against sharp edges.

3.3 Collective protection system (CPS). A CPS system is a system designed to inhibit the entry of chemical, biological, and radiological contaminants into collective protection zones on board Naval ships.

3.4 Kickpipe. A kickpipe is a pipe welded into the deck with a stuffing tube attached. Kickpipes provide protection for cables at deck penetrations and are used to clear an obstruction or preserve alignment.

3.5 Metal stuffing tube. A metal stuffing tube provides a means for making watertight single cable penetrations through shell plating, decks, and bulkheads, and into equipment.

3.6 Multiple cable penetrator (MCP). A MCP provides a means for making watertight, airtight, and firetight penetrations through decks, bulkheads, and into equipment.

3.7 Nipple. A nipple is a smaller version of the chafing collar, and is used to protect a single cable penetration.

3.8 Optical fiber cable. A cable that contains optical fibers.

3.8.1 BOF cable. A cable that contains one or more BOF tubes through which optical fibers or optical fiber bundles are blown.

3.8.2 Conventional optical fiber cable. An optical fiber cable in which the optical fiber is an integral part of the cable and is installed during the cable manufacturing process.

3.9 Swage tube. A swage tube provides watertight cable penetrations through decks and is an alternative to a stuffing tube with a kickpipe.

4. GENERAL REQUIREMENTS

4.1 Cable penetrations. Optical fiber cable penetrations of ship structure shall be made by metal stuffing tubes (see 3.5), swage tubes (see 3.9), multiple cable penetrators (see 3.6), chafing collars (see 3.2), or nipples (see 3.7). Cable penetrations into equipment shall be made by nylon stuffing tubes or integral multiple cable penetrators in accordance with Part 2 of this standard practice. Penetrations of ship structure shall be in accordance with this Part of this standard practice.

4.1.1 Cable penetration of ship structure. Cable penetration of ship structure shall be in accordance with DDS 100-1, DDS 100-2, the methods described herein, and as follows:

a. Metal stuffing tubes or multiple cable penetrators (MCP's) shall be used for the penetration of the following structures, except that only metal stuffing tubes shall be used to penetrate bulkheads or decks that are exposed to the weather:

   (1) Collective protection system (CPS) (see 3.3) boundaries.

   (2) Watertight cable trunks.

   (3) Watertight decks.

   (4) Watertight bulkheads.

   (5) Bulkheads designed to withstand a waterhead.

   (6) That portion of a bulkhead specified to be watertight to a certain height.

   (7) That portion of a bulkhead below the height of the sill or the coaming of a compartment access.

   (8) Bulkheads surrounding compartments subject to flooding by sprinkling systems.

   (9) Garbage disposal rooms.

   (10) Battery shops.

   (11) Medical operating rooms.

   (12) Medical wards.

b. Metal stuffing tubes only shall be used to penetrate decks and bulkheads forming the boundaries of spaces containing volatile, combustible, or explosive material.

c. Unless otherwise specified, metal stuffing tubes, multiple cable penetrators or nipples and chafing collars packed with plastic sealer shall be used for the following penetrations. The method selected shall satisfy the tightness requirements of the structure.

   (1) Decks (non-watertight).

   (2) Structural bulkheads.

   (3) Airtight bulkheads.

   (4) Fumetight bulkheads.

   (5) Multiple cable (two or more) penetrations through non structural steel bulkheads (other than mesh or expanded metal), bents, web frames, transverse girders and longitudinal girders.

   Cable penetrations of vertical non tight structures within a compartment need not be sealed at intervals closer than 20 feet horizontally. However, if one

penetration on the structure requires sealing, then all penetrations of that structure shall be sealed.

d. Metal stuffing tubes in accordance with MIL-S-24235/1 shall be used to penetrate pressureproof submarine bulkheads and surface ship sonar domes that are filled with water under normal operating conditions. One half of the tube may be used to penetrate surface ship sonar domes only.

e. The size of the stuffing tube groups shall be limited to permit tightening of gland nuts in the group using stuffing tube wrench set type II, class I, style A, form B in table IV of GGG-W-646. Penetration spacing shall be as specified in DDS 100-2.

4.1.2 Plastic sealer. Plastic sealer, type HF as specified in MIL-I-3064 shall be used to seal the space around the cables in collars or nipples used for passing cables through light tight and fume tight bulkheads.

4.1.3 Kickpipes. Kickpipes (see 3.4) shall be made of a material to suit the structure being penetrated and shall be compatible with the stuffing tube material. Pipe ends shall be chamfered and inside wall burrs shall be removed to prevent chafing of the cable jacket. Swage tubes in accordance with MIL-S-24235/17 or MIL-S-24235/18 may be used as an alternative to stuffing tubes in accordance with MIL-S-24235/9.

4.1.4 Multiple cable penetrators (MCP's). MCP's shall be in accordance with MIL-P-24705.

4.1.5 Metal stuffing tubes. Metal stuffing tubes shall be in accordance with MIL-S-24235/1, MIL-S-24235/2, MIL-S-24235/9 or MIL-S-24235/10.

4.1.5.1 Stuffing tube packing. Packing for stuffing tubes that penetrate submarine pressureproof and surface ship ballistic bulkheads, and sonar domes filled with water under normal operating conditions shall be in accordance with MIL-S-24235/1. For all other metal stuffing tubes, packing shall be in accordance with either the preformed (coil), class 2 or the bulk, class 1 of MIL-P-16685. When bulk packing is used, the first and last turns shall be part A (hard) and the intermediate turns shall be part B (soft). Reinforced neoprene packing in accordance with class 1 of MIL-PRF-15624 may be used as an alternate.

4.1.6 Chafing collars and nipples. Collar length shall be not less than 76 mm (3 inches) with a minimum radial distance between the cable and collar of 25 mm (1 inch). Nipple length shall be not less than 51 mm (2 inches), with a minimum radial distance between the cable and the nipple of 6 mm (0.25 inch).

4.2 Safety precautions. The following safety precautions apply:

a. The classification of a laser is based on the ability of the optical beam to cause damage to the eye. Under normal operating conditions, an optical fiber communication system (OFCS) is inherently an eye safe system; but, when an optical fiber connection is broken and optical viewing instruments are used, it is possible that hazardous energy can enter the eye. For this reason four service group hazard classes have been devised to indicate the degree of hazard and required hazard control measures. Refer to ANSI Z136.2 for a full technical definition. The following laser safety precautions shall apply:

(1) Ensure personnel are familiar with the laser degree of hazard and the required control measures.

(2) Light generated by light emitting diodes (LED's) and laser diodes may not be visible but may still be hazardous to the unprotected eye. Never stare into the end of an optical fiber connected to an LED or laser diode and do not stare into broken, severed or disconnected optical cables.

(3) Do not view the primary beam or a specular reflection from an OFCS with an optical microscope, eye loupe or other viewing instrument. The instrument may create a hazard due to its light gathering capability.

b. Safety glasses shall be worn when handling bare fibers. Always handle cable carefully to avoid personal injury. The ends of optical fibers may be extremely sharp and can lacerate or penetrate the skin or cause permanent eye damage if touched. If the fiber penetrates the skin, it most likely will

break off, in which case the extraction of the fiber should be performed by trained medical personnel to prevent further complications.

c. Wash hands after handling bare fibers.

5. DETAILED REQUIREMENTS

5.1 Penetration of ship structure (submarines). Optical fiber cables shall penetrate the ship structure of submarines in accordance with Figures 3A1 and 3A10 through 3A23 of MIL-STD-2003-3, as modified (see 5.5). Stuffing tube sizes for optical fiber cables shall be selected in accordance with Method 3A1-1 of this standard practice.

5.2 Penetration of ship structure (surface ships) using steel or aluminum stuffing tubes. Optical fiber cables shall penetrate the ship structure of surface ships using steel or aluminum stuffing tubes in accordance with Figures 3B1 through 3B3, 3B10 through 3B24, 3B43 through 3B46, 3B48 and 3B49, 3C13 through 3C16 and 3C18 of MIL-STD-2003-3, as modified (see 5.5). Stuffing tube sizes for optical fiber cables shall be selected in accordance with Method 3A1-2 of this standard practice.

5.3 Penetration of ship structure using multiple cable penetrators (MCP's). Optical fiber cables shall penetrate the ship structure using MCP's in accordance with Figures 3B25, 3B27 through 3B35, and 3B54 through 3B66 of MIL-STD-2003-3, as modified (see 5.5). MCP insert block sizes for optical fiber cables shall be selected in accordance with Method 3B1 of this standard practice.

5.4 Penetration of ship structure using kickpipes. Optical fiber cables shall penetrate the ship structure using kickpipes in accordance with Figures 3D1 through 3D6 and 3D8 of MIL-STD-2003-3, as modified (see 5.5). Stuffing tube sizes for optical fiber cable shall be in accordance with Method 3A1-2 of this standard practice. Swage tubes may be used in place of kickpipes. Swage tube sizes for optical fiber cable shall be selected in accordance with Method 3A1-3 of this standard practice.

5.5 Retention of the watertight seal. The optical fiber cable may lose some of its resiliency after being compressed. To ensure the watertight seal is achieved and maintained, retighten cap (stuffing tube) or bolt (MCP) approximately 24 hours after initial compression.

6. NOTES

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

6.1 Intended use. The methods for cable penetrations depicted in this standard practice are intended primarily for new construction; however, they are applicable for conversion or alteration of existing ships.

6.2 Issue of DODISS. When this standard practice is used in acquisition, the applicable issue of DODISS must be cited in the solicitation (see 2.2.1).

6.3 Standard method designation. To simplify the usage of this standard practice, an alpha-numeric designation system was developed to identify and locate a given method. The methods were grouped together by function as follows:

Group A: Cable penetrations via metal stuffing tubes
Group B: Cable penetrations via MCP

Then the designation system was completed as follows:

```
3    A   1 - 2
•    •   •  •
•    •   •  •
•    •   •  ••••••••      Alternate procedure within method
•    •   ••••••••••••    Method number within group
•    ••••••••••••••••••  Functional group
•••••••••••••••••••••••• MIL-STD-2042 Part number
```

Thus, method 3A1-2 identifies the second alternate procedure for method 1 of group A in Part 3 (MIL-STD-2042-3) of MIL-STD-2042.

6.4 Subject term (key word) listing.

Chafing collar
Collective protection system (CPS)
Kickpipes
Metal stuffing tubes
Multiple cable penetrator (MCP)
Swage tubes
Nipple

Preparing activity:
NAVY - SH
(Project GDRQ-xxxx)

METHOD 3A1

CABLE PENETRATIONS VIA METAL STUFFING TUBES

1.1 Scope. These methods identify stuffing tube sizes used to pass optical fiber cables through decks and bulkheads. The methods for installation of the stuffing tubes is the same as those specified for electrical cables in MIL-STD-2003. These installation methods are not repeated in this standard practice but they are identified in paragraph 5 in this part of this standard practice.

2. REQUIRED EQUIPMENT AND MATERIALS. (Not applicable.)

3. PROCEDURES.

3.1 Safety summary. The following safety precautions shall be observed during the passing of optical fiber cables through the installed stuffing tubes:

a. Safety glasses shall be worn when handling bare fibers.

b. Do not touch the ends of fibers as they may be razor sharp. Wash your hands after handling bare fiber.

c. Observe the warnings and cautions on equipment and materials.

d. Never stare into the end of a fiber connected to a laser source or LED.

3.2 Procedure I. Method 3A1-1-Metal stuffing tubes for submarines.

Step 1 - Select a steel stuffing tube from those shown in tables 3A1-I and 3A1-II.

TABLE 3A1-I. Steel stuffing tube sizes for optical fiber cable (Submarines).

Cable type	Cable O.D. mm (inches) (nominal)	Tube size	Packing assembly	
			Part no. M24235/2	Symbol no.
4-Fiber	8.1 (0.32)	1	-*002	2405.2
8-Fiber	11.1 (0.44)	1	-*003	2405.3
36-Fiber	20.8 (0.82)	3	-*013	2407.1
7-Tube	29.0 (1.14) to 31.5 (1.25)	4	-*034	2408.4

NOTE: The asterisk "*" represents item material. The material shall be Neoprene (N) or Silicone (S).

TABLE 3A1-II. Steel stuffing tube data (Submarines).

Grade steel		HY-80			HT		
		Tube size 1	Tube size 3	Tube size 4	Tube size 1	Tube size 3	Tube size 4
Stuffing tube assembly	Part number M24235/1	-001	-003	-004	-101	-103	-104
Part numbers of components	Tube body (1 required) M24235/1	-010	-012	-013	-110	-112	-113
	Gland nut (2 required) M24235/1	-019	-021	-022	-019	-021	-022
	Lock washer (2 required) M24235/1	-028	-030	-031	-028	-030	-031
Symbol number		2405 HY-80	2407 HY-80	2408 HY-80	2405-HT	2407-HT	2408-HT

3.3 Procedure II. Method 3A1-2- Metal stuffing tubes for surface ships.

Step 1 - Select a steel or aluminum stuffing tube from those shown in tables 3A1-III and 3A1-IV.

TABLE 3A1-III. Aluminum and steel stuffing tube sizes for optical fiber cable (Surface ships).

Cable type	Cable O.D. mm (inches) (nominal)	Tube size MIL-S-24235/9 and /10	Packing assembly MIL-P-16685
4-Fiber	8.1 (0.32)	A	Class 1 and 2
8-Fiber	11.1 (0.44)	B	Class 1 and 2
36-Fiber	20.8 (0.82)	F	Class 1 and 2
7-Tube	29.0 (1.14) to 31.5 (1.25)	L	Class 1 and 2

TABLE 3A1-IV. Steel stuffing tube data for decks and bulkheads with and without pipe protection.

Tube type		Without pipe protection				With pipe protection			
Tube size		A	B	F	L	A	B	F	L
Stuffing tube assembly	Part number M24235/	10-01	10-02	10-06	10-10	09-121	09-122	09-126	09-130
Part numbers of components	Tube body (1 required) 24235/	10-31	10-32	10-36	10-40	09-151	09-152	09-156	09-160
	Gland nut (1 required) M24235/	09-061	09-062	09-066	09-070	09-061	09-062	09-066	09-070
	Gland ring (1 required) M24235/	09-181	09-182	09-186	09-190	09-181	09-182	09-186	09-190
Symbol number		1600	1601	1605	1609	1570	1571	1575	1579

3.4 Procedure III. Swage type stuffing tubes.

Step 1 - Select swage type aluminum or steel stuffing tubes from those shown in tables 3A1-V, 3A1-VI, 3A1-VII or 3A1-VIII respectively.

TABLE 3A1-V. Swage type aluminum stuffing tube data for decks and bulkheads.

Tube type		Bulkheads				Decks			
Tube size		A	B	F	L	A	B	F	L
Stuffing tube assembly	Part number M24235/17	-031	-032	-036	-040	-091	-092	-096	-100
Part numbers of components	Tube body (1 required) M24235/17	-151	-152	-156	-160	-211	-212	-216	-220
	Gland nut (1 required) M24235/17	-241	-242	-246	-250	-241	-242	-246	-250
	Gland ring (1 required) M24235/17	-271	-272	-276	-280	-271	-272	-276	-280
Symbol number		1731	1732	1736	1740	1791	1792	1796	1800

TABLE 3A1-VI. Swage type steel stuffing tube data for decks and bulkheads.

Tube type		Bulkheads				Decks			
Tube size		A	B	F	L	A	B	F	L
Stuffing tube assembly	Part number M24235/17	-001	-002	-006	-010	-061	-062	-066	-070
Part numbers of components	Tube body (1 required) M24235/17	-121	-122	-126	-130	-181	-182	-186	-190
	Gland nut (1 required) M24235/09	-061	-062	-066	-070	-061	-062	-066	-070
	Gland ring (1 required) M24235/09	-181	-182	-186	-190	-181	-182	-186	-190
Symbol number		1701	1702	1706	1710	1761	1762	1766	1770

TABLE 3A1-VII. Reduced diameter swage type aluminum stuffing tube data for decks and bulkheads.

Tube type		Bulkheads				Decks			
Tube size		A	B	F	L	A	B	F	L
Stuffing tube assembly	Part number M24235/18	-031	-032	-036	-040	-091	-092	-096	-100
Part numbers of components	Tube body (1 required) M24235/18	-151	-152	-156	-160	-211	-212	216	220
	Gland nut (1 required) M24235/17	-241	-242	-246	-250	-241	-242	-246	-250
	Gland ring (1 required) M24235/17	-271	-272	-276	-280	-271	-272	-276	-280
Symbol number		1871	1872	1876	1880	1941	1942	1946	1950

TABLE 3A1-VIII. Reduced diameter swage type steel stuffing tube data for decks and bulkheads.

Tube type		Bulkheads				Decks			
Tube size		A	B	F	L	A	B	F	L
Stuffing tube assembly	Part number M24235/18	-001	-002	-006	-010	-061	-062	-066	-070
Part numbers of components	Tube body (1 required) M24235/18	-121	-122	-126	-130	-181	-182	-186	-190
	Gland nut (1 required) M24235/09	-061	-062	-066	-070	-061	-062	-066	-070
	Gland ring (1 required) M24235/09	-181	-182	-186	-190	-181	-182	-186	-190
Symbol number		1821	1822	1826	1830	1911	1912	1916	1920

METHOD 3B1

CABLE PENETRATIONS VIA MCP'S

1. SCOPE.

1.1 Scope. This method identifies MCP insert block sizes used to pass optical fiber cables through decks and bulkheads. The methods for installation of the MCP and insert blocks is the same as those specified for electrical cables in MIL-STD-2003-3. These installation methods are not repeated in this standard practice but they are identified in paragraph 5 in this part of this standard practice.

2. REQUIRED EQUIPMENT AND MATERIALS. (Not applicable.)

3. PROCEDURES.

3.1 Safety summary. The following safety precautions shall be observed during the passing of optical fiber cables through the installed MCP's.

a. Safety glasses shall be worn when handling bare fibers.

b. Do not touch the ends of bare fibers as they may be razor sharp. Wash your hands thoroughly after handling bare fiber.

c. Observe warnings and cautions on equipment and materials.

d. Never stare into the end of a fiber connected to a laser source or LED.

3.2 Procedure.

Step 1 - Select MCP insert blocks from those shown in table 3B1-I.

TABLE 3B1-I. MCP data and insert block sizes for optical fiber cable.

Cable type	4-Fiber	8-Fiber	36-Fiber	Single-Tube	7-Tube	
Cable O.D. mm (inches) nominal	8.1 (0.32)	11.1 (0.44)	20.8 (0.82)	11.1 (0.44)	29.0 (1.14)	31.5 (1.25)
Primary Insert block part number M24705/1-BN	1508	2011	3021	2011	4029	4032
Alternate insert block part number M24705/1-BN	2008	N/A	N/A	N/A	NA	6032