DOD-STD-2003-1(NAVY)
24 June 1987
SUPERSEDING
NAVSEA S9300-AW-EDG-010/EPISM
(INCLUDING NAVSEA DWG. NO.
803-5001027) AND NAVSEC NO.
9000-S6202-73980

MILITARY STANDARD

ELECTRIC PLANT INSTALLATION STANDARD METHODS FOR SURFACE SHIPS AND SUBMARINES (CABLE)

SECTION 1 OF 5 SECTIONS

AMSC N/A
AREA GDRQ

SECTION 1

CABLES

DEPARTMENT OF THE NAVY
NAVAL SEA SYSTEMS COMMAND
Washington, DC 20362-5101

Electric Plant Installation Standard Methods for Surface Ships and Submarines

1. This Military Standard 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 55Z3, Department of the Navy, Washington, DC 20362-5101 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FOREWORD

1. The criteria contained herein for the installation of the electrical plant on ships of the United States Navy supersede the data contained in Sections 1 through 5 of NAVSHIPS Drawing 9000-S6202-73980, NAVSEA Drawing No. 803-5001027 and NAVSEA PUBLICATION S9300-AW-EDG-010/EPISM.

2. This standard disseminates up-to-date information detailing Requirements for Standard Installation Methods Employed for Submarine and Surface Ship Electrical Distribution Systems.

3. These criteria apply to work on a specific ship or ships only when invoked by the Ship Specifications or similar contractual documents.

4. Although these criteria are primarily for application to new construction, their use may be considered in the conversion or alteration of existing ships. In such cases the degree of applicability of these criteria will be specified by the activity preparing the instructions for the work.

5. Considering the magnitude of this standard, along with the changing requirements imposed on the Electric Plant, it is inevitable that changes will be required to up-date these criteria. Therefore, as comments arise they should be forwarded to Naval Sea Systems Command (NAVSEA) 55Z3 to keep this standard as current as possible through subsequent revisions. Revisions will be accomplished by the issuance of additional or revised figures to be inserted in the basic standard sections. Document Improvement Proposal Form DD 1426 attached. Superseded pages may be retained for reference if so desired.

6. This standard is available in a 8-1/2 X 11 hard copy, in microfilm aperture cards, or in microfiche. It is available in 8-1/2 X 11 hard copy from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120. Microfilm aperture card or microfiche are available from Commanding Officer, Portsmouth Naval Shipyard, Code 202.2, Portsmouth, NH 03801. All revisions on microfilm aperture cards, or on microfiche are automatically distributed to a previously approved distribution list. (Tel: (207) 439-1000, Ext. 1718, Autovon 684-1718). Activities having a requirement to be placed on the distribution or for additional copies should forward these requests to Commander, Naval Sea Systems Command, SEA 55Z3, Department of the Navy, Washington, DC 20362-5101. Aperture cards have been distributed to those activities presently on the distribution for NAVSEA Standard and Type Drawing microfilm aperture card sets. Microfiche has been distributed to all active ships.

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CONTENTS - Continued

Group A - Cable Prep/End Sealing

Group B - Cable Entry To Equipment

CONTENTS - Continued

Group B - Cable Entry To Equipment (Continued)

1. SCOPE

1.1 Purpose. The purpose of section 1 of DOD-STD-2003 is to disseminate up-to-date information for cable preparation and end-sealing, entry to equipment and connectors, repair and splicing.

1.1.1 Application. These installation standards shall be used by all installing activities. These standards do not identify ship or type, but do establish minimum standards of acceptance for NAVSEA ships. It is the responsibility of the user activity to determine which standard satisfies their requirements. It does not authorize relaxation of any requirement specifically invoked by new construction, conversion, overhaul, or refurbishment contracts. In instances where deviated design requirements (for example, ship type, ship class, and so forth) conflict with the requirements of this standard, the requirements of this standard shall govern. Any deviation for electric plant installation identified in this standard shall be submitted to NAVSEA 56Z2 for resolution.

1.1.2 New cable specifications. Refer to the cable comparison handbook for guidance in substituting MIL-C-24643 cable for equivalent MIL-C-915 cable applications. All cable type designations specified herein to be in accordance with MIL-C-24643 shall be preceded by the prefix "LS". The following cable types shall be retained as MIL-C-915 for use as outboard or portable applications and have no MIL-C-24643 equivalent:

DLT	TRF	MSPW	3PR-16
DSWS	TRXF	MSP	1Q-16
DSS	TSP	5SS	1TR-16
TSS	TSPA	TPMU	7SPR-16S
FSS	1SWF	1PR-AZOE	1SPR-16
7SS	2SWF	1PR-16	
JAS	MWF	7PR-16	
MCSF	S2S	2SPR-16	

Cable ratings and minimum bend radii for cables in accordance with MIL-C-24643, MIL-C-24640 and MIL-C-915 shall comply with cable comparison handbook.

2. REFERENCED DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified, the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this standard to the extent specified herein.

SPECIFICATIONS

FEDERAL

W-F-406 - Fittings For Cable, Power, Electrical and Conduit, Metal, Flexible.

MILITARY

MIL-T-3064 - Insulation, Electrical, Plastic Sealer.
MIL-T-7928 - Terminal, Lug Splices, Conductor, Crimp Style, Copper, General Specification for.
MIL-T-15659 - Terminal, Lug: Solder, Copper and Phosphor Bronze.
MIL-S-16036 - Switchgear, Power, Naval Shipboard.
MIL-T-16366 - Terminal, Electrical Lug and Conductor Splices, Crimp Style.

STANDARDS

FEDERAL

FED-STD-157 - Fittings for Electrical Cable and Flexible Metal Conduit.

MILITARY

MIL-STD-1310 - Shipboard Bonding, Grounding, and Other Techniques for Electromagnetic Compatibility and Safety.

2.1.2 Other Government documents and drawings. The following other Government documents and drawings form a part of this standard to the extent specified herein.

DRAWINGS

NAVSHIPS

815-1197060 - Cable Assembly, Set Aircraft Serve, Start.
803-5001027 - Cable End Preparation for Open Equipment.

DOCUMENTS

DESIGN DATA SHEET

DDS 304-2 - Electric Cable Ratings and Characteristics.

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

2.2 Order of precedence. In the event of a conflict between the text of this standard and the references cited herein, the text of this standard shall take precedence.

3. DEFINITIONS

3.1 Cable repair. Cable repair refers to restoration of only the cable armor or the outermost cable sheath or both.

3.2 Flooding water level II (FWL-II). FWL-II is the highest water level that can be expected above the bulkhead deck at any particular intact watertight subdivision after any flooding elsewhere in the ship which the ship is expected to be capable of surviving.

4. GENERAL REQUIREMENTS

4.1 Cable.

4.1.1 Cable slack. Where cables enter electrical equipment, a minimum of 2 inches of slack cable shall be provided in the cableway, permitting repairs to be made at the cable ends, avoiding cable replacement. Cable conductors shall also have 2 inches of slack inside the enclosure.

4.1.2 Supporting cables entering enclosures. Cables entering enclosures shall be secured to bulkheads and shall not exceed the cable bend radius.

4.1.3 Cable bends. Bends at electrical equipment entrances shall be made through angle stuffing tubes. Straight stuffing tubes may be used in place of angle stuffing tubes if the bend in the cable is not less than the minimum radius specified in DDS 304-2 or eight times cable outside diameter (od) unarmored, 12 times shielded cable od.

4.1.4 Box connectors, electrical. Junction box or outlet connectors shall be in accordance with FED-STD-157 and W-F-406 type, class and style listed.

(a) Straight connector for single round cable type I, class 1, style A.
(b) Straight connector for duplex round cable type I, class 1, style B.
(c) 45-degree angle connector for single round cable type I, class 1, style C.
(d) 90-degree angle connector for single round cable type I, class 1, style D.

4.1.5 Cable connection. Changes in conductor size other than at switchboards or panels shall be made by use of specified electrical enclosures, terminal boxes or other equipment indicated herein or on standard drawings. At the point of connection, the separation of conductors and the removal of sheathing shall be in accordance with specifications and kept to a minimum. On parallel cable runs, the length of sheath removed from each cable shall be equal.

4.1.6 Cable end-sealing. Cables terminating at the following equipment, located below FWL-II, shall be end-sealed. If FWL-II is unknown, consider the FLW to be the main deck.

(a) Power and lighting switchboards (includes ship service, emergency and load center switchboards).
(b) Manual and automatic bus transfer equipment (whether mounted on a switchboard or panel or as an independent unit).
(c) Distribution power and lighting panels supplies from two sources of power (normal, alternate and emergency).
(d) Automatic degaussing control panels.
(e) Degaussing switchboards and power supplies except where they supply power to only one degaussing coil.
(f) Watertight interior communication and weapons control equipment, including switchboards and connection boxes, where water seepage into the unit would jeopardize undamaged operable portions of the system.
(g) Top entrance cable to interior communication and weapons control switchboards of other than watertight construction.
(h) In minesweepers only, degaussing.
(i) Degaussing connection and through boxes having connections for more than one degaussing coil.

4.1.6.1 Cable end-sealing exceptions. Cables terminating at equipment designated need not be end-sealed where one or more of the following conditions apply:

(a) Flexible cables to rotating structures.
(b) Cables which do not pass through a watertight deck or bulkhead.
(c) Cables which penetrate FWL-II but do not pass through a watertight deck or bulkhead below FWL-II.
(d) Where end-sealing would prevent bringing the armor or shields of a cable into the enclosure, as required for shielding or grounding.
(e) Where water seepage into a unit of an interior communication or weapons control system through a damaged cable would result in no loss of function beyond that already sustained due to cable casualty.
(f) In interior communication systems and weapons control systems, cable types TTSU and MSCU, and all electronic, communication and instrumentation two, three, and four-conductor cable of size 9 and smaller.
(g) Where space is not available inside interior communication and weapons control units, the other end of the cable involved shall be end-sealed regardless of its location.
(h) Degaussing cables where connection boxes or through boxes will be completely filled with a sealing compound because of their location in a compartment subject to flooding or extreme moisture conditions.

4.1.7 Cable lug terminals. Cable lug terminals shall be installed on each connected conductor. Lug terminals shall conform to MIL-T-16366 (solderless type), MIL-T-7928 (insulated barrel solderless type), or MIL-T-15659 (solder type).

4.1.7.1 Application. Solderless type lug terminals including water seal lugs when cable end-sealing is required shall be used for all applications except for equipment having requirements for solder type terminals or in specified electrical enclosures in which electrical clearances would be reduced below minimum standards by the use of solderless types. The ends of propulsion system cables 9,000 circular mils and larger shall be sealed with solderless waterseal type lug terminals.

4.1.8 Cable entrance to machinery and equipment. Cable entry into bulkhead-mounted non-watertight equipment shall be through the bottom or lower half of the side. Cables shall enter watertight equipment in locations best suited to disposition of the cable installation. Sufficient slack shall be allowed for cable connection to machinery to prevent damage to cables, due to vibration, at locations where the cables pass from the structure of the ship to the machinery. Cables connected to equipment provided with resilient mounts shall have a minimum length between the equipment and the last point of support of the cable of 18 inches with at least 3 inches of slack to provide for flexibility and movement of the equipment under shock. Entry of cables into enclosures shall conform to the following:

(a) Splashproof, spraytight, watertight submersible, and explosion-proof enclosures. Through stuffing tubes. These stuffing tubes shall be of plastic types in place of metal types except when used with explosionproof and submersible (over 50-foot depth) enclosures, or when the cable shielding requirements of MIL-STD-1310 apply.
(b) All other types of enclosures. By specified cable clamp (see 4.1.4). Cable clamp shall be sealed with MIL-I-3064, type HF, insulation, electrical, plastic-sealer to prevent entry of water dripping from above.
(c) Cable entry into permanently mounted or portable enclosures of molded plastic materials shall be by insulating type clamp or nylon stuffing tubes. Metallic type clamps shall not be used.
(d) Cables entering propulsion system equipment from above or from the sides shall enter through stuffing tubes and shall be braced and secured to prevent dislodgement under vibration and shock stresses.

4.1.9 Cable entrance to switchboards. Switchboards designed in accordance with MIL-S-16036 provide for bringing cables in from either top or bottom or both as specified. The cable sheath shall be maintained intact, and the cable armor, jacket and shield shall be stripped to individual conductors to form a loop at each end of the wiring trunk, to provide adequate flexibility and to meet the requirements for bending radius. Where the cable runs are very short and the use of two or three-conductor cables is not practicable, single conductor cable may be used. A dripproof (approximately no. 16 gauge) sheet steel enclosure shall be provided that will permit community entrance of the cables into the section enclosure without the use of stuffing tubes. Weight of cable supported by the

top of the switchboard structure shall be kept to a minimum. If the entire wiring trunk is enclosed, louvers shall be provided for ventilation, and provision shall be made so that movement of the switchboard sections in any direction is not restricted by cables or the wiring truck (see figure 1B1). Connections of ship cables to switchboards shall be made so that when any switchboard section is caused to move with respect to the ship structure, the inherent flexibility of the connecting cables will permit movement of the section in any direction without subjecting lug connections to stress. Cable connections shall be so made that insulation distances within the switchboard are not reduced below the values required by MIL-S-16036. Where armored cable is used, the armor shall be removed from that portion of all cables which is within the switchboard structure.

4.1.10 Cable connection to machinery. Sufficient slack shall be allowed to prevent damage to cables, due to vibration, at locations where the cables pass from the structure of the ship to the machinery and equipment.

4.1.10.1 Cables connected to equipment provided with resilient mounts. These cables shall have a minimum length between the equipment and the last point of support of the cable of 18 inches with at least 3 inches of slack to provide for flexibility and movement of the equipment under shock.

4.1.11 Cable splicing. The following cables shall not be spliced:

(a) Antenna system cables (both inboard and outboard).
(b) Cables for repeated flexing service.
(c) Portable cables (shore power cables may be spliced).
(d) Cables in voids.
(e) Cables in normally inaccessible spaces.
(f) Cables in hazardous spaces (spaces requiring explosion-proof enclosures).
(g) MDU cable exposed to the weather.
(h) Direct current (dc) bus tie cable on nuclear submarines.
(i) Reactor plant system cables.
(j) Non-nuclear cables in the reactor compartment.

4.1.12 Cable jacket repair. All Navy cable may be repaired except the following:

(a) Cables for repeated flexing service.
(b) Portable cable (shore power cables may be repaired).
(c) Dc bus tie cable on nuclear submarines.
(d) Reactor plant system cable.

Cable repair is defined as the restoration of only the cable armor or the outermost cable sheath or both. Radio frequency coaxial cables that suffer damage to the cable jacket or shield during installation shall be replaced or repaired. Where damage to coaxial cable jackets and shields is more cost effective to repair, repairs shall be in accordance with the methods specified in the EIMB series, NAVSEA 0967-LP-000-0100. Cables that are in good mechanical and electrical condition may be spliced.

5. DETAILED REQUIREMENTS

SEE FIGURES

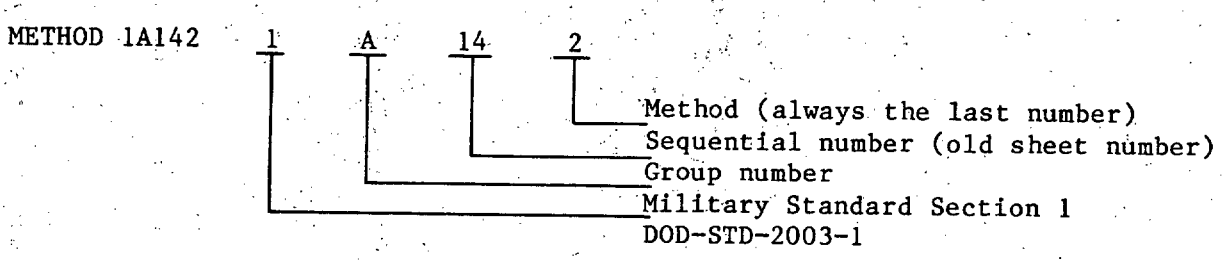
6. NOTES

6.1 Intended use. This section specifies the requirements for cable preparation and end sealing, cable entry to equipment, cable entry to connectors, cable repair and cable splicing methods to be employed both on surface ships and submarines. Standard methods identified for electric plant installation are intended for new construction only.

6.2 Designation of electric plant installation standard methods figures. The electric plant installation standard method (DOD-STD-2003-1) contains figures that depict Standard Methods that are applicable for general electric plant installation on both surface ships and submarines. Standard Methods shown on the individual sheets of Drawing 803-5001027 have been assigned a corresponding figure number in this standard. The methods shown on the figures are grouped together providing similar functions. These groups are:

DOD-STD-2003-1 (Cables) Group
- A. Cable Preparation and End-Sealing
- B. Cable Entry to Equipment
- C. Cable Entry to Connectors
- D. Cable Repair
- E. Cable Splicing

The methods shown on the figures are identified by the following alpha-numeric designation system:



Thus, method 1A142 identifies method 2, sequential number 14 in group A of DOD-STD-2003-1.

6.3 Subject term (key word) listing.

Cable end-sealing
Cable entry to equipment
Cable entry to connectors
Cable preparation
Cable repair
Cable splicing

Preparing activity:
Navy - SH
(Project GDRQ-N066-1)

NOTES:

1. THIS STANDARD COVERS PROTECTION & FINISH OF CABLE ENDS ENTERING OPEN EQUIPMENT (NON WATERTIGHT CABLES WITHOUT P.P. PACKING OR END SEALS).
2. THESE METHODS SHALL ONLY BE USED FOR CABLE IN EQUIPMENT.
3. THIS FIGURE SUPERSEDES SECTION 5, SHEET 59, & 60 OF DRAWING NAVSEC NO. 9000-S6202-73980 & SHEET 1A1 OF DRAWING 803-5001027.

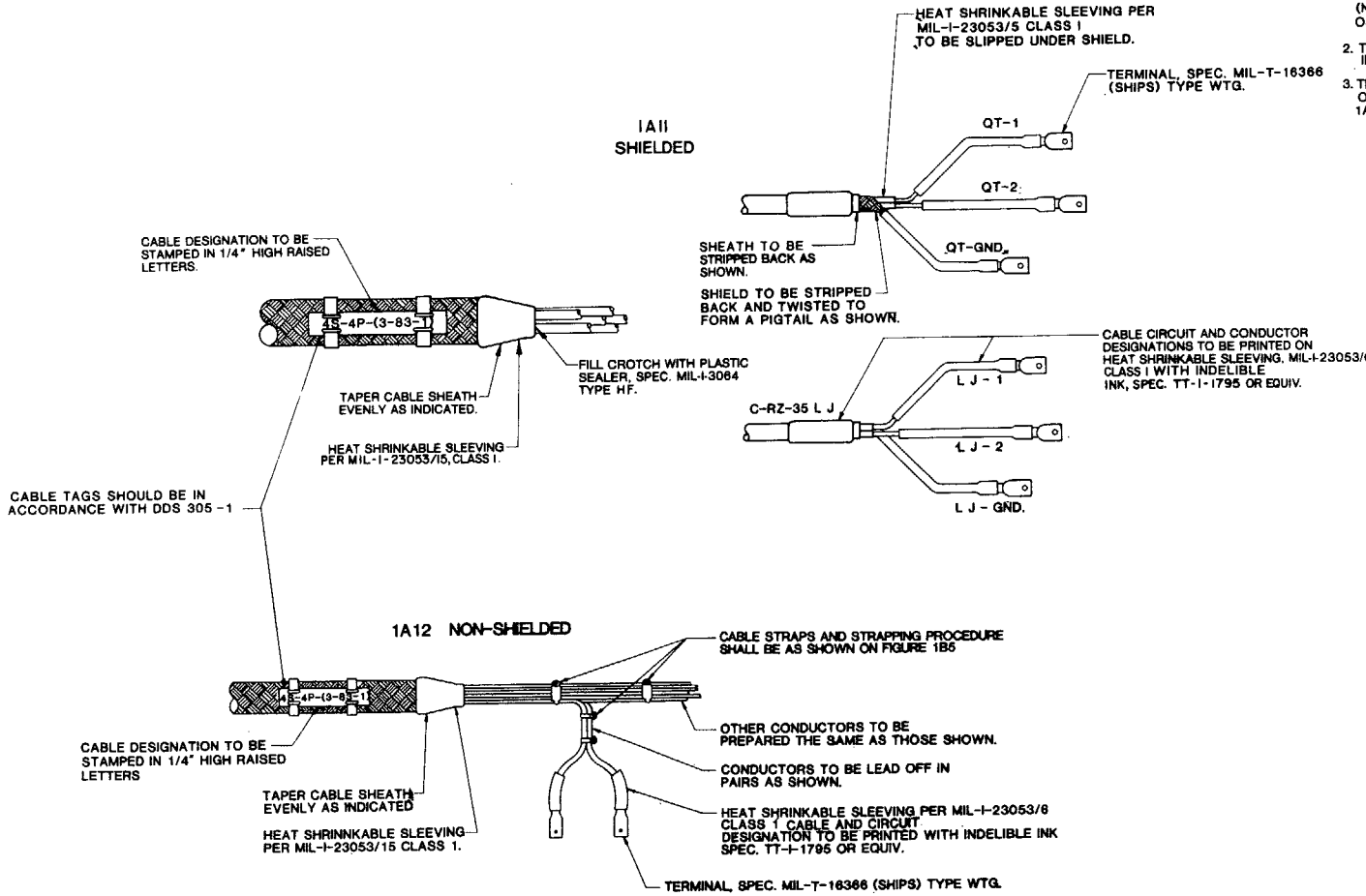
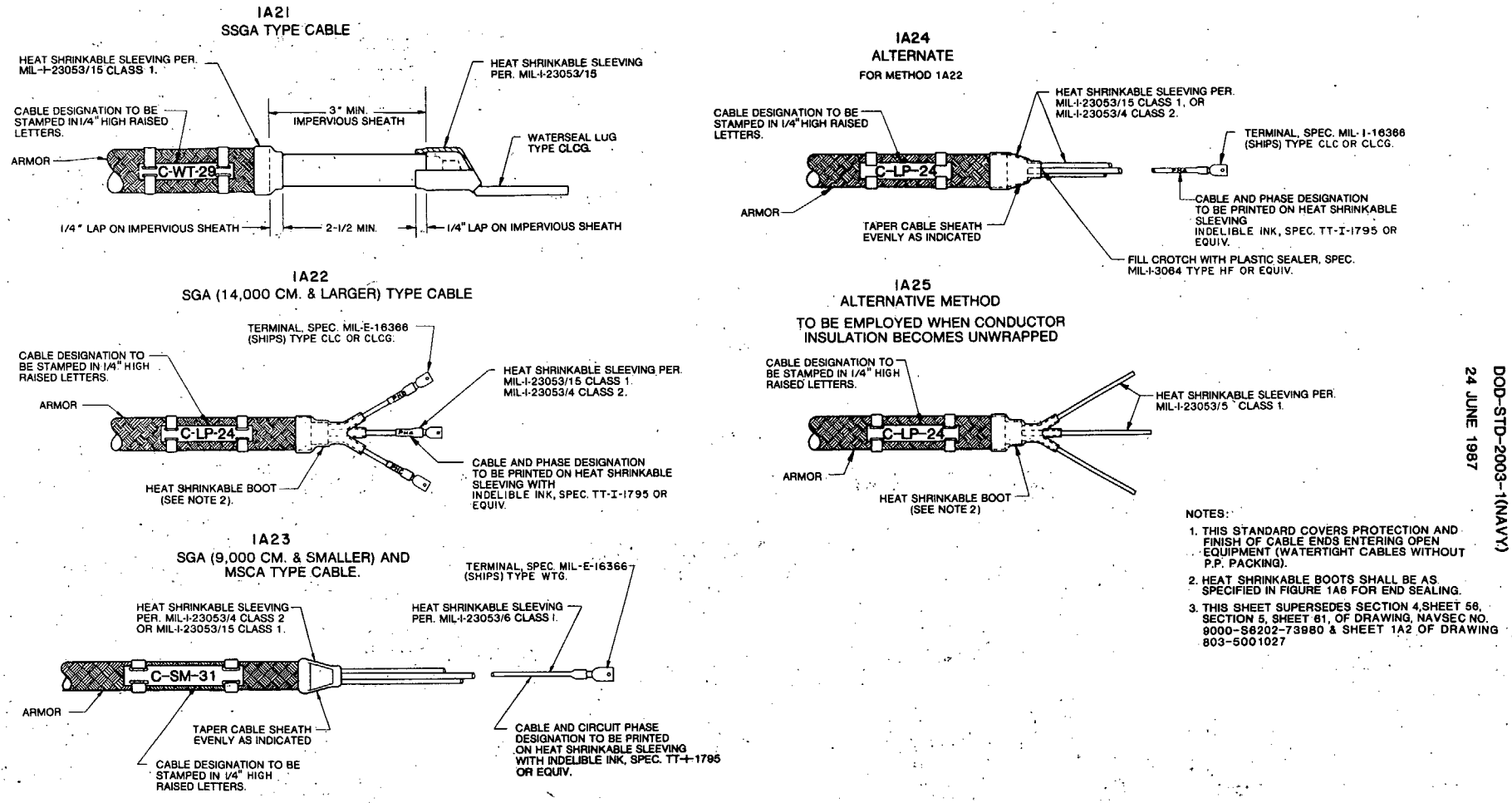


FIGURE 1A1. Cable end preparation for open equipment.



NOTES:

1. THIS STANDARD COVERS PROTECTION AND FINISH OF CABLE ENDS ENTERING OPEN EQUIPMENT (WATERTIGHT CABLES WITHOUT P.P. PACKING).
2. HEAT SHRINKABLE BOOTS SHALL BE AS SPECIFIED IN FIGURE 1A6 FOR END SEALING.
3. THIS SHEET SUPERSEDES SECTION 4,SHEET 58, SECTION 5, SHEET 61, OF DRAWING, NAVSEC NO. 9000-S6202-73980 & SHEET 1A2 OF DRAWING 803-5001027

SH 132316945

FIGURE 1A2. Cable end preparation for open equipment.

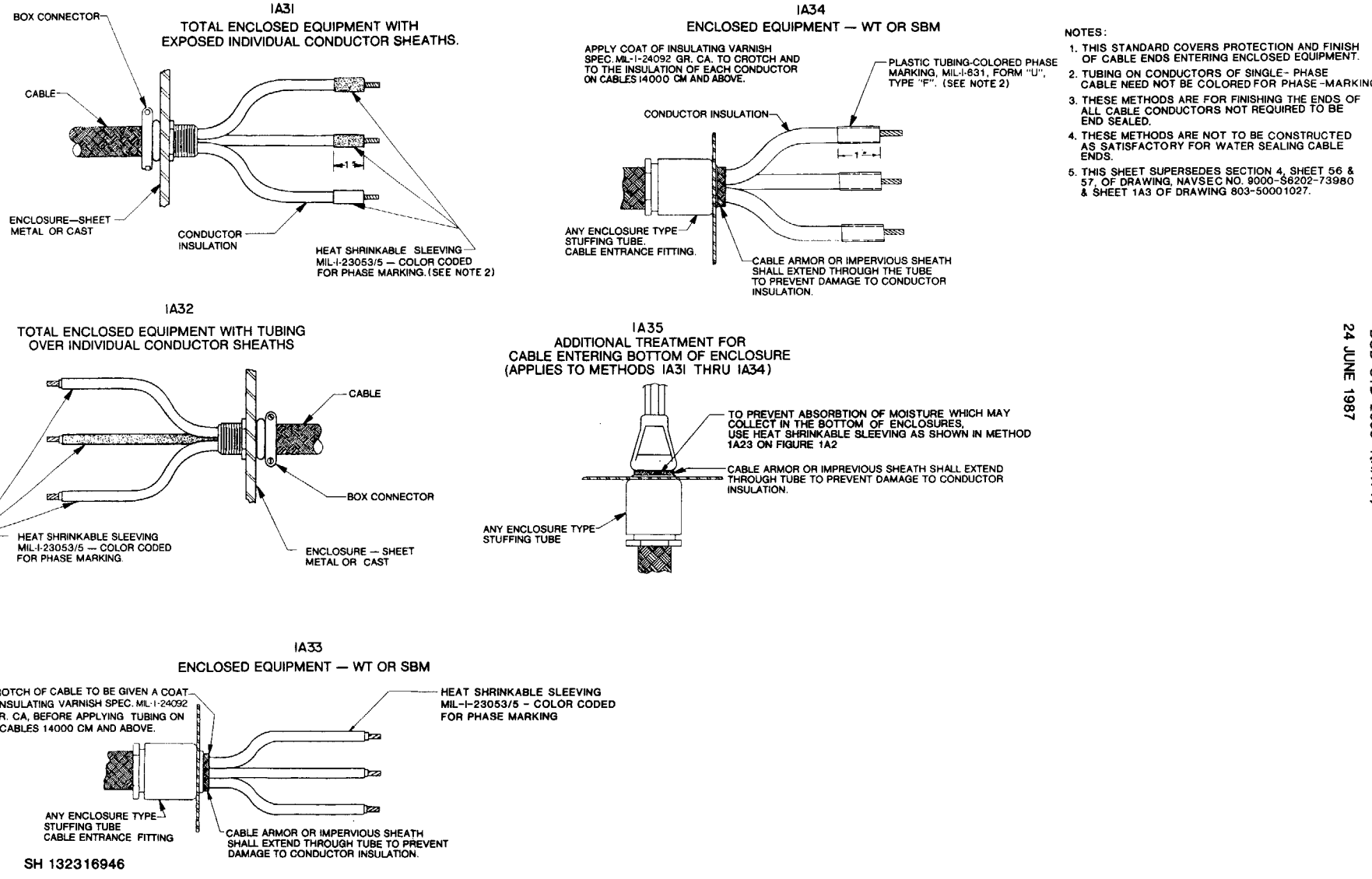
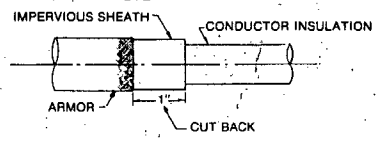


FIGURE 1A3. Cable end preparation for enclosed equipment.

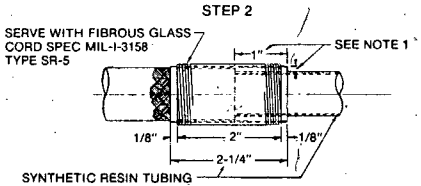
1A41

SEALING SHEATH OF SINGLE CONDUCTOR CABLE (SEE NOTE 9)

STEP 1



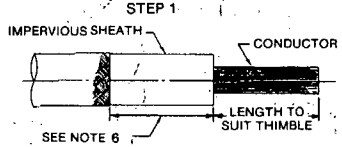
STEP 2



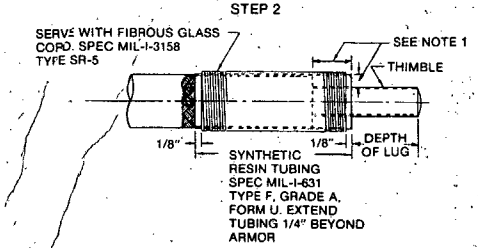
1A42

SEALING SHEATH & CONDUCTOR OF SINGLE CONDUCTOR CABLE

STEP 1



STEP 2

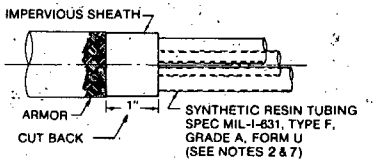


SH 132316947

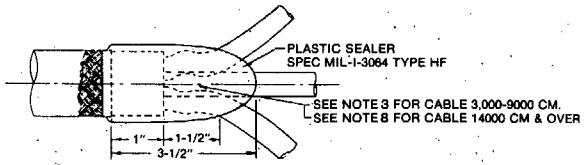
1A43

SEALING SHEATH OF 2, 3, 4 & MULTIPLE CONDUCTOR CABLE (SEE NOTE 9)

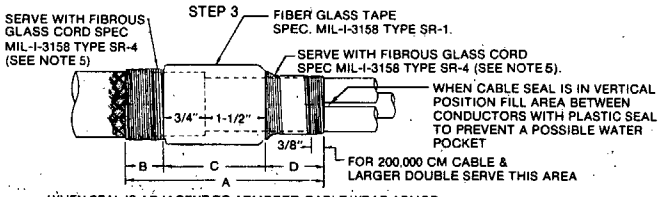
STEP 1



STEP 2



STEP 3



WHEN SEAL IS ADJACENT TO ARMORED CABLE WRAP ARMOR WITH SUITABLE MATERIAL TO PREVENT FRAYING OF FIBER GLASS TAPE.

DIMENSION TABLE FOR ID OF SYNTHETIC TUBING

SIZE OF CABLE (CIR. MILS.)	INSIDE DIA. OF SYNTHETIC RESIN TUBING, SPEC MIL-I-631, TYPE F GRADE A FORM U, FOR USE OVER	
	CABLE SPEC MIL-C-915	
	INDIVIDUAL CABLE LEADS	IMPERVIOUS SHEATH OF SINGLE CONDUCTOR CABLE
3,000	.162	.430
4,000	.250	.430
9,000	.280	.630
14,000	.320	.630
23,000	.360	.680
30,000	.400	.680
40,000	.430	.760
50,000	.450	.760
60,000	.520	.760
75,000	.570	.820
100,000	.630	.890
125,000	.680	.890
150,000	.760	.960
200,000	.820	1.030
250,000	.890	—
300,000	.960	1.100
350,000	1.030	—
400,000	1.100	1.285
500,000	1.165	1.365
650,000	1.225	1.470
800,000	1.365	1.585

FINISHED DIMENSIONS				
CABLE SIZES (1000 CM)	DIMENSIONS			
	A	B	C	D
3 TO 9 M-7 TO M-10 TT-1 TO TT-25	4-1/4"	3/4"	2-1/4"	1-1/4"
14 TO 100 M-14 TO M-44 TT30 TO TT60	5"	3/4"	2-1/4"	2"
125 TO 400	6"	3/4"	2-1/4"	3"

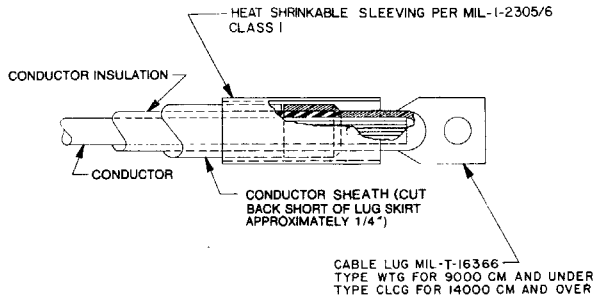
FIGURE 1A4. Cable end preparation for non-watertight equipment.

NOTES

1. BUILD DIAMETERS INDICATED TO I.D. OF SYNTHETIC TUBING WITH SYNTHETIC RESIN TAPE, SPEC MIL-I-631 TYPE F, GRADE A, FORM T 3/4" WIDE X 0.010" THICK & BONDING AGENT & ALLOW TO DRY BEFORE APPLYING SYNTHETIC RESIN TAPE.
2. SYNTHETIC RESIN TUBING IS NOT REQUIRED FOR MULTIPLE CONDUCTOR CABLE, OR 2, 3 & 4 CONDUCTOR CABLE, 3,000 TO 9000 CM.
3. SPREAD CONDUCTORS & APPLY PLASTIC SEALER TIGHTLY IN BETWEEN INDIVIDUAL CONDUCTORS BEING SURE THAT THERE IS A CUSHION OF PLASTIC SEALER AROUND & BETWEEN INDIVIDUAL CONDUCTORS. PULL CONDUCTORS TOGETHER, COVER WITH TWO TURNS PLUS ONE INCH OVERLAP OF GLASS TAPE & SERVE TIGHTLY WITH FIBROUS GLASS CORD. COAT WITH INSULATING VARNISH SPEC MIL-I-24092 GRADE CA.
4. THIS END TO BE SERVED FIRST, WORKING FROM LEFT TO RIGHT.
5. THIS END TO BE SERVED AFTER NOTE 4 HAS BEEN ACCOMPLISHED. WORK FROM RIGHT TO LEFT. THIS OPERATION TENDS TO FORCE THE PLASTIC SEALER TIGHTLY INTO THE CROTCH OF THE CABLE AND THIS ACTION SHOULD BE ASSISTED BY MANIPULATING THE PLASTIC SEALER AHEAD OF THE CORD, WITH THE HANDS AS THE SERVING PROGRESSES.
6. CABLE ARMOR SHALL BE CUT BACK & IMPERVIOUS SHEATH THOROUGHLY CLEANED OF PAINT FOR A SUFFICIENT DISTANCE TO PREVENT ELECTRICAL CREEPAGE BETWEEN ARMOR & LUG OR THIMBLE AFTER CABLE IS INSERTED.
7. SYNTHETIC RESIN TUBING SHALL BE SLIPPED OVER CONDUCTOR INSULATION, EXTENDING FROM WELL INTO THE CABLE CROTCH TO THE END OF THE CONDUCTOR.
8. SPREAD CONDUCTORS JUST ABOVE THE CROTCH & INSERT A 1/2" DIAMETER BALL AGAINST WHICH THE CONDUCTORS ARE TO BE TIGHTLY SQUEEZED. REMOVAL OF THE BALL WILL LEAVE A PERMANENT POCKET IN THE CROTCH WHICH WILL SERVE AS A RECEPTACLE FOR PLASTIC SEALER. PROCEED WITH SEALING AS DESCRIBED IN NOTE 5.
9. CABLE SHEATH END SEALING SHOULD BE ACCOMPLISHED BY THE USE OF TERMINAL TUBES EXCEPT WHERE INSURMOUNTABLE DIFFICULTIES PREVENTS ITS USE.
10. THIS SHEET SUPERSEDES SECTION 4, SHEET 95, OF DRAWING, NAVSEC NO. 8000-S6202-73980 & SHEET 1A4 OF DRAWING 803-5001027.

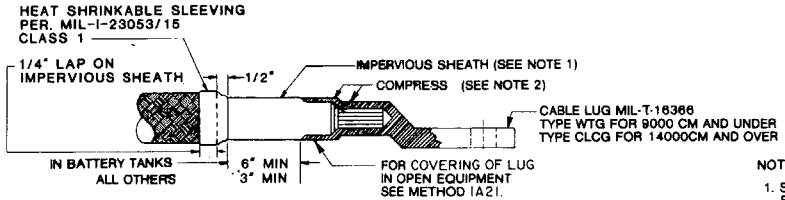
1A51

ATTACHMENT OF LUGS*
TO MULTIPLE CONDUCTOR CABLE



1A52

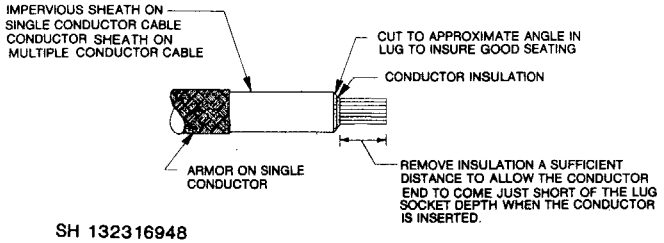
ATTACHMENT OF LUGS*
TO SINGLE CONDUCTOR CABLE



NOTES:

1. SUFFICIENT CABLE ARMOR SHALL BE CUT BACK AND THE IMPERVIOUS SHEATH THROUGHLY CLEANED OF PAINT OVER THE DISTANCE INDICATED ON DETAIL TO PREVENT ELECTRICAL CREEPAGE BETWEEN ARMOR AND LUG.
2. THE SOLDERLESS LUG SHALL BE CRIMPED TO THE CONDUCTOR. THE LUG SKIRT SHALL BE COMPRESSED OVER THE IMPERVIOUS SHEATH PRODUCING A WATERTIGHT SEAL CAPABLE OF WITHSTANDING 50 POUNDS PRESSURE PER SQUARE INCH WITHOUT LEAKAGE.
3. WATER SEAL LUGS SHALL BE USED FOR SUBMARINES.
4. THIS FIGURE SUPERSEDES SECTION 5, SHEET 95,OF DRAWING, NAVSEC NO. 9000-S6202-73980 & SHEET 1A5 OF DRAWING 803-5001027.

PREPARATION OF CONDUCTOR END



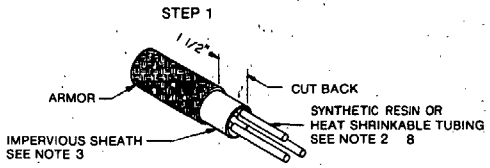
SH 132316948

FIGURE 1A5. Attachment of solderless lugs to cables.

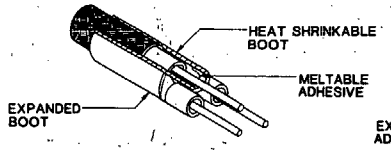
1A61

SEALING SHEATH OF MULTIPLE CONDUCTOR CABLE

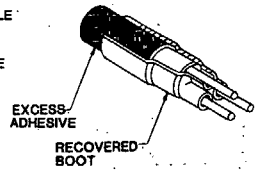
STEP 1



STEP 2



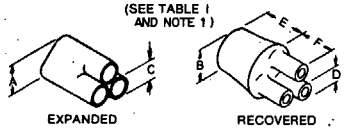
STEP 3



1A62

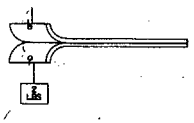
CABLE CROTCH BOOT

(SEE TABLE I AND NOTE 1)



ADHESIVE REQUIREMENTS

1. TEST STRIPS 3/4" X 4.5" ARE TO BE CUT FROM THE BOOT (SEE NOTE 1)
2. THE STRIPS ARE BONDED TOGETHER USING STANDARD METHODS.
3. THE BONDED STRIPS ARE TO BE KEPT AT ROOM TEMPERATURE FOR APPROX 8 HOURS.
4. THE BONDED STRIPS ARE THEN HUNG IN A 60 DEGREE C. OVEN IN A T-PEEL POSITION (SEE ILLUSTRATION) WITH A 2LB. WEIGHT ATTACHED FOR 8 HOURS.



6. AFTER 8 HOURS, THERE SHALL BE NO DELAMINATION.

TABLE I

CABLE CROTCH BOOT DIMENSIONS (INCHES)

BOOT STYLE	CABLE MCM	PART NUMBER	CABLE ENTRY I.D. EXPANDED A-DIA MIN	CABLE ENTRY I.D. RECOVERED B-DIA MAX	CONDUCTOR I.D. EXPANDED C-DIA MIN	CONDUCTOR I.D. RECOVERED D-DIA MAX	MIN. LENGTH RECOVERED E(BODY)	MIN. LENGTH RECOVERED F (LEGS)	MIN. WALL RECOVERED
2 LEGS	3, 4, 6, 9	1A62-1	.80	.37	.33	.11	2.0	.7	.05
	14, 23, 30	1A62-2	1.20	.60	.50	.17	2.5	1.0	.07
	50, 75, 83, 100	1A62-3	1.90	.90	.75	.30	3.0	1.2	.10
	200, 250, 300, 400	1A62-4	3.00	1.50	1.45	.50	3.5	1.5	.12
3 LEGS	3, 4, 6, 9	1A62-5	.90	.36	.33	.12	2.0	.7	.08
	14, 23	1A62-6	1.20	.50	.50	.18	2.3	1.0	.09
		1A62-7	1.50	.69	.65	.18	1.8	2.2	.09
	42, 50, 75, 100	1A62-8	1.70	.90	.82	.30	2.3	1.2	.12
	150, 200, 250, 300	1A62-9	2.40	1.40	1.55	.50	3.5	1.6	.12
	400	1A62-10	3.20	2.00	1.40	.75	3.5	1.6	.14
	500, 600	1A62-11	4.50	2.39	2.00	1.00	7.5	2.5	.12
4 LEGS	3, 4, 6, 9	1A62-12	.90	.43	.28	.11	2.0	.75	.05
	23	1A62-13	1.25	.80	.50	.19	2.3	1.0	.09
	42, 50, 60	1A62-14	1.75	.98	.79	.28	2.3	1.2	.14
	75, 100	1A62-15	2.35	1.00	1.00	.35	6.8	1.7	.14
	133, 150, 200	1A62-16	2.65	1.40	1.20	.55	3.5	1.6	.13
		1A62-17	3.20	3.00	1.50	.55	6.0	3.0	.13
6 LEGS	100, 125, 150, 200	1A62-18	2.39	1.45	.80	.35	3.4	2.0	.10

NOTES AND INSTALLATION INSTRUCTIONS

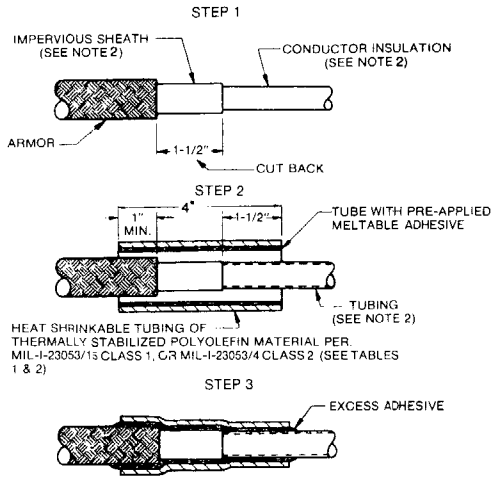
1. MATERIAL FOR CABLE CROTCH BOOT SHALL BE POLYOLEFIN, SEMI-RIGID, NON-BURNING & SHALL CONFORM TO THE REQUIREMENTS OF MIL-I-81765/1. THE CABLE CROTCH BOOT SHALL HAVE AN INTERNAL COATING OF ADHESIVE WHICH MEETS THE ADHESIVE REQUIREMENTS DESCRIBED ON THIS SHEET.
2. HEAT SHRINKAGE TUBING, OR SYNTHETIC RESIN TUBING SHALL BE SLIPPED OVER CONDUCTOR INSULATION, EXTENDING FROM WELL INTO THE CABLE CROTCH TO THE END OF THE CONDUCTOR. HEAT SHRINKAGE HEAT SHRINKABLE TUBING SHOULD BE SHRUNK BEFORE CROTCH BOOT IS POSITIONED.
3. CABLE ARMOR SHALL BE CUT BACK TO EXPOSE IMPERVIOUS SHEATH FOR 1-1/2". IMPERVIOUS SHEATH AND CONDUCTOR INSULATION SHALL BE THOROUGHLY CLEANED OF PAINT AND ANY OTHER FOREIGN MATTER.
4. SLIDE CROTCH BOOT OVER SECTION TO BE SEALED AS SHOWN ON DRAWING. PRESS CROTCH BOOT FIRMLY INTO CROTCH OF CONDUCTORS.
5. SHRINK PART BY APPLYING HEAT, USING A GAS (BUTANE OR PROPANE) TORCH, HOT AIR BLOWER (HEAT GUN) OR OTHER HEAT SOURCE. MINIMUM RECOVERY TEMPERATURE IS 250°F.
6. AS HEAT IS APPLIED, MOVE HEAT SOURCE BACK AND FORTH OVER THE PART TO BE SHRUNK. FOR CROTCH BOOT, SHRINK FROM CENTER TO ENDS TO AVOID TRAPPING AIR.
7. WHEN CROTCH BOOT HAS RECOVERED ENOUGH TO ASSUME THE CONFIGURATION OF THE ITEM COVERED AND EXCESS ADHESIVE APPEARS AT THE ENDS OF THE CROTCH BOOT LEGS, DISCONTINUE HEATING. ADDITIONAL HEAT WILL NOT MAKE THE PART SHRINK MORE TIGHTLY.
8. TUBING IS NOT REQUIRED FOR CABLE 3,000 TO 23,000 CM WITH EXTRUDED CONDUCTOR INSULATION.
9. THIS FIGURE SUPERSEDES SECTION 4, SHEET 93, OF DRAWING, NAVSEC NO. 9000-S6202-73980 & SHEET 1A6 OF DRAWING 803-5001027.

SH 132316949

FIGURE 1A6. Cable end sealing with heat shrinkable cable crotch boots.

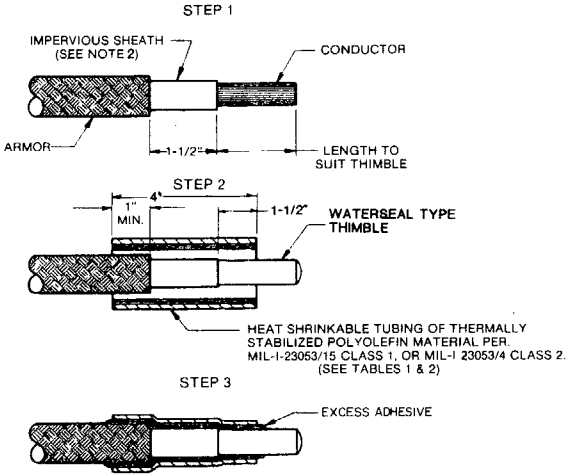
1A7I

SEALING SHEATH OF
SINGLE CONDUCTOR CABLE



1A72

SEALING SHEATH & CONDUCTOR
OF SINGLE CONDUCTOR CABLE



NOTES AND INSTALLATION INSTRUCTIONS:

1. TUBING SHALL CONFORM TO MIL-I-23053/15 CLASS 1 OR MIL-I-23053/4 CLASS 2.
2. CABLE ARMOR SHALL BE CUT BACK TO EXPOSE IMPERVIOUS SHEATH FOR 1-1/2". IMPERVIOUS SHEATH AND CONDUCTOR INSULATION SHALL BE THOROUGHLY CLEANED OF PAINT AND ANY OTHER FOREIGN MATTER.
3. SLIDE TUBE OVER SECTION TO BE SEALED AS SHOWN ON DRAWING. POSITION TUBE TO INSURE MINIMUM OVERLAP ON ARMOR SHOWN IN STEP 2.
4. SHRINK PART BY APPLYING HEAT USING A GAS (BUTANE OR PROPANE) TORCH, HOT AIR BLOWER (HEAT GUN), OR OTHER HEAT SOURCE. MINIMUM RECOVERY TEMPERATURE IS 250°F.
5. AS HEAT IS APPLIED MOVE HEAT SOURCE BACK AND FORTH OVER PART TO BE SHRUNK. SHRINK TUBE FROM CENTER TO ENDS TO AVOID TRAPPING AIR.
6. WHEN TUBE HAS RECOVERED ENOUGH TO ASSUME THE CONFIGURATION OF THE ITEM COVERED AND ADHESIVE APPEARS AT THE ENDS OF THE SEALANT TUBE, DISCONTINUE HEATING. ADDITIONAL HEAT WILL NOT MAKE THE PART SHRINK MORE TIGHTLY.
7. THIS FIGURE SUPERSEDES SECTION 4, SHEET 93 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1A7 OF DRAWING 803-5001027.

SH 132316950

TABLE 3
TUBING DIMENSIONS(WITHOUT ADHESIVE)

INTENDED USE: WIRE COLOR CODING, MARKING AND IDENTIFICATION

MILITARY PART NUMBER	EXPANDED	FULLY RECOVERED	
	I. D. MIN.	I. D. MAX.	WALL THICK.
CLASS 1			
M23053/5-105-*	.187	.093	.020
M23053/5-106-*	.250	.125	.025
M23053/5-107-*	.375	.187	.025
M23053/5-108-*	.500	.250	.025
M23053/5-109-*	.750	.375	.030
M23053/5-110-*	1.000	.500	.035
M23053/5-111-*	1.500	.750	.040
M23053/5-112-*	2.000	1.000	.045
M23053/5-113-*	3.000	1.500	.050
M23053/5-114-*	4.000	2.000	.055

DIMENSIONS ARE IN INCHES
* - REFERS TO COLOR CODE NUMBER
0 - BLACK, 2 - RED, 9 - WHITE, 5 - GREEN

HEAT SHRINKABLE DIMENSION NOTES

A. EXPANDED DIMENSIONS INCLUDE FACTORY APPLIED ADHESIVE.
B. ALL DIMENSIONS ARE NOMINAL.
C. TOLERANCES SHALL BE IN ACCORDANCE WITH MIL-I-23053/15 CLASS 1, MIL-I-23053/4 CLASS 2 OR MIL-I-23053/5 CLASS 1.
D. RECOMMENDED LENGTHS ARE MINIMUMS.
E. WALL DIMENSION DOES NOT INCLUDE ADHESIVE.

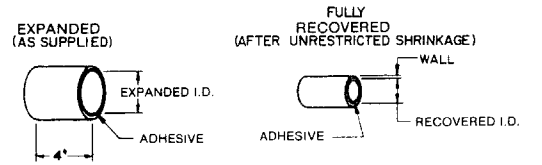


TABLE 1

SEALING TUBING DIMENSIONS (WITH ADHESIVE)

INTENDED USE: REPAIR OF HEAVY CABLES, SPLICES (WHERE APPROVED) AND MOISTURE SEALING

MILITARY PART NUMBER	TUBE FOR SSGA CABLE SIZE RANGE (CMA)	EXPANDED	FULLY RECOVERED	
		I.D. MIN	I.D MAX.	WALL THICK. NOM.
CLASS 1				
M23053/15-101-0	3-40	.750	.220	.105
M23053/15-102-0	50-150	1.100	.375	.120
M23053/15-103-0	200-250	1.500	.500	.140
M23053/15-104-0	GREATER	2.000	.750	.155
M23053/15-105-0	THAN	3.000	1.250	.155
M23053/15-106-0	500	4.000	1.750	.155

DIMENSIONS ARE IN INCHES

TABLE 2
SEALING TUBING DIMENSIONS (WITH ADHESIVE)

INTENDED USE: ENCAPSULATING OR MOISTURE SEALING

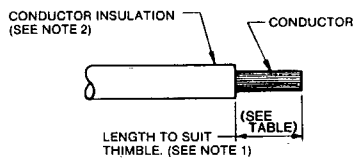
MILITARY PART NUMBER	EXPANDED	FULLY RECOVERED	
	I.D. MIN.	WALL THICK NOM.	I.D. MAX.
CLASS 2			
M23053/4-201-0	.238	.029	.125
M23053/4-202-0	.355	.029	.187
M23053/4-203-0	.475	.030	.250
M23053/4-204-0	.712	.035	.375
M23053/4-205-0	.950	.042	.500
M23053/4-206-0	1.425	.047	.750

DIMENSIONS ARE IN INCHES

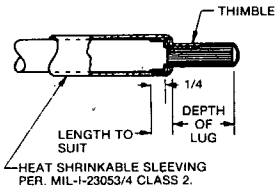
FIGURE 1A7. Cable end sealing with heat shrinkable tubing.

1A81
ATTACHMENT OF THIMBLES TO SINGLE & 2, 3 & 4 CONDUCTOR CABLES.

PREPARATION OF CONDUCTOR

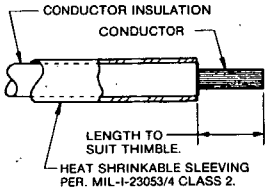


THIMBLE ATTACHED TO CONDUCTOR

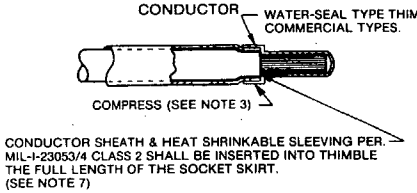


1A82
ATTACHMENT OF WATER-SEAL THIMBLES TO CABLES WITH MORE THAN ONE CONDUCTOR.

PREPARATION OF CONDUCTOR

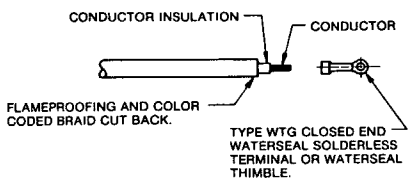


WATER-SEAL THIMBLE ATTACHED TO CONDUCTOR

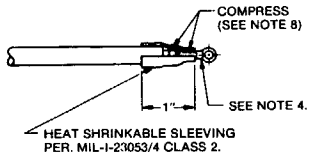


1A83
ATTACHMENT OF CLOSED END TERMINALS TO MULTIPLE & 2, 3 & 4, 3,000 TO 9,000 CM. CONDUCTOR CABLE.

PREPARATION OF CONDUCTOR

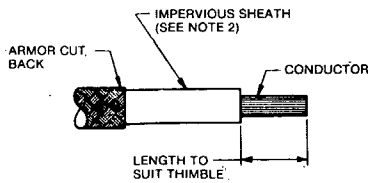


TERMINAL ATTACHED TO CONDUCTOR

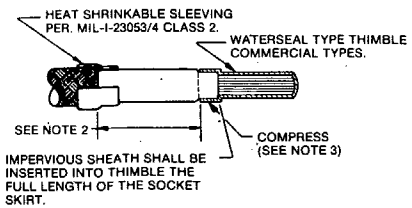


1A84
ATTACHMENT OF WATER-SEAL THIMBLES TO SINGLE CONDUCTOR CABLES.

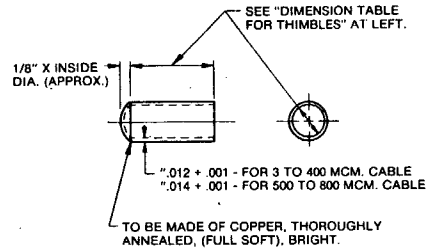
PREPARATION OF CABLE ENDS



WATER-SEAL THIMBLE ATTACHED TO CABLE



1A86
THIMBLE DETAIL



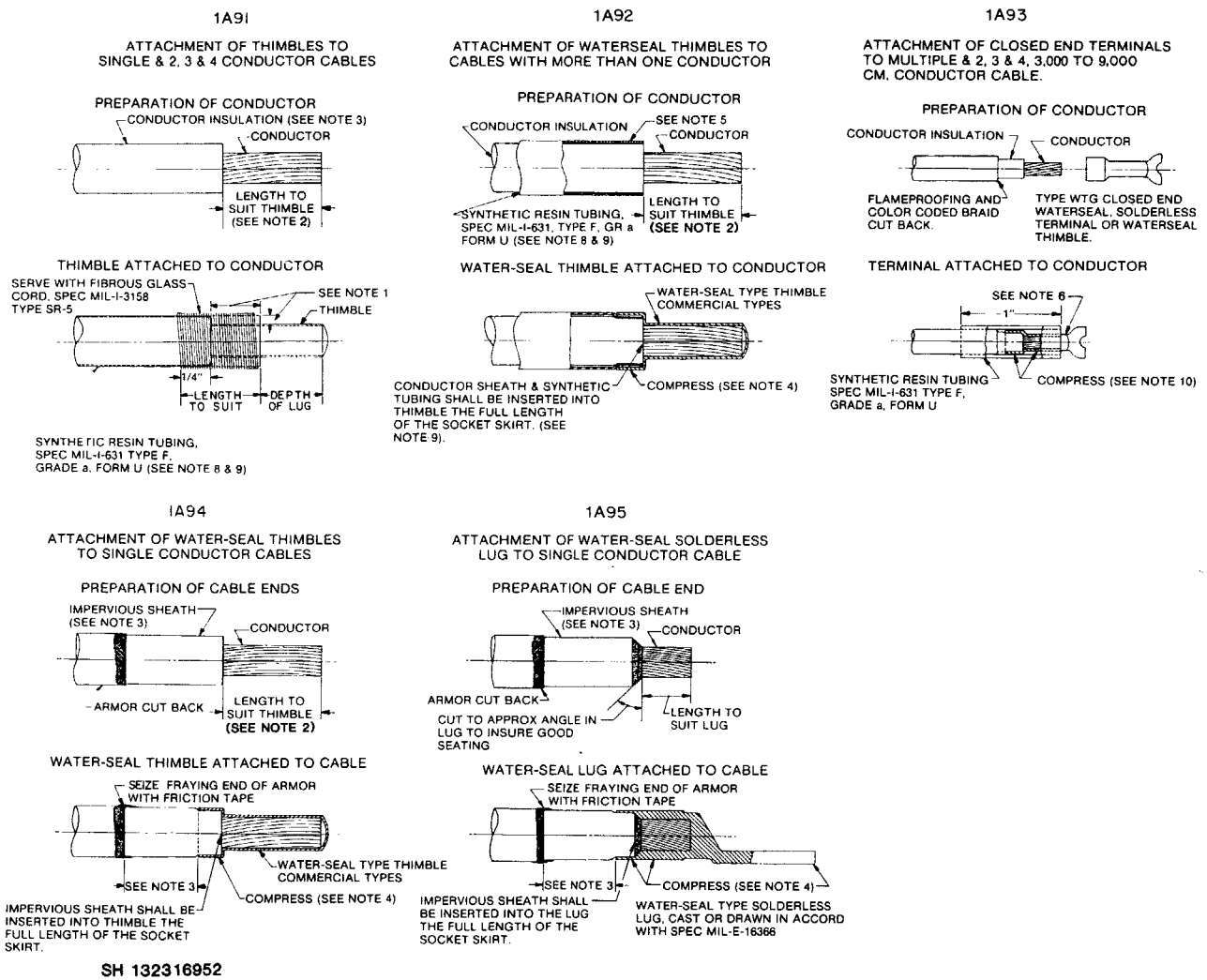
DIMENSION TABLE FOR THIMBLES

SIZE OF CABLE (CIR MILS)	I.D. OF THIMBLE FOR USE OVER COPPER CONDUCTOR	LENGTH OF THIMBLE
3,000	.069	1"
4,000	.084	1"
9,000	.116	1"
14,000	.144	1-1/2"
23,000	.179	1-1/2"
30,000	.210	1-1/2"
40,000	.234	1-1/2"
50,000	.262	2"
60,000	.290	2"
75,000	.325	2"
100,000	.371	2"
125,000	.415	2"
150,000	.465	2"
200,000	.522	2-1/2"
250,000	.585	2-1/2"
300,000	.636	2-1/2"
350,000	.693	2-1/2"
400,000	.750	2-1/2"
500,000	.841	2-3/4"
650,000	.944	2-3/4"
800,000	1.050	2-3/4"

NOTES:
1. CUT CONDUCTOR INSULATION BACK SO THAT THE THIMBLE FITS TIGHTLY UP AGAINST THE INSULATION. NO GAP IS PERMITTED.
2. CABLE ARMOR SHALL BE CUT BACK AND IMPERVIOUS SHEATH THOROUGHLY CLEANED OF PAINT FOR A SUFFICIENT DISTANCE TO PREVENT ELECTRICAL CREEPAGE BETWEEN ARMOR & LUG OR THIMBLE AFTER CASLE IS INSERTED.
3. THE SOLDERLESS LUG OR WATER-SEAL THIMBLE SHALL BE SECURED TO THE CABLE CONDUCTOR BY APPROVED METHODS. THE SKIRT OF THE LUG OR THIMBLE SHALL BE COMPRESSED OVER THE IMPERVIOUS SHEATH OR TUBING BY APPROVED METHODS PRODUCING A WATERTIGHT SEAL CAPABLE OF WITHSTANDING 50 LBS. PRESSURE PER. SQ. INCH WITHOUT LEAKAGE.
4. FILL BARREL OF TERMINAL WITH PLASTIC SEALER, SPEC. MIL-I-3064, TYPE HF, BEFORE INSTALLING IT ON CONDUCTOR.
5. THE SEALING OF TERMINAL ENDS OF TELEPHONE TWISTED PAIR CONDUCTORS IS NOT REQUIRED. THE CROTCH OF THE CABLE, HOWEVER, IS TO BE TREATED THE SAME AS FOR ALL MULTIPLE CONDUCTOR CABLE.
6. HEAT SHRINKABLE TUBING SHALL BE SLIPPED OVER CONDUCTOR INSULATION, EXTENDING FROM WELL INTO THE CABLE CROTCH, TO THE END OF THE CONDUCTOR.
7. HEAT SHRINKABLE TUBING IS NOT REQUIRED FOR MULTIPLE CONDUCTOR CABLE OR 2, 3 & 4 CONDUCTOR CABLE, 3,000 TO 9,000 CM.
8. PREPARE CABLE ENDS AS SHOWN, INCLUDING CUTTING COLOR CODED BRAID OR GLASS BACK A SUFFICIENT DISTANCE TO CLEAR SKIRT OF TERMINAL WHEN INSTALLED. THEN SLIP A PIECE OF HEAT SHRINKABLE TUBING, 1" LONG OVER CABLE END.
   INSERT WIRE INTO TERMINAL & SECURE THE BARREL OF TERMINAL TO COPPER CONDUCTOR BY APPROVED METHODS. THEN COMPRESS THE SKIRT OF TERMINAL TO THE IMPERVIOUS SHEATH OF CABLE BY APPROVED METHODS CAPABLE OF WITHSTANDING 30 LBS. PRESSURE PER SQ. INCH WITHOUT LEAKAGE. SLIDE HEAT SHRINKABLE TUBING OVER TERMINAL. FOR APPROVED CRIMPING TOOL SEE DRAWING 9000-S6202-73809.
9. THIS FIGURE SUPERSEDES SECTION 4, SHEET 96 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1A8 OF DRAWING 803-5001027.

SH 132316951

FIGURE 1A8. Cable end sealing with heat shrinkable tubing.

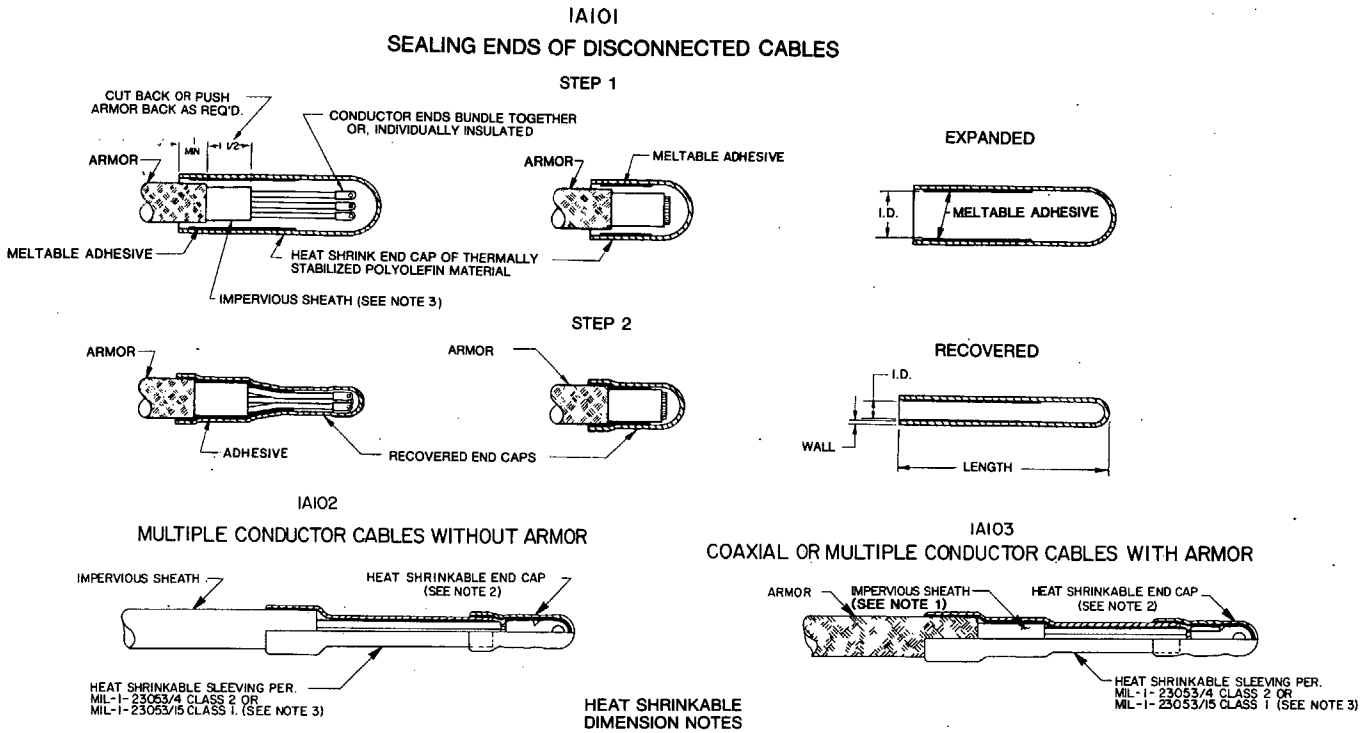


SH 132316952

FIGURE 1A9. Cable conductor end sealing.

NOTES

1. BUILT DIAMETERS INDICATED TO I.D. OF SYNTHETIC TUBING FOR DISTANCES INDICATED WITH SYNTHETIC RESIN TAPE, SPEC MIL-I-631 TYPE F, GRADE a, FORM T & BONDING AGENT (NOTE 2). PAINT WITH BONDING AGENT & ALLOW TO DRY BEFORE APPLYING SYNTHETIC RESIN TAPE.
2. CUT CONDUCTOR INSULATION BACK SO THAT THE THIMBLE FITS TIGHTLY UP AGAINST THE INSULATION. NO GAP IS PERMITTED.
3. CABLE ARMOR SHALL BE CUT BACK AND IMPERVIOUS SHEATH THOROUGHLY CLEANED OF PAINT FOR A SUFFICIENT DISTANCE TO PREVENT ELECTRICAL CREEPAGE BETWEEN ARMOR & LUG OR THIMBLE AFTER CABLE IS INSERTED.
4. THE SOLDERLESS LUG OR WATER-SEAL THIMBLE SHALL BE SECURED TO THE CABLE CONDUCTOR BY APPROVED METHODS. THE SKIRT OF THE LUG OR THIMBLE SHALL BE COMPRESSED OVER THE IMPERVIOUS SHEATH OR TUBING BY APPROVED METHODS PRODUCING A WATERTIGHT SEAL CAPABLE OF WITHSTANDING 50 LBS PRESSURE PER SQ INCH WITHOUT LEAKAGE.
5. BUILD CONDUCTOR TO FIT I.D. OF SYNTHETIC TUBING, & FOR A MINIMUM DISTANCE EQUAL TO THE THIMBLE SKIRT LENGTH, WITH SYNTHETIC RESIN TAPE, SPEC MIL-I-631, TYPE F, GRADE a, FORM T.
6. FILL BARREL OF TERMINAL WITH PLASTIC SEALER, SPEC MIL-I-3064, TYPE HF, BEFORE INSTALLING IT ON CONDUCTOR.
7. THE SEALING OF TERMINAL ENDS OF TELEPHONE TWISTED PAIR CONDUCTORS IS NOT REQUIRED. THE CROTCH OF THE CABLE, HOWEVER, IS TO BE TREATED THE SAME AS FOR ALL MULTIPLE CONDUCTOR CABLE.
8. SYNTHETIC RESIN TUBING SHALL BE SLIPPED OVER CONDUCTOR INSULATION, EXTENDING FROM WELL INTO THE CABLE CROTCH, TO THE END OF THE CONDUCTOR.
9. SYNTHETIC RESIN TUBING IS NOT REQUIRED FOR MULTIPLE CONDUCTOR CABLE OR 2, 3 AND 4 CONDUCTOR CABLE, 3000 TO 9000 CM.
10. PREPARE CABLE ENDS AS SHOWN, INCLUDING CUTTING COLOR CODED BRAID **OR GLASS BACK A** SUFFICIENT DISTANCE TO CLEAR SKIRT OF TERMINAL WHEN INSTALLED. THEN SLIP A PIECE OF SYNTHETIC TUBING ".160 DIAMETER, 1" LONG OVER CABLE END.
    INSERT WIRE INTO TERMINAL & SECURE THE BARREL OF TERMINAL TO COPPER CONDUCTOR BY APPROVED METHODS. THEN COMPRESS THE SKIRT OF TERMINAL TO THE IMPERVIOUS SHEATH OF CABLE BY APPROVED METHODS CAPABLE OF WITHSTANDING 30 LBS PRESSURE PER SQ INCH WITHOUT LEAKAGE. SLIDE SYNTHETIC TUBING OVER TERMINAL. FOR APPROVED CRIMPING TOOL SEE DRAWING 9000-S6202-73809.
11. **THIS FIGURE SUPERSEDES SECTION 4, SHEET 96 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1A9 OF DRAWING 803-5001027.**



HEAT SHRINKABLE DIMENSION NOTES

A. EXPANDED DIMENSIONS INCLUDE FACTORY APPLIED ADHESIVE.

B. ALL DIMENSIONS ARE NOMINAL.

C. RECOMMENDED LENGTHS ARE MINIMUMS.

D. WALL DIMENSIONS DO NOT INCLUDE ADHESIVE.

TABLE 1
END CAP DIMENSIONS

CABLE SIZE RANGES (THOUSANDS CIR. MILS.)	EXPANDED	FULLY RECOVERED		
	I.D.	LENGTH	I.D.	WALL THICK.
3-40	.35 .81	1.32 2.70	.18 .37	.06 .08
50-150	1.05	3.00	.50	.09
200-500	1.56	4.00	.75	.10
650 & GREATER	2.05 3.31	4.50 5.00	1.00 1.50	.11 .12

NOTES AND INSTALLATION INSTRUCTIONS

1. CABLE ARMOR SHALL BE CUT BACK TO EXPOSE IMPERVIOUS SHEATH FOR 1 1/2". IMPERVIOUS SHEATH AND CONDUCTOR INSULATION SHALL BE THOROUGHLY CLEANED CLEANED OF PAINT AND ANY OTHER FOREIGN MATTER.
2. SLIDE END CAP OVER SECTION TO BE SEALED AS SHOWN ON DRAWING POSITION END CAP TO INSURE ONE INCH MINIMUM OVERLAP ON ARMOR AS SHOWN IN STEP 1.
3. SHRINK PART BY APPLYING HEAT USING A GAS (BUTANE OR PROPANE) TORCH, HOT AIR BLOWER (HEAT GUN), OR OTHER SOURCE. MINIMUM RECOVERY TEMP IS 250% F.
4. AS HEAT IS APPLIED MOVE HEAT SOURCE BACK AND FORTH OVER PART TO BE SHRUNK. SHRINK END CAP FROM CLOSED END TO OPEN END TO AVOID TRAPPING AIR.
5. WHEN END CAP HAS RECOVERED ENOUGH TO ASSUME THE CONFIGURATION OF THE ITEM COVERED AND EXCESS ADHESIVE APPEARS AT THE END OF THE CAP, DISCONTINUE HEATING. ADDITIONAL HEAT WILL NOT MAKE THE PART SHRINK MORE TIGHTLY.
6. END CAPS SHALL CONFORM TO MIL-I-81765/1 AND TABLE 1.
7. THIS FIGURE SUPERSEDES SECTION 4, SHEET 93, OF DRAWING, NAVSEC NO. 9000-S6202-73980 AND SHEET 1A10 OF DRAWING 803-5001027.

SH 132316953

FIGURE 1A10. Cable end sealing with heat shrinkable tubing and end caps.

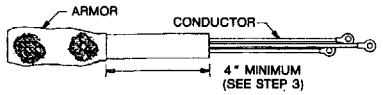


FIG. 1

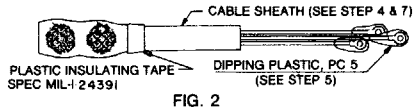


FIG. 2

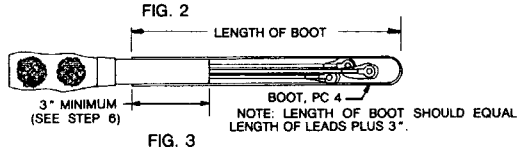


FIG. 3

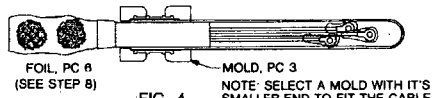


FIG. 4

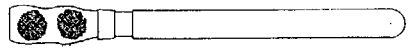


FIG. 5

BOOT MAY BE FOLDED BACK, AS SHOWN, TO CREATE MORE PRESSURE IN MOLD FOR A BETTER SEALING EFFECT.

FIG. 6

WHEN OVERSIZE BOOT IS USED, PULL OPPOSITE SIDES AND FOLD OVER AS SHOWN.

FIG. 7

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WEATHER SEALING STEPS

1. DISCONNECT CABLE FROM EQUIPMENT.
2. TAKE MEGGER READINGS OF CABLE AND RECORD FOR REFERENCE.
3. PUSH THE ARMOR BACK A MINIMUM OF 4" FROM THE END OF THE CABLE SHEATH (FIGURE 1) AND TAPE THE ARMOR IN PLACE, (FIGURE 2). THE ARMOR SHOULD BE RETAINED IN ITS ENTIRETY SO THAT IT MAY BE REPLACED FOR SHIELDING.
4. CLEAN THE CABLE SHEATH BY SCRAPING WITH A KNIFE, SANDPAPER OR A WIRE BRUSH, THEN CLEAN THOROUGHLY WITH SOLVENT, PC 7.
5. DIP ENDS OF CONDUCTORS OR LUGS IN HOT DIP INSULATING MATERIAL, PC 5 (FIGURE 2). THE COATING THUS PROVIDED, PROTECTS THE CONDUCTOR END AND INSULATES BETWEEN CONDUCTORS. THE INSULATION CAN BE EASILY STRIPPED FROM THE CONDUCTORS WHEN THE CABLE IS TO BE REACTIVATED.
6. PLACE A BOOT, PC 4, OF THE PROPER SIZE OVER THE CABLE; (FIGURE 3). THIS BOOT SHOULD EXTEND AT LEAST 3" OVER THE CABLE SHEATH.
7. BRUSH SOLVENT, PC 7, ON AREAS OF BOOT AND CABLE SHEATH THAT ARE TO BE JOINED.
8. WRAP FOIL, PC 6, OVER THE BOOT AND CABLE SHEATH (FIG. 4).
9. PLACE THE PROPER SIZE MOLD, PC 3, OVER THE FOIL, BOOT AND SHEATH, THEN TIGHTEN THE MOLD CLAMPS. (FIGURE 4)
10. APPLY THERMOSTATICALLY CONTROLLED HEATER, PC 2, OVER THE METAL SECTION OF THE MOLD. THE HEATING TIME IS GENERALLY 4 TO 5 MINUTES, HOWEVER, IT WILL DEPEND ON AMBIENT TEMPERATURE AND CABLE SIZE. REMOVE THE HEATER.
11. ALLOW THE MOLD TO COOL APPROXIMATELY 5 MINUTES THEN REMOVE MOLD AND FOIL (FIGURE 5).

TABLE I

LIST OF MOLD AND BOOT SIZES

CABLE DIA.	MOLD: DITTMORE & FREIMOUTH CO. PART NO. OR EQUIVALENT	BOOT: DITTMORE & FREIMOUTH CO. PART NO. 2078-2001 OR EQUIVALENT				
		12" LNG	18" LNG	24" LNG	30" LNG	36" LNG
1/4"	2078-2008-2	2-12	2-18	2-24	2-30	2-36
3/8"	3	3-12	3-18	3-24	3-30	3-36
1/2"	4	4-12	4-18	4-24	4-30	4-36
5/8"	5	5-12	5-18	5-24	5-30	5-36
3/4"	6	6-12	6-18	6-24	6-30	6-36
7/8"	7	7-12	7-18	7-24	7-30	7-36
1"	8	8-12	8-18	8-24	8-30	8-36
1 1/8"	9	9-12	9-18	9-24	9-30	9-36
1 1/4"	10	10-12	10-18	10-24	10-30	10-36
1 3/8"	11	11-12	11-18	11-24	11-30	11-36
1 1/2"	12	12-12	12-18	12-24	12-30	12-36
1 5/8"	13	13-12	13-18	13-24	13-30	13-36
1 3/4"	14	14-12	14-18	14-24	14-30	14-36
1 7/8"	15	15-12	15-18	15-24	15-30	15-36
2"	16	16-12	16-18	16-24	16-30	16-36

EXAMPLE: THE PART NUMBER FOR A 24" LONG BOOT FOR A CABLE OF 1" DIAMETER IS 2078-2001-8-24.

NOTES:
1. HEAT SHRINK END CAPS, METHOD 1A143, MAY BE USED AS ALTERNATE TO METHOD 1A111.
2. PIECES 1 THRU 7 SHALL BE IN ACCORDANCE WITH MIL-S-21953.
3. THIS FIGURE SUPERSEDES SECTION SE 4, SHEET 100, DRAWING, NAVSEC NO. 9000-S6202-73980, AND SHEET 1A111 OF DRAWING 803-5001027.

FIGURE 1A11. Cable end sealing when exposed to weather.

NOTES:
1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 101, OF DRAWING, NAVSEC NO. 9000-S6202-73980, AND SHEET 1A12 OF DRAWING 803-5001027.

1A121

MULTIPLE CONDUCTOR CABLES
WITH AND WITHOUT ARMOR

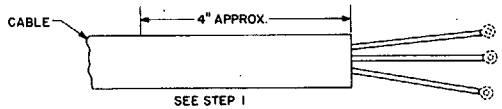

FIG. 1

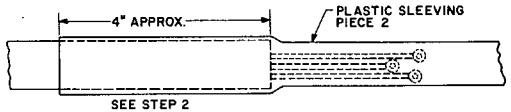

FIG. 2

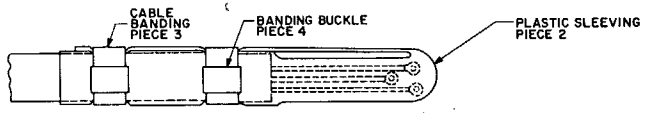

FIG. 3

1A122

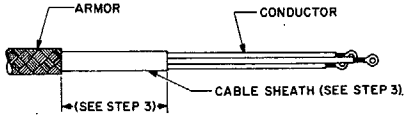

FIG. 1

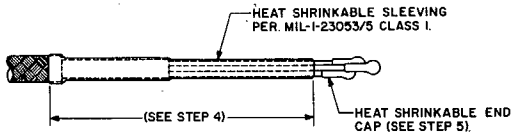

FIG. 2

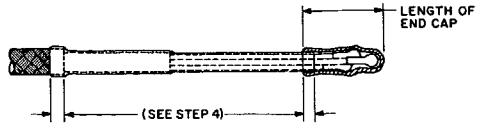

FIG. 3

WEATHER SEALING STEPS FOR METHOD 1A121

1. PUSH CABLE ARMOR BACK ABOUT 6" (OUT OF WAY OF SEALING AREA) AND SECURE WITH A WRAPPING OF PLASTIC TAPE.
SEPARATE & STRAIGHTEN THE CONDUCTORS AND LIBERALLY APPLY BATTERY SEALING COMPOUND (PC. 1) ON THE CONDUCTORS (ESPECIALLY WHERE THE CONDUCTORS ENTER THE CABLE) AND APPROXIMATELY 4 INCHES BACK ON THE CABLE. (SEE FIG. 1)

2. SLIDE THE PLASTIC SLEEVING (PC. 2) OVER THE CONDUCTORS AND APPROX. 4 INCHES BACK ONTO THE CABLE. (SEE FIG. 2)

3. DOUBLE BACK AND CUT THE PLASTIC SLEEVING, ALLOWING SUFFICIENT LENGTH OF SLEEVING SO THAT THE CONDUCTORS DO NOT DOUBLE BACK AND OVER-LAP ONTO THE CABLE. (SEE FIG. 3)

4. SHAPE THE LOOSE END OF THE SLEEVING TO THE CABLE AND INSTALL THE CABLE BANDS (PC. 3) AND BANDING BUCKLE (PC. 4). (SEE FIG. 3)

5. APPLY THE BATTERY SEALING COMPOUND ONTO THE CABLE AROUND THE ENDS OF THE PLASTIC SLEEVING.

LIST OF MATERIAL

PC. 1. BATTERY SEALING COMPOUND-MIX EQUAL PARTS BY VOLUME OF BATTERY COMPOUND (SPEC MIL-C-2687) AND TOLUENE (SPEC. JAN-T-171).

PC. 2. PLASTIC SLEEVING-SPEC. MIL-I-631, CLASS 1 OR 2 CATEGORY I, SUBFORM Ua or Ub, TYPE F OF NAVY STOCK LIST FOR GENERAL STORES, GROUP 59 PART 4.

PC. 3. CABLE BANDING-CRES.

PC. 4. BANDING BUCKLE-CRES.

STEPS FOR METHOD 1A122

1. DISCONNECT CABLE FROM EQUIPMENT.
2. TAKE MEGGER READINGS OF CABLE AND RECORD FOR FUTURE REFERENCE.
3. PUSH THE ARMOR BACK A MINIMUM OF 1-1/2 INCHES FROM THE END OF THE CABLE SHEATH (FIGURE 1), AND CLEAN CABLE SHEATH BY SCRAPING WITH A KNIFE, SANDPAPER OR A WIRE BRUSH, THEN CLEAN THOROUGHLY WITH SOLVENT. THE ARMOR SHOULD BE RETAINED IN ITS ENTIRETY SO THAT IT MAY BE REPLACED FOR SHIELDING.
4. SECURE ARMOR IN PLACE WITH HEAT SHRINKABLE SLEEVING (FIGURE 2). SLEEVING SHALL BE CUT TO A LENGTH THAT WILL ALLOW 1 TO 2 INCHES TO OVERLAP WITH CABLE ARMOR AND HEAT SHRINKABLE END CAP, DEPENDING UPON THE SIZE OF CABLE.
5. PLACE A HEAT SHRINKABLE END CAP OF THE PROPER SIZE FROM TABLE I FIGURE 1A10 OVER EACH OF THE CONDUCTOR ENDS, AND SHRINK TO CONFORM. HEAT SHRINKABLE SLEEVING PER MIL-I-23053/4 CLASS 2 WITH CRIMPED END MAY BE USED AS AN ALTERNATE CONDUCTOR INSULATION. AVAILABLE FROM RAYCHEM.
6. PLACE A HEAT SHRINKABLE END CAP OF THE PROPER SIZE, PER. METHOD 1A101, OVER CABLE END AND SHRINK TO CONFORM (FIGURE 3).

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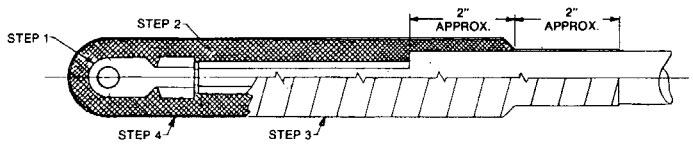
FIGURE 1A12. Cable end sealing when exposed to weather.

1A131

MULTIPLE CONDUCTOR CABLES WITHOUT ARMOR



STEP 1. INDIVIDUAL CONDUCTORS MAY BE BALLED TOGETHER, TWISTED, OR LEFT STRAIGHT.

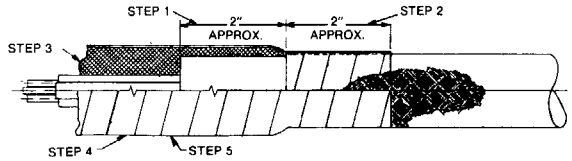
STEP 2. MOLD FLAMEPROOF INSULATING FILLER TAPE AROUND BUNCHED INDIVIDUAL CONDUCTORS AND EXTEND APPROXIMATELY 2" OVER CABLE SHEATH. NEOPRENE FILLER, ASBESTOS IMPREGNATED SPEC. MIL-I-17695.

STEP 3 APPLY TWO SERVINGS (MIN.) HALF LAPPED OF PLASTIC ELECTRICAL INSULATING ADHESIVE TAPE, 1" WIDE, SPEC. MIL-I-24391.

STEP 4. COAT ENTIRE SEAL WITH THREE COATS OF NEOPRENE CEMENT.

1A132

COAXIAL OR MULTIPLE CONDUCTOR CABLES WITH ARMOR



STEP 1. REMOVE ARMOR.

STEP 2. SEIZE ARMOR END WITH ONE SERVING HALF LAPPED OF PLASTIC ELECTRICAL INSULATING ADHESIVE TAPE, 1" WIDE, SPEC. MIL-I-24391.

STEP 3. MOLD FLAMEPROOF INSULATING FILLER TAPE AROUND CABLE END AND INDIVIDUAL CONDUCTORS AS APPLICABLE FOR CABLE TYPE NEOPRENE FILLER, ASBESTOS IMPREGNATED SPEC. MIL-I-17695

STEP 4. APPLY TWO SERVINGS (MIN.) HALF LAPPED OF PLASTIC ELECTRICAL INSULATING ADHESIVE TAPE, 1" WIDE, SPEC. MIL-I-24391.

STEP 5. COAT ENTIRE SEAL WITH THREE COATS OF NEOPRENE CEMENT.

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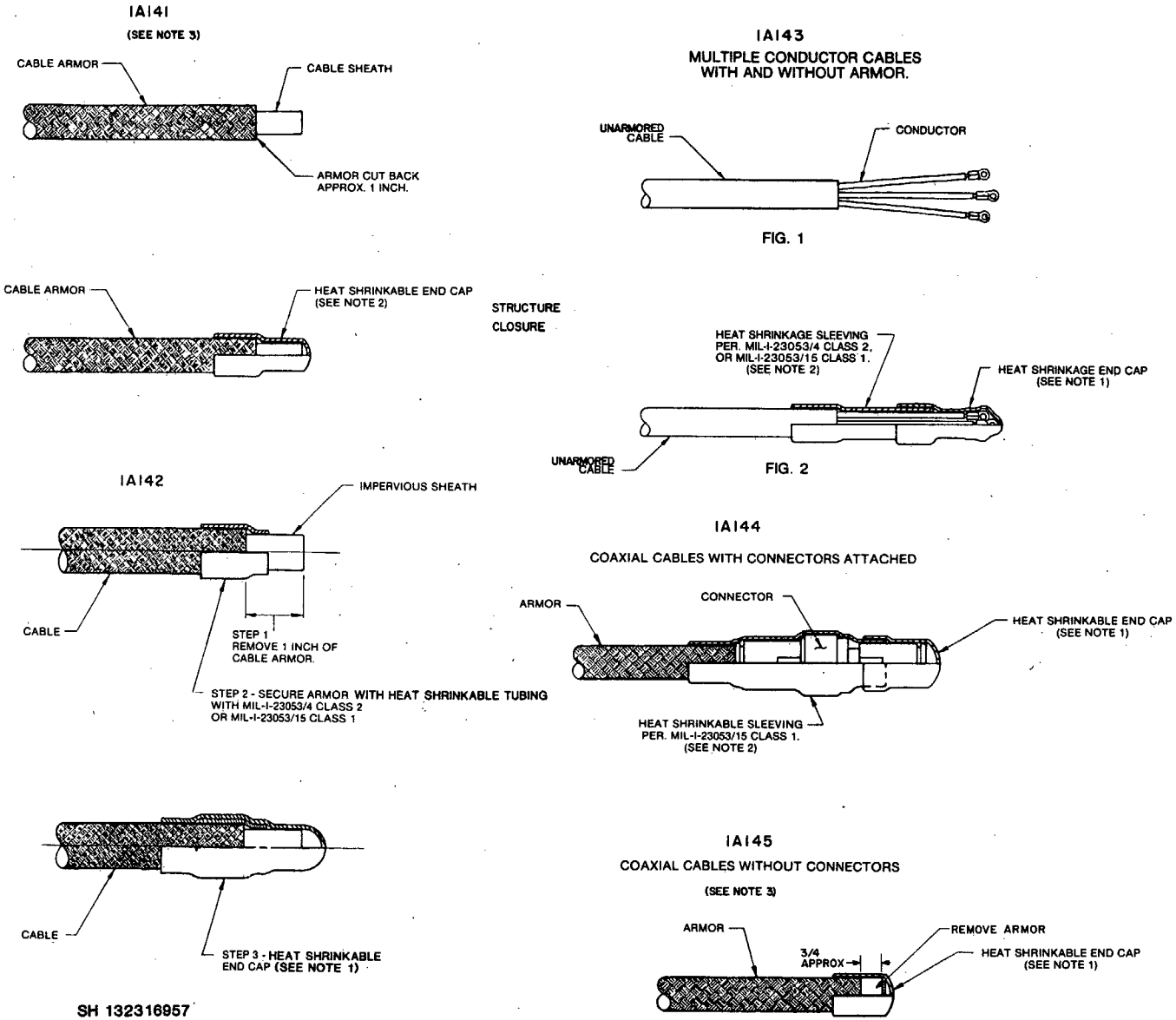
NOTES:

1. ALTERNATE METHOD OF SEALING MAY BE USED IN ACCORDANCE WITH SPEC. MIL-S-21953 (SHIPS) EXCEPT ON COAXIAL CABLE.
2. FOR SELECTION AND INSTALLATION INSTRUCTIONS OF HEAT SHRINKABLE END CAPS, SEE METHOD 1A101.
3. HEAT SHRINKABLE SLEEVING SHALL BE CUT TO A LENGTH THAT WILL ALLOW 1 TO 2 INCHES OF OVERLAP WITH CABLE INSULATION AND HEAT SHRINKABLE END CAP, DEPENDING UPON THEH SIZE OF THE CABLE.
4. THIS FIGURE SUPERSEDES SECTION 4, SHEET 60, OF DRAWING, NAVSEC NO. 9000-S6202-73980 , AND SHEET 1A13 OF DRAWING 803-5001027.

FOR VESSELS IN RESERVE

FIGURE 1A13. Cable end sealing when exposed to weather.



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NOTES:

1. FOR SELECTION AND INSTALLATION INSTRUCTIONS OF HEAT SHRINKABLE END CAPS, SEE METHOD 1A101.
2. HEAT SHRINKABLE SLEEVING SHALL BE CUT TO A LENGTH THAT WILL ALLOW 1 TO 2 INCHES OF OVERLAP WITH CABLE INSULATION AND HEAT SHRINKABLE END CAP, DEPENDING UPON THE SIZE OF CABLE.
3. THIS METHOD APPLIES TO CABLE COILS OR REELS STORED IN A COVERED LOCATION NOT SUBJECT TO ENTRANCE OF WATER OR MOISTURE.
4. THIS FIGURE SUPERSEDES SECTION 4, SHEET 59, OF DRAWING, NAVSEC NO. 9000-S6202-73980, AND SHEET 1A14 OF DRAWING 803-5001027.

FOR VESSELES IN RESERVE

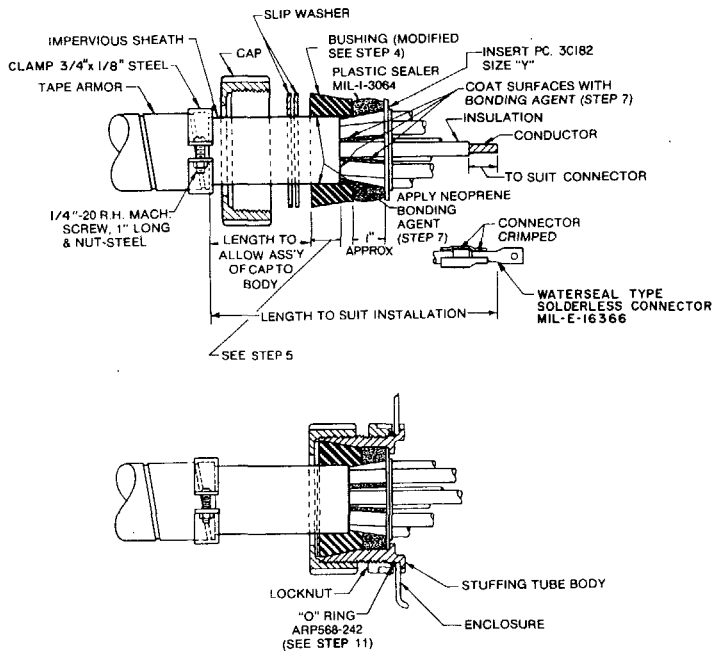
FIGURE 1A14. Cable end sealing disconnected and stored cable.

NOTES:

1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 99, OF DRAWING, NAVSEC NO. 9000-S6202-73980, AND SHEET 1A15 OF DRAWING 803-5001027.

1A151

TYPE MDGY CABLES ENTERING CONNECTION BOXES

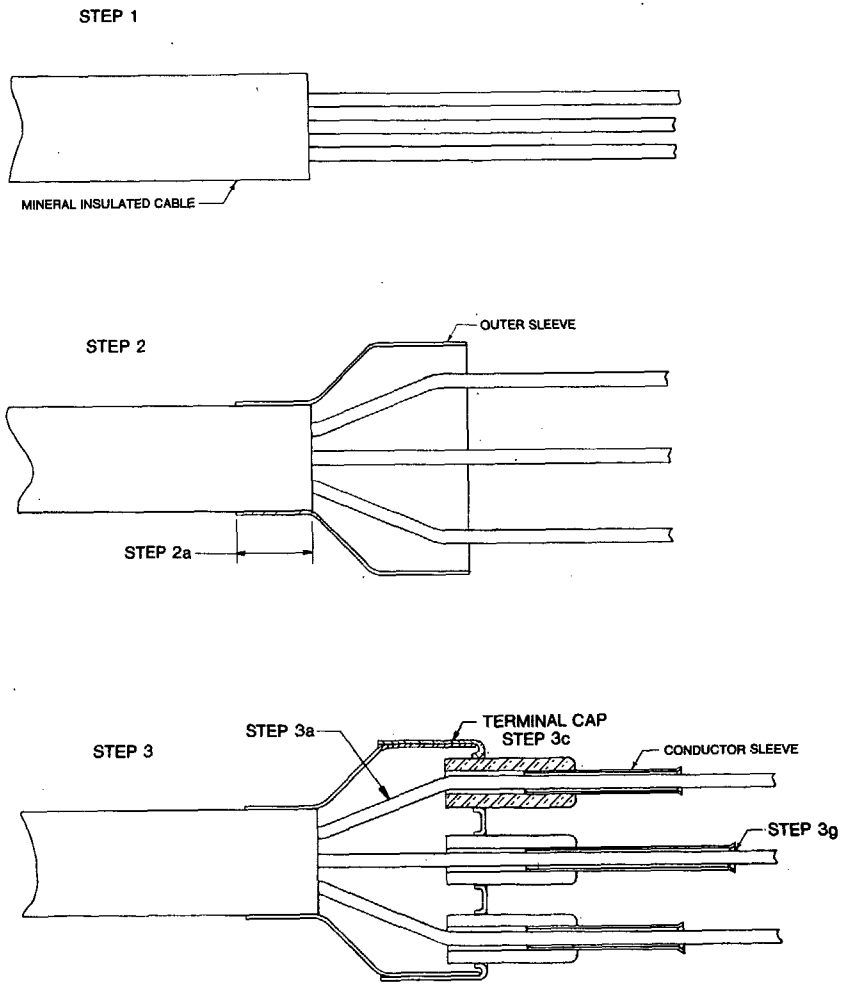


INSTALLATION STEPS:

1. INSTALL CLAMP ON CABLE AT POSITION TAPE ARMOR IS TO BE REMOVED.
2. REMOVE TAPE ARMOR, OUTER BRAID AND DUCK TAPE BEYOND THE CLAMP. SLIDE THE CLAMP TOWARD CABLE END SUFFICIENTLY TO COVER SHARP EDGES OF TAPE ARMOR.
3. REMOVE IMPERVIOUS SHEATH TO APPROXIMATELY 4 IN. FROM CABLE CLAMP.
4. MODIFY BUSHING BY CUTTING 5/8 IN. OFF SMALL END TO ENSURE UNIFORM CUT.
5. PLACE STUFFING TUBE CAP, SLIP WASHERS AND MODIFIED BUSHING OVER CABLE END. COAT IMPERVIOUS SHEATH AND INSIDE OF GROMMET WITH NEOPRENE BONDING AGENT, GATES ENGINEERING CO. N29 OR EQUAL, AND IMMEDIATELY INSERT CABLE SHEATH APPROXIMATELY TWO-THIRDS OF THE WAY INTO THE BUSHING.
6. CHECK CABLE READING WITH MEGGER BEFORE STEP 7 TO INSURE THAT NO MOISTURE IS PRESENT. IF A LOW READING IS OBTAINED, DRY CABLE BY PASSING CURRENT THROUGH IT OR BY SOME OTHER APPROVED METHOD. A SATISFACTORY CABLE INSULATION RESISTANCE IAW (IN ACCORDANCRE WITH) NSTM CHAP. 300 AND GEN SPEC SECTION 095 & 320320.
7. SPREAD CONDUCTORS APART, PACK PLASTIC SEALER, TYPE HF SPEC. MIL-I-3064, AROUND CABLE CROTCH, INSURING THAT ALL SPACES WITHIN BUSHING ARE THOROUGHLY FILLED AND THAT ALL CONDUCTORS ARE CUSHIONED FROM EACH OTHER WITH SEALER.
8. INSERT CONDUCTORS THROUGH HOLES IN INSERT, PREDRILLED TO SUIT NUMBER AND SIZE OF CONDUCTORS, AND SLIDE INSERT ALONG CONDUCTORS TO WITHIN ONE IN. OF BUSHING.
9. CONNECT WATER SEAL SOLDERLESS TERMINALS, SPEC. MIL-E-16366, TO ENDS OF CONDUCTORS AND COMPRESS TERMINAL SKIRT TO CONDUCTOR INSULATION.
10. INSTALL STUFFING TUBE BODY, "O" RING AND LOCKNUT IN CONNECTION BOX IN ACCORDANCE WITH NOTES 1, 2, 3 & 5 OF FIGURE 3C1 THE GLAND NUT SHOULD BE TIGHTENED UNTIL THERE IS EVIDENCE OF PLASTIC SEALER BEING FORCED BETWEEN CONDUCTORS AND INSERT TO ASSURE THAT THE TUBE IS TIGHTLY PACKED.
11. "O" RINGS SHALL BE FURNISHED BY THE INSTALLING ACTIVITY IN ACCORDANCE WITH MIL-P-25732.

SH 132316958

FIGURE 1A15. End sealing of type "MDY" cables entering connection boxes.



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STEP 1

a. DETERMINE LENGTH OF BARE CONDUCTOR REQUIRED. THIS LENGTH SHALL PERMIT THE FANNING OUT AND CUTTING TO SUIT, OF INDIVIDUAL CONDUCTORS IN MULTIPLE CONDUCTOR "MI" CABLE. MARK THIS LENGTH ON CABLE SHEATH. USING A COPPER TUBE CUTTER, CUT APPROXIMATELY HALF WAY THROUGH CABLE SHEATH AT THIS POINT. AFTER CUTTING, FLEX SLIGHTLY AND STRIP OFF SHEATH, USING CARE NOT TO DAMAGE OR EXCESSIVELY BEND CONDUCTOR(S). THE CABLE SHEATH SHALL BE SQUARE AND FREE OF BURRS.

b. DETERMINE INSULATION RESISTANCE OF CABLE. EACH CABLE LENGTH SHALL BE MEASURED TO HAVE A MINIMUM READING ON INSULATION RESISTANCE TEST AS SPECIFIED FOR NAVY CABLES.

A CABLE READING BELOW THE MINIMUM INSULATION RESISTANCE SHALL BE MADE TO MEET THE REQUIREMENT BY APPLYING A FLAME TO THE CABLE AT A POINT 12" BACK FROM THE CABLE END, WORKING TOWARD, THE END OF THE CABLE UNTIL THE SHEATH GLOWS SLIGHTLY, USING CARE NOT TO DIRECT THE FLAME AGAINST THE EXPOSED MAGNESIA. AFTER ALLOWING THE CABLE TO COOL TO AMBIENT TEMPERATURE, THE INSULATION RESISTANCE SHALL AGAIN BE MEASURED.

c. USING FINE GRADE, SANDPAPER, CLEAN CABLE SHEATH AND CONDUCTOR(S) 1/8" IN EACH DIRECTION OF JOINT TO BE BRAZED.

STEP 2

a. SLIDE OUTER SLEEVE OF THE ASSEMBLY ONTO THE CABLE USING A MAXIMUM LENGTH OF 1/4" OF PENETRATION FOR MI 14/2 CABLE,3/8" FOR ALL OTHER TERMINALS.

b. APPLY TO JUNCTION OF THE TERMINAL SLEEVE AND THE CABLE SHEATH AN ABSOLUTE MINIMUM OF LOW TEMPERATURE BRAZING FLUX, SPEC O-F-499 ("HANDY-FLUX"OR EQUIV.).

c. USING OXY-ACETYLENE OR HYDROGEN TORCH FLAME, PRE HEAT THE CABLE SHEATH THOROUGHLY AND THE TERMINAL SLEEVE SLIGHTLY, UNTIL THE FLUX BECOMES FLUID.

d. USING A SILVER BASE BRAZING ALLOY 1/16" DIA. WIRE, SPEC QQ-B-654 GR IV ("EASY-FLO"TYPE IV OR EQUIV.) BRAZE TERMINAL SLEEVE TO CABLE SHEATH, USING A MINIMUM OF HEAT. ALLOW BRAZE TO COOL TO AMBIENT TEMPERATURE. REMOVE ALL TRACES OF FLUX.

STEP 3

a. SLIDE TERMINAL CAP OVER THE OUTER SLEEVE, USING CARE IN POSITIONING THE TERMINAL CAP TO PREVENT TWISTING CONDUCTORS. AFTER POSITIONING THE TERMINAL CAP, IT SHALL BE NECESSARY TO SLIDE THE TERMINAL CAP AWAY FROM THE OUTER SLEEVE TO PERMIT A VISUAL INSPECTION OF THE CONDUCTORS. ASSURE THE PROPER ALIGNMENT AND THEN REPOSITION THE TERMINAL CAP OVER THE OUTER SLEEVE.

b. IF THERE HAS BEEN A TIME LAG OF 15 MINUTES BETWEEN STEP 2d AND a ABOVE, REPEAT STEP 1b.

c. APPLY FLUX, HEAT AND SILVER BASE BRAZING ALLOY AS OUTLINED IN STEP 2 AND BRAZE THE TERMINAL CAP TO THE OUTER SLEEVE. CAUTION SHALL BE USED NOT TO DIRECT THE FLAME AGAINST THE CERAMIC PORTION OF THE ASSEMBLY. ALLOW TO COOL TO AMBIENT TEMPERATURE. REMOVE ALL TRACES OF FLUX.

d. PLACE ASSEMBLY IN A POSITION WHICH WILL PERMIT BRAZING THE INDIVIDUAL CONDUCTORS.

e. CHECK INSULATION RESISTANCE IN ACCORDANCE WITH STEP 1b.

f. APPLY TO THE JUNCTIONS OF THE INDIVIDUAL CONDUCTORS AND THE FLARED CONDUCTOR SLEEVES AN ABSOLUTE MINIMUM OF FLUX (STEP 2b).

g. BRAZE CONDUCTOR TO THE CONDUCTORS SLEEVES AS OUTLINED IN STEP 2d OBSERVING THE FOLLOWING PRECAUTIONS:

(1) PRE HEAT THE CONDUCTOR THOROUGHLY USING A FINE TORCH TIP AND THE CONDUCTOR SLEEVE SLIGHTLY UNTIL FLUX BECOMES FLUID. CAUTION SHALL BE USED NOT TO DIRECT THE FLAME AGAINST THE CERAMIC PORTIONS OF THE ASSEMBLY.
(2) A MINIMUM OF BRAZING ALLOY SHALL BE USED TO FILL THE FLARED CUPS AT THE JUNCTION OF THE CONDUCTORS AND TERMINAL SLEEVES.

h. ALLOW BRAZE TO COOL. REMOVE ALL TRACES OF FLUX.

i. INSPECT ALL BRAZES VISUALLY FOR PIN HOLES.

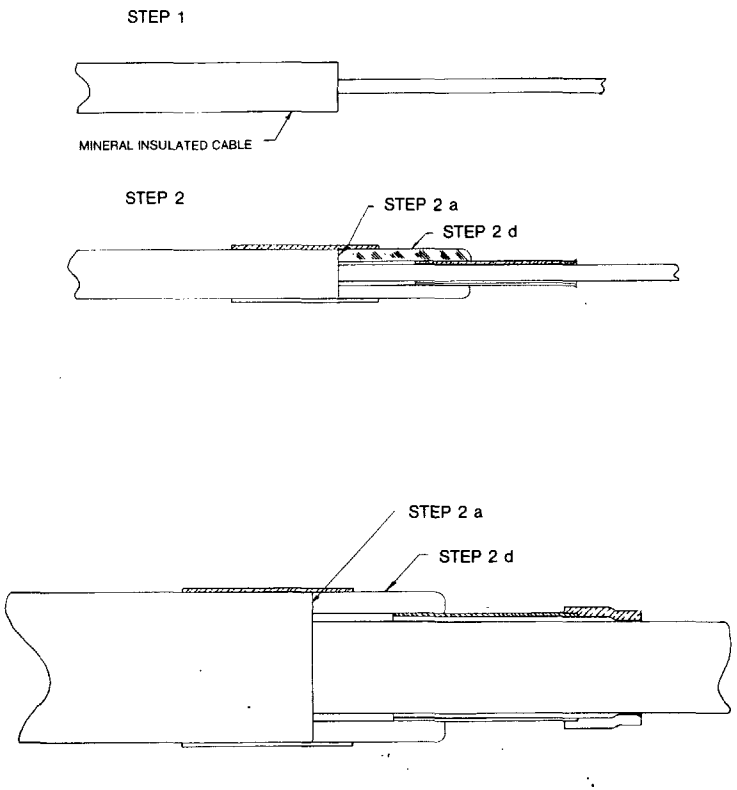
j. AFTER SEALING, CHECK INSULATION RESISTANCE IN ACCORDANCE WITH STEP 1b.

CABLE ASSIGNMENT		
CABLE SIZE	END SEAL ASSEMBLY	
14/2	MS-17020	
14/3	MS-17022	
14/4	MS-17023	
14/7	MS-17024	
8/2	MS-17025	

NOTES:
1. THIS FIGURE SUPERSEDES SECTION 5, SHEET 87, OF DRAWING, NAVSEC NO. 9000-S6202-73980, AND SHEET 1A16 OF DRAWING 803-5001027.

FIGURE 1A16. Cable end sealing of mineral insulated cables.

1A171



CABLE ASSIGNMENT

SIZE	END SEAL
14/1 10/1 4/0	MS-17013 MS-17017 MS-17018

SH 132316960

FIGURE 1A17. Cable end sealing of mineral insulated cables.

STEP 3

a. APPLY FLUX, HEAT AND SILVER BASE BRAZING ALLOY AS OUTLINED IN STEP 2 AND BRAZE THE TERMINAL SLEEVE. CAUTION SHALL BE USED NOT TO DIRECT THE FLAME AGAINST THER CERAMIC PORTION OF THE TERMINAL. ALLOW TO COOL TO AMBIENT TEMPERATURE. REMOVE ALL TRACES OF FLUX.

b. PLACE ASSEMBLY IN A POSITION WHICH WILL PERMIT *BRAZING THE INDIVIDUAL CONDUCTORS.*

c. CHECK INSULATION RESISTANCE IN ACCORDANCE WITH STEP 1b.

d. APPLY TO THE JUNCTION OF THE INDIVIDUAL CONDUCTOR AND THE FLARED CONDUCTOR SLEEVE AN ABSOLUTE MINIMUM OF FLUX (STEP 1b.

e. BRAZE CONDUCTOR TO THE CONDUCTOR SLEEVES AS OUTLINNED IN STEP 2d OBSERVING THE FOLLOWING PRECAUTIONS:

(1) PREHEAT THE CONDUCTOR THOROUGHLY USING A FINE TORCH TIP AND THE CONDUCTOR SLEEVE SLIGHTLY UNTIL FLUX BECOMES FLUID. CAUTION SHALL BE USED NOT TO DIRECT THE FLAME AGAINST THE CERAMIC PORTION OF THE TERMINAL.

(2) A MINIMUM OF BRAZING ALLOY SHALL BE USED TO FILL THE FLARED CUP AT THE JUNCTION OF THE CONDUCTOR AND TERMINAL SLEEVE.

f. ALLOW.BRAZE TO COOL. REMOVE ALL TRACES OF FLUX.

g. INSPECT ALL BRAZES VISUALLY FOR PIN HOLES.

h. AFTER SEALING, CHECK INSULATION RESISTANCE IN ACCORDANCE WITH STEP 1b.

NOTES:

1. THIS FIGURE SUPERSEDES SECTION 5, SHEET 88, OF DRAWING, NAVSEC NO. 9000-S6202-73980, AND SHEET 1A17 OF DRAWING 803-5001027.

STEP 1

a. DETERMINE LENGTH OF BARE CONDUCTOR REQUIRED. THIS LENGTH SHALL PERMIT THE FANNING OUT AND *CUTTING TO SUIT OF INDIVIDUAL CONDUCTORS IN* MULTIPLE CONDUCTOR "MI" CABLE. MARK THIS LENGTH ON CABLE SHEATH USING A COPPER TUBE CUTTER.CUT APPROXIMATELY HALF WAY THROUGH CABLE SHEATH AT THIS POINT. AFTER CUTTING, FLEX SLIGHTLY AND STRIP OFF SHEATH USING CARE NOT TO DAMAGE OR EXCESSIVELY BEND CONDUCTOR(S). THE CABLE SHEATH SHALL BE SQUARE AND FREE OF BURRS.

b. *DETERMINE* INSULATION RESISTANCE OF CABLE EACH CABLE LENGTH SHALL BE MEASURED TO HAVE A MINIMUM READING ON INSULATION RESISTANCE TEST AS SPECIFIED FOR NAVY CABLES.

A CABLE READING BELOW THE MINIMUM INSULATION RESISTANCE SHALL BE MADE TO MEET THE REQUIREMENT BY APPLYING A FLAME TO THE CABLE AT A POINT 12" BACK FROM THE CABLE END, WORKING TOWARD THE END OF THE CABLE UNTIL THE SHEATH GLOWS SLIGHTLY. USING CARE NOT TO DIRECT THE FLAME AGAINST THE EXPOSED MAGNESIA AFTER ALLOWING THE CABLE TO COOL TO AMBIENT TEMPERATURE, THE INSULATION RESISTANCE SHALL AGAIN BE MEASURED.

c. USING FINE GRADE SANDPAPER, CLEAN CABLE SHEATH AND CONDUCTOR(S) 1/8" IN EACH DIRECTION OF JOINT TO BE BRAZED.

STEP 2

a. SLIDE TERMINAL ON TO THE CABLE SHEATH UNTIL THE CERAMIC PORTION OF THE TERMINAL BUTTS AGAINST THE CABLE SHEATH.

b. PLACE ASSEMBLY IN A POSITION TO PERMIT BRAZING. BRAZING IN A VERTICAL POSITION IS NOT RECOMMENDED.

c. APPLY TO JUNCTION OF THE TERMINAL SLEEVE AND THE CABLE SHEATH AN ABSOLUTE MINIMUM OF LOW TERMPERATURE GRAZING FLUX, SPEC O-F-499 ("HANDY-FLUX OR EQUIV.")

d. USING OXY-ACETYLENE OR HYDROGEN TORCH FLAME, PREHEAT THE CABLE SHEATH THOROUGHLY AND THE TERMINAL SLEEVE SLIGHTLY , UNTIL THE FLUX BECOMES FLUID.

e. IF THERE HAS BEEN A TIME LAG OF 15 MINUTES BETWEEN *THE BRAZING OF THE OUTER SLEEVE* AND STRIPPING THE CABLE, CHECK INSULATION RESISTANCE WITH STEP 1b FIGURE 1A16.

f. USING A SILVER BASE BRAZING ALLOY 1/16" DIA. WIRE, SPEC QQ-B-654 GR IV ("EASY-FLO TYPE IV OR EQUIV.") BRAZE TERMINAL SLEEVE TO CABLE SHEATH, USING A MINIMUM OF HEAT. ALLOW BRAZE TO COOL TO AMBIENT TEMPERATURE. REREMOVE ALL TRACES OF FLUX.

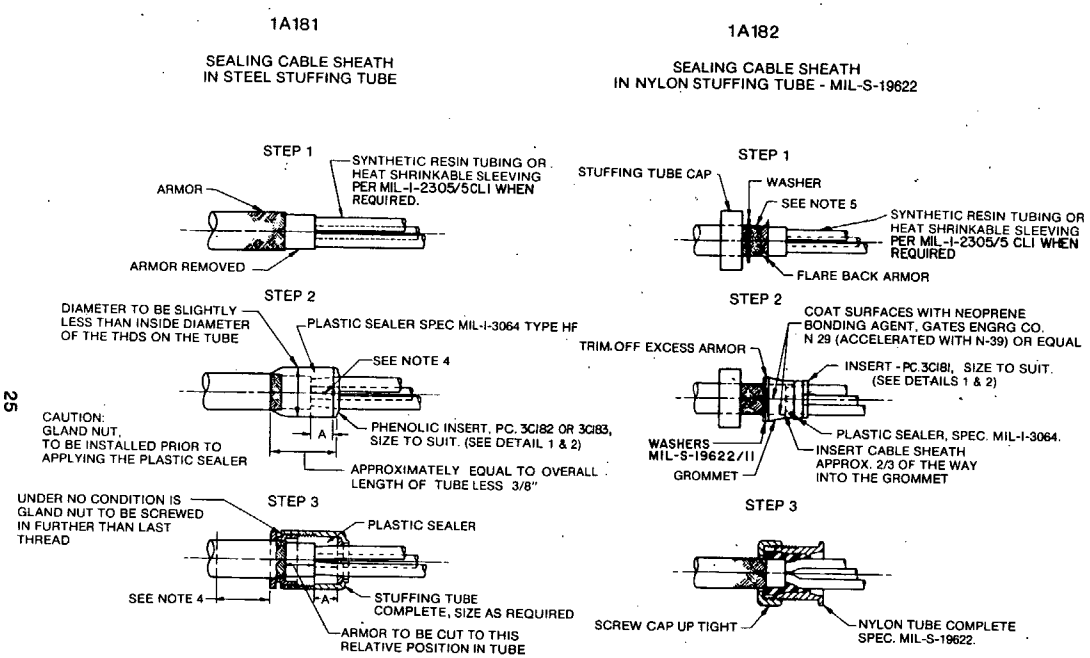
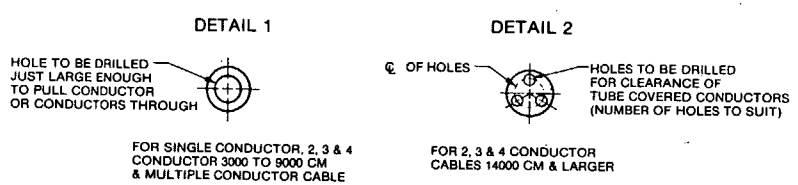


TABLE "C"

STEPS 2 & 3 "A" DIMENSION			
TERM TUBE SIZE	"A" DIM	TERM TUBE SIZE	"A" DIM
A	5/8"	N	7/8"
B	5/8"	P	7/8"
C	5/8"	R	7/8"
D	5/8"	S	1-1/2"
E	5/8"	T	1-1/2"
F	5/8"	V	1-1/2"
G	5/8"	W	1-1/2"
J	5/8"	X	1-1/2"
K	7/8"	Y	1-1/2"
L	7/8"	Z	1-1/2"
M	7/8"	AA	1-1/2"



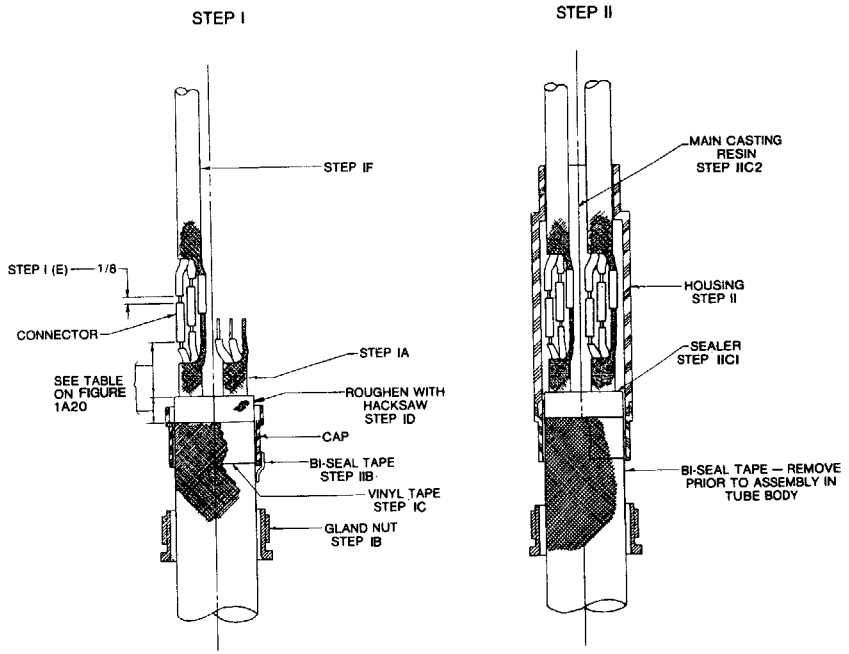
SH 132316961

FIGURE 1A18. Cable and sealing using stuffing tubes.

NOTES:

1. SYNTHETIC RESIN TUBING, SPEC. MIL-I-631 TYPE F, GRADE A, FORM U, OR HEAT SHRINKABLE SLEEVING PER MIL-I-23053/5 CLASS 1, IS NOT REQUIRED FOR MULTIPLE CONDUCTOR CABLE OR 2, 3 AND 4 CONDUCTOR CABLE 3000 TO 23000 CM.
2. SPREAD CONDUCTORS. APPLY PLASTIC SEALER TIGHTLY IN BETWEEN INDIVIDUAL CONDUCTORS BEING SURE THAT THERE IS A CUSHION OF PLASTIC SEALER AROUND AND BETWEEN INDIVIDUAL CONDUCTORS. PULL CONDUCTORS TOGETHER AND INSTALL INSERT.
3. RIGIDLY SECURE THE CABLE APPROX. 3" FROM METAL TUBE BEFORE THE GLAND NUT IS SET UP TO PREVENT THE CABLE FROM BEING FORCED OUT OF THE STUFFING TUBE BY THE PRESSURE SET UP BY THE PLASTIC SEALER WHEN THE GLAND NUT IS TIGHTENED. (NOT REQUIRED FOR NYLON TUBES.)
4. WHERE CABLE ARMOR GROUNDING IS REQUIRED, A GROUND STRAP MAY BE INSTALLED.
5. THIS FIGURE SUPERSEDES SECTION 4, SHEET 97, OF DRAWING, NAVSEC NO. 9000-S6202-73980, AND SHEET 1A18 OF DRAWING 803-4803-5001027.

1A191



SH 132316962

INSTRUCTIONS

STEP I

A. PREPARE CABLE END BY EXPOSING WIRES AND CUTTING BACK ARMOR AS INDICATED.
B. SLIDE GLAND NUT AND CAP ONTO THE CABLE.
C. CUT BACK ARMOR (ARMORED TYPES) AS INDICATED AND SECURE WITH TAPE AS REQUIRED.
D. ROUGHEN UP EXPOSED AREA OF CABLE SHEATH WITH A HACKSAW BLADE.
E. CRIMP INSULATED CONNECTORS ON THE CONDUCTORS LEAVING 1/8 INCH OF THE BARE CONDUCTOR EXPOSED. ON SHIELDED CONDUCTORS, CUT AND FRAY THE SHIELDING BACK, TWIST TOGETHER AND TREAT AS A SEPARATE CONDUCTOR AS INDICATED.
F. CRIMP EXTENSION WIRES TO THE CONNECTORS IN THE SAME MANNER AS INDICATED ABOVE, MAINTAINING PROPER COLOR CODING AND/OR LABELING FOR IDENTIFICATION.
NOTE: EXTENSION WIRES MAY BE OBTAINED BY STRIPPING A SECTION OF CABLE SIMILAR TO THAT BEING END SEALED.

STEP II

A. ROUGHEN THE INTERIOR HOUSING WITH ABRASIVE CLOTH OR PAPER.
B. POSITION CAP AND HOUSING TOGETHER ON CABLE AS INDICATED. SECURE CAP IN PLACE WITH TAPE TO PREVENT RESIN FROM LEAKING THROUGH.
C. WITH CAP AND HOUSING ASSEMBLED AS SHOWN CLAMP THE ASSEMBLY IN A VERTICAL POSITION (CABLE END DOWN· EXTENSION WIRES UP FILL CABLES WITH CASTING RESIN AS FOLLOWS:
   1. FOR TTRSA TYPE CABLES: POUR A 1/8 to 1/4 LAYER OF (SEALER) EPON #828" MIXTURE INTO THE HOUSING. ALLOW TO STAND APPROXIMATELY ONE HOUR AT TEMPERATURES ABOVE 40° F, THEN CONTINUE FILLING HOUSING AS DESCRIBED IN PARAGRAPH (2) BELOW.
   2. FOR ALL CABLES: FILL WITH (MAIN CASTING RESIN) AN EPOXY RESIN #84 x 20 MIXTURE. ALLOW THE MIXTURE TO SETTLE FOR 20 MIN. AND POUR IN MORE MIXTURE TO BRING THE LEVEL TO THE TOP OF THE HOUSING.
D. ALLOW THE EPOXY FILLED ASSEMBLY TO SET FOR APPROXIMATELY 4 HOURS AT A TEMPERATURE ABOVE 60° F, THE ASSEMBLY CAN THEN BE INSTALLED IN THE STUFFING TUBE. IF AT ANY TIME DURING THE CURING PROCESS THE AMBIENT TEMPERATURE FALLS BETWEEN 40° AND 60° F, ALLOW THE ASSEMBLY TO SET FOR 8 HOURS PRIOR TO INSTALLATION IN ITS STUFFING TUBE.

MIXING INSTRUCTIONS

1. MATERIALS
   A. EPON RESIN #828 — MANUFACTURED BY SHELL CHEMICAL CORP.
   B. EPOXY RESIN #84 X 20 — MANUFACTURED BY STANLEY CHEMICAL COMPANY, EAST BERLIN, CONNECTICUT.
   C. ACTIVATOR #90 X 3 (DIETHYLENE-THIAMINE) — MANUFACTURED BY STANLEY CHEMICAL COMPANY, EAST BERLIN, CONNECTICUT.
2. PRECAUTIONS
   A. CAUTION SHOULD BE USED TO INSURE THAT ALL MATERIALS AND PARTS USED IN THIS PROCESS ARE CLEAN AND FREE OF GREASE, OIL, AND OTHER DELETERIOUS MATTER PRIOR TO USE. THE MIXING CONTAINERS USED FOR THE EPOXY RESIN AND ACTIVATOR SHOULD BE CLEAN AND SHOULD BE DISCARDED AFTER USE.
   B. THE FOLLOWING SAFETY PRECAUTIONS SHOULD BE FOLLOWED TO PROTECT PERSONNEL FROM TOXIC EFFECTS OF THE AMINE ACTIVATOR.
      1. AVOID CONTACT WITH THE SKIN AND EYES. USE PROTECTIVE SKIN CREAMS, GLOVES AND GOGGLES AS NECESSARY. USE SOAP AND WATER TO REMOVE THE ACTIVATOR FROM THE SKIN. THE EYES SHOULD BE RINSED WITH COPIOUS AMOUNTS OF FRESH WATER AND MEDICAL AID OBTAINED.
      2. DO NOT INHALE FUMES. AMPLE VENTILATION SHOULD BE PROVIDED TO REDUCE TOXIC VAPOR CONCENTRATIONS
      3. GOOD HOUSEKEEPING IS VERY IMPORTANT. PROMPTLY CLEAN UP ALL DRIPPINGS, WASTE AND DEPOSITS ON TOOLS.

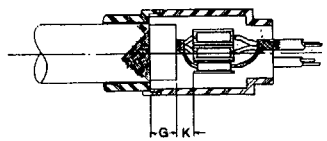
NOTES:
1. VINYL ELECTRICAL TAPE SHOULD BE 1/2" WIDE STOCK NO. G5970-188-5476, CONFORMING TO SPEC. MIL-I-24931.
2. BI-SEAL SELF BONDING TAPE, OR EQUIVALENT SHALL BE 3/4" WIDE, 10 MILS THICK AS MANUFACTURED BY BISHOP MANUFACTURING CORPORATION, 100 CANFIELD ROAD, CEDAR GROVE, N.J.
3. TUBES SHALL BE IN ACCORDANCE WITH MIL-S-24235/7&8.
4. THIS FIGURE SUPERSEDES SECTION 5, SHEET 5, OF DRAWING, NAVSEC NO. 9000-S6202-73980, & SHEET 1A19 OF DRAWING 803-5001027.

MIXING INSTRUCTIONS(CONTINUED)

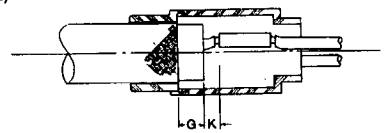
4. IF ANY INDIVIDUAL WORKER SHOWS A PERSONAL SENSITIVITY TO THE EPOXY RESIN OR ACTIVATOR, HE SHOULD BE REMOVED IMMEDIATELY FROM THIS WORK AND REFERRED TO THE MEDICAL DEPARTMENT.
3. EPON RESIN #828 (SEALING RESIN)
   A. ADD 100 PARTS BY WEIGHT OF EPON #828 TO 10 PARTS BY WEIGHT OF ACTIVATOR 90 X 3 AND STIR UNTIL THOROUGHLY MIXED.
4. EPOXY RESIN #84 X 20 (MAIN CASTING RESIN)
   A. ADD 100 PARTS BY WEIGHT OF EXPOXY RESIN #84 X 20 TO 10 PARTS BY WEIGTH OF ACTIVATOR #90 X 3 AND STIR UNTIL THOROUGHLY MIXED. POUR THIS MIXTURE INTO A CLEAN PAPER CUP (DO NOT SCRAPE THE SIDES OF THE FIRST CUP WHEN TRANSFERRING THE MIXTURE) AND ALLOW TO STAND FOR 10 MINUTES. THIS WILL ALLOW ANY AIR BUBBLES TO RISE TO THE TOP. SCRAPE THE BUBBLES FROM THE TOP AND THE MIXTURE IS READY FOR USE.

FIGURE 1A19. Cable end sealing for inboard Pressure Proof installations on submarines.

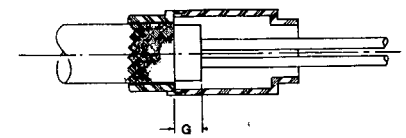
IA201
SHIELDED CABLES (SHIELDS SEPARATE)



IA202
CABLES WITHOUT SHIELDS



IA203
CABLES WITHOUT ENDSEAL



IA204

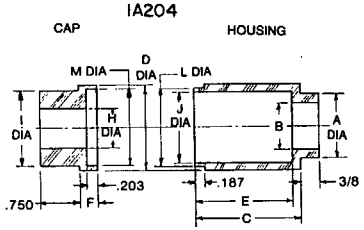


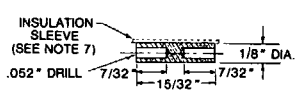
TABLE OF DIMENSIONS

PIECE NO.	TUBE SIZE	A	B	C	D	E	F	G	H	I	J	K	±.001 L	±.001 M
IA204-A	A	.548	.437	1.562	.833	1.500	.250	1/2	3/8	.687	.625	1/4	.719	.723
IA204-B	B	.734	.625	1.625	1.045	1.500	.312	1/2	3/8	.844	.812	1/4	.908	.910
IA204-C	C	.984	.875	2.000	1.351	1.875	.312	1/2	3/8	1.125	1.125	3/8	1.250	1.254
IA204-D	D	.984	.875	2.594	1.351	2.469	.312	1/2	3/8	1.125	1.125	3/8	1.250	1.254
IA204-E	E	1.203	1.062	2.000	1.583	1.875	.312	1/2	3/8	1.437	1.375	3/8	1.469	1.473
IA204-F	F	1.545	1.437	2.000	2.015	1.875	.312	1/2	3/8	1.710	1.807	7/16	1.901	1.905

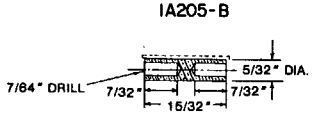
CABLE ASSIGNMENT

TUBE SIZE DWG. 73902	CABLE	O.D.	CONNECTOR PC. NO.	CAP AND HOUSING ASSY.
A	DSGA-3	.441	IA205A	IA204A
B				
C	TTRSA-2	.740	IA205AA	IA204C
	TTRSA-4	.800	IA205AA	
	TTRSA-6	.840	IA205AA	
D				
E	TTRSA-8	1.050	IA205AA	IA204E
	TTRSA-10	1.140	IA205AA	
F	TTRSA-16	1.250	IA205AA	IA204F

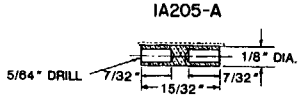
IA205-AA



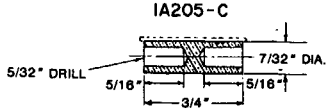
IA205-B



IA205-A



IA205-C



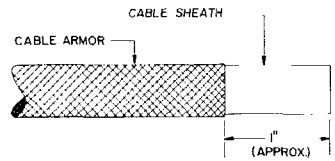
SH 132316963

NOTES:

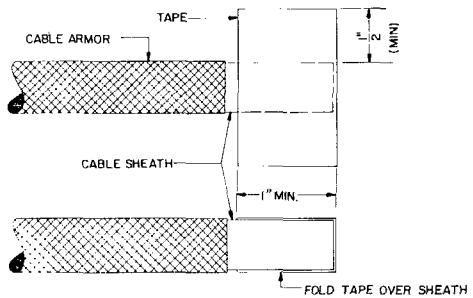
1. END SEALS SHOWN IN THIS FIGURE ARE INTENDED FOR USE ON NON-WATERTIGHT CABLES.
2. EPOXY END SEALS SHALL NOT BE USED ON ANY OUT-BOARD CABLES.
3. NON-WATERTIGHT CABLES WHICH START AND TERMINATE WITHIN A COMPARTMENT OR WHICH PENETRATE THE PRESSURE HULL THROUGH A PIN TYPE CONNECTOR (SEE FIGURE 3E1). DO NOT REQUIRE END SEALING.
4. WATERTIGHT CABLES SHALL BE UTILIZED WHENEVER POSSIBLE. THE USE OF NON-WATERTIGHT CABLES SHALL BE RESORTED TO ONLY WHEN WATERTIGHT CABLES ARE NOT AVAILABLE OR WHEN THE DESIRED ELECTRICAL CHARACTERISTICS CANNOT BE OBTAINED IN WATERTIGHT CABLES.
5. MATERIAL FOR CAP AND HOUSING (PC 1A204) SHALL BE POLYVINYL CHLORIDE, RIGID.
6. MATERIAL FOR CONNECTOR (PC 1A 205) SHALL CONFORM TO SPEC MIL-E-16366. INSULATION MAY BE LOOSE FITTING PLASTIC SLEEVING MIL-I-631. NOTE: ALTERNATE COMMERICAL PRE-INSULATED CONNECTORS HAVING A SOLID CENTER SECTION (WATER DAM) SUCH AS BURNDY #PSM 18-G5, PSM 18-G1, PS 10G & PS 8CG1 FOR PIECES 1A95AA TO C OR AMP DWG NO. 52575, 52576, 52577 ARE ACCEPTABLE.
7. REAM "H" DIMENSIONS ON CAP PC 1A204 TO OBTAIN A SNUG FIT ON O.D.OF CABLE.
8. TUBES SHALL BE IN ACCORDANCE WITH MIL-S-23235/7&8.
9. THIS FIGURE SUPERSEDES SECTION 5, SHEET 4, OF DRAWING, NAVSEC NO. 9000-S6202-73980, & SHEET 1A20 OF DRAWING 803-5001027.

FIGURE 1A20. Cable end sealing for inboard Pressure Proof installations on submarines.

1A211
(SEE NOTE 1)



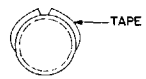
STEP 1
REMOVE ABOUT ONE INCH OF CABLE ARMOR



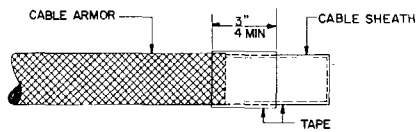
STEP 2
APPLY PRESSURE SENSITIVE TAPE, FED SPEC PPP-T-60, ADHESIVE WATERPROOF SEALING WITH RED CLOTH BACKING. THE WIDTH OF TAPE USED WILL BE AS REQUIRED BY THE SIZE OF CABLE BEING SEALED.

1" WIDE TAPE-NSN 8135-00-074-4966
3" WIDE TAPE-NSN 8135-00-074-4996
6" WIDE TAPE-NSN 8135-00-074-5058

STEP 3
PRESS ENDS OF TAPE TOGETHER



STEP 4
FOLD TAPE ENDS AROUND SHEATH



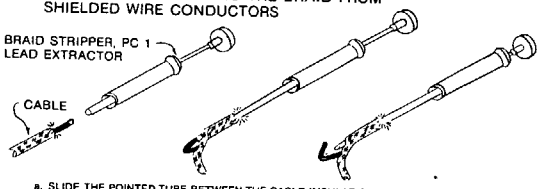
STEP 5
APPLY TWO OR MORE WRAPPINGS OF TAPE, CROSSWISE, WITH A MINIMUM WIDTH OF 3/4 INCH.

NOTES:
1. THIS METHOD APPLIES TO CABLE COILS OR REELS STORED IN A COVERED LOCATION NOT SUBJECT TO ENTRANCE OF WATER OR MOISTURE.
2. THIS FIGURE SUPERSEDES SECTION 4, SHEET 62, OF DRAWING, NAVSEC NO. 9000-S6202-72980, AND SHEET 1A21 OF DRAWING 803-5001027.

SH 132316964

FIGURE 1A21. End sealing cables in coils or reels in covered stowage not subject to entrance of water.

METHOD OF SEPARATING THE BRAID FROM SHIELDED WIRE CONDUCTORS

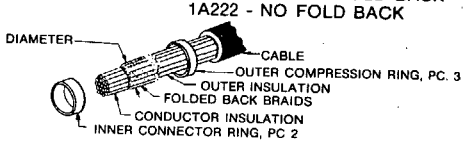


a. SLIDE THE POINTED TUBE BETWEEN THE CABLE INSULATION AND THE METAL BRAID.
b. BEND CABLE AT RIGHT ANGLES UNTIL POINT OF TUBE PROTRUDES THROUGH THE BRAID AND BY MOVEMENT OF TOOL ENLARGE THE HOLE UNTIL OF SUFFICIENT SIZE TO ACCEPT THE INSULATED CORE.
c. INSERT PLUNGER AND PUSH CORE BACK THROUGH THE HOLE IN THE BRAID AS ILLUSTRATED.

1A221

CONDUCTOR SHIELDS OF MULTI-CONDUCTOR CABLE (DOUBLE FOLD METHOD)

SEE 1A231 - SINGLE FOLD BACK
1A222 - NO FOLD BACK

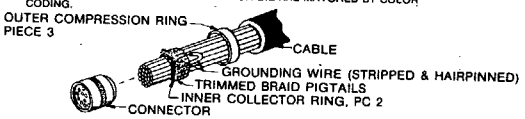


STEP 1 - PREPARATION OF SHIELDED CONDUCTORS

THE INNER CONDUCTOR IS PUSHED THROUGH THE BRAID AND THE BRAID FOLDED BACK. THIS MAY BE DONE WITH A BLUNT INSTRUMENT OR WITH LEAD EXTRACTION TOOL SHOWN ABOVE. FLATTEN THE BRAID PIGTAIL BY HAND AND FOLD BACK AGAINST THE CABLE BUNDLE.

STEP 2 - SELECTION OF RING SIZE

THE INNER COLLECTOR RING PIECE 2, OUTER COMPRESSION RING PIECE 3 AND THE COMPRESSION DIE PIECE 4 SIZES ARE DETERMINED BY MEASURING THE DIAMETER OF THE BUNDLE OVER THE FOLDED BACK BRAIDS. THE COLLECTOR RING WITH THE INSIDE DIAMETER NEAREST THE DIAMETER OF THE CABLE IS SELECTED WITH THE MATCHING SET OF COMPRESSION RING AND COMPRESSION DIE. COLLECTOR AND COMPRESSION RINGS AND COMPRESSION DIE ARE MATCHED BY COLOR CODING.



STEP 3 - ASSEMBLING OF RINGS

THE OUTER COMPRESSION RING IS SLIPPED BACK OVER THE FOLDED BACK BRAIDS. THE INNER COLLECTOR RING IS PLACED OVER THE BRAIDS SO THAT THE COLLECTOR RING IS AS CLOSE TO THE FOLDED END OF THE BRAID AS POSSIBLE. FOLD THE EXPOSED ENDS OF THE BRAID PIGTAILS OVER THE COLLECTOR RING, EVENLY DISTRIBUTE THE BRAIDS AROUND THE PERIPHERY OF THE COLLECTOR RING. TRIM THE ENDS OF THE PIGTAILS EVEN WITH THE EDGE OF THE RING.

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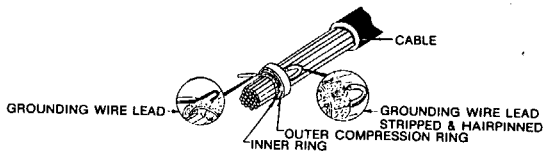
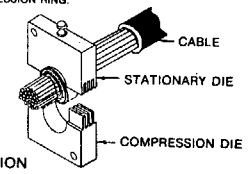


STEP 4 - POSITIONING COMPRESSION RING

POSITION THE COMPRESSION RING OVER THE FOLDED BACK BRAIDS. CAREFULLY LOCATE THE OUTER RING IN THE CENTER OF THE INNER RING. INSERT THE GROUNDING LEAD OR LEADS BETWEEN THE BRAIDS AND THE OUTER COMPRESSION RING.

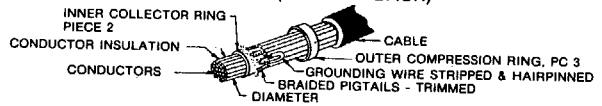


STEP 5 - COMPRESSION

THE ASSEMBLY IS THEN PLACED IN THE INSTALLING TOOL AND THE COMPRESSION RING IS FORCED INTO THE STATIONARY DIE. THE COMPRESSION IS COMPLETED WHEN THE PUMP BYPASSES OR THE GAUGE READS 9800 PSI.

1A222

CONDUCTOR SHIELDS OF MULTI-CONDUCTOR CABLES (NO FOLD BACK)



STEP 1 - PREPARATION OF SHIELDED CONDUCTORS

PREPARE SHIELDED CONDUCTORS AS FOR DOUBLE FOLDED METHOD 1A221 STEP 1 EXCEPT DO NOT FOLD BACK BRAID PIGTAILS.

STEP 2 - SELECTION OF RING SIZE

SELECT THE INNER COLLECTOR RING PIECE 2 WITH THE INSIDE DIAMETER NEAREST TO THE DIAMETER OF THE CONDUCTOR BUNDLE UNDER BRAID PIGTAILS. COMPRESSION RING PIECE 3 AND COMPRESSION DIE PIECE 4 ARE TO BE SELECTED WITH MATCHING COLOR CODE.

STEP 3 - ASSEMBLY OF RINGS

SLIDE OUTER COMPRESSION RING OVER CABLE BUNDLE. PLACE INNER RING UNDER THE BRAID PIGTAILS. FLATTEN PIGTAILS BY HAND AND EVENLY DISTRIBUTE AROUND THE PERIPHERY OF THE INNER RING. TRIM EXCESS BRAIDS EVEN WITH FRONT EDGE OF RING. POSITION OUTER COMPRESSION RING OVER BRAIDS AND INSERT GROUNDING LEAD BETWEEN BRAID AND OUTER RING. CAREFULLY LOCATE THE OUTER RING IN THE CENTER OF THE INNER RING.

STEP 4 - COMPRESSION

SELECT THE PROPER COMPRESSION DIE AND COMPRESS THE ASSEMBLY AS FOR THE DOUBLE FOLD METHOD 1A221 STEP 5.

FIGURE 1A22. Grounding of shields of multiple conductor cables.

NOTES:

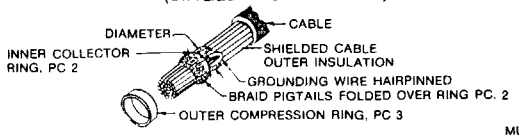
1. TESTS FOR GROUNDING RING CONNECTORS AND NOTE 1, FIGURE 1A23 SHALL APPLY.
2. THIS FIGURE SUPERSEDES SECTION 4, SHEET 134, OF DRAWING, NAVSEC NO. 9000-S6202-73980, AND SHEET 1A22, DRAWING 803-5001027.

MATERIAL

THE FOLLOWING MATERIAL SHALL BE SIMILAR TO THAT FOUND IN THOMAS & BETTS CO., SHIELD-KON INFORMATION BULLETIN S-3.

PC.1 LEAD EXTRACTOR, SIZE AS REQUIRED.
PC.2 INNER COLLECTOR RING SIZE AS REQUIRED (SEE TABLE 1. SHEET 1A23
PC.3 OUTER COMPRESSION RING, SIZE AS REQUIRED. (SEE TABLE 1. FIGURE 1A23
PC.4 INSTALLING DIE, SIZE AS REQUIRED.

1A231
CONDUCTOR SHIELDS OF MULTI-CONDUCTOR CABLE (SINGLE FOLD METHOD)



STEP 1 - PREPARATION OF SHIELDED CONDUCTORS

PREPARE SHIELDED CONDUCTORS AS FOR DOUBLE FOLDED METHOD 1A221 STEP 1 EXCEPT DO NOT FOLD BACK BRAID PIGTAILS

STEP 2 - SELECTION OF RING SIZE

SELECT THE INNER COLLECTOR RING PIECE 2 WITH THE INSIDE DIAMETER NEAREST TO THE DIAMETER OF THE CONDUCTOR BUNDLE OVER BRAIDS BEFORE PIGTAILING. COMPRESSION RING PIECE 3 AND COMPRESSION DIE PIECE 4 ARE TO BE SELECTED WITH MATCHING COLOR CODE.

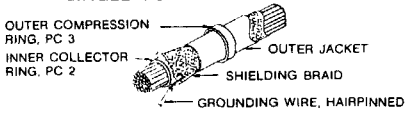
STEP 3 - ASSEMBLY OF RINGS

PLACE THE INNER COLLECTOR RING OVER THE CABLE BUNDLE. FLATTEN THE BRAID PIGTAILS BY HAND AND FOLD BACK OVER INNER COLLECTOR RING. EVENLY DISTRIBUTE THE PIGTAILS AROUND THE PERIPHERY OF THE RING. TRIM EXCESS BRAID EVEN WITH THE BACK EDGE. POSITION OUTER COMPRESSION RING OVER THE BRAIDS. INSERT GROUNDING LEAD BETWEEN BRAID AND OUTER RING. CAREFULLY LOCATE THE OUTER RING IN THE CENTER OF THE INNER RING.

STEP 4 - COMPRESSION

SELECT THE PROPER COMPRESSION DIE AND COMPRESS THE ASSEMBLY AS PER THE DOUBLE FOLD METHOD 1A221 STEP 5.

1A232
CABLE SHIELD OVER MULTIPLE OR SINGLE CONDUCTOR CABLE



STEP 1 - PREPARATION OF SHIELDING BRAID

STRIP BACK OUTSIDE INSULATION OR JACKET WITHOUT CUTTING, NICKING OR BREAKING BRAID STRANDS.

STEP 2 - SELECTION OF RING SIZE

SELECT THE RINGS IN ACCORDANCE WITH THE SINGLE FOLD FORWARD METHOD 1A222 STEP 2.

STEP 3 - ASSEMBLY OF RINGS

SLIDE OUTER RING OVER BRAID BUNDLE. TRIM BRAID TO APPROXIMATELY 1-1/2" FROM JACKET AND FAN SLIGHTLY. SLIDE INNER RING OVER BUNDLED CONDUCTORS AND UNDER THE BRAIDS. GROUNDING LEAD MAY BE INSERTED BETWEEN BRAID AND OUTER RING AS OUTER RING IS ASSEMBLED OVER BRAIDED SHIELD. CAREFULLY LOCATE THE OUTER RING IN THE CENTER OF THE INNER RING.

STEP 4 - COMPRESSION

SELECT THE PROPER COMPRESSION DIE AND COMPRESS THE ASSEMBLY AS PER THE DOUBLE FOLD METHOD 1A221 STEP 5.

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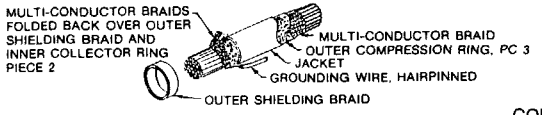
1A233
CONDUCTOR SHIELDS COMBINED WITH CABLE SHIELD INSIDE JACKET



STEP 1 - PREPARATION OF SHIELDED CONDUCTORS

TRIM BRAID TO APPROXIMATELY 1-1/2" FROM JACKET AND FAN SLIGHTLY. PREPARE SHIELDED CONDUCTORS AS FOR DOUBLE FOLDED METHOD 1A221 STEP 1 EXCEPT DO NOT FOLD BACK BRAID PIGTAILS.

STEP 2 - SELECTION OF RING SIZE

SELECT THE RINGS IN ACCORDANCE WITH THE DOUBLE FOLD METHOD 1A221 STEP 2.p

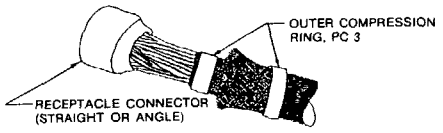
STEP 3 - ASSEMBLY OF RINGS

PLACE THE INNER COLLECTOR RING OVER THE CABLE OUTER SHIELD, THEN FOLD THE OUTER SHIELD BACK OVER THE INNER RING. FLATTEN THE BRAID PIGTAILS BY HAND AND FOLD BACK OVER THE OUTER SHIELD AND INNER RING. PLACE OUTER COMPRESSION RING OVER THE SHIELD AND BRAIDS. INSERT GROUNDING LEAD BETWEEN BRAIDS AND OUTER RING. CAREFULLY LOCATE THE OUTER RING IN THE CENTER OF THE INNER RING.

STEP 4 - COMPRESSION

SELECT THE PROPER COMPRESSION DIE AND COMPRESS THE ASSEMBLY AS PER THE DOUBLE FOLD METHOD 1A221 STEP 5.

1A234
CONDUCTOR SHIELDS COMBINED WITH CABLE ARMOR OR WITH ARMOR ADDED TO UNARMORED CABLE



STEP 1 - RING ASSEMBLY FOR THE MULTI-CONDUCTOR BRAID

FOLD THE OUTER SHIELDING BRAID BACK TO ALLOW THE MULTI-CONDUCTOR BRAID TO BE BANDED BY METHOD 1A221, 1A222, OR 1A231.

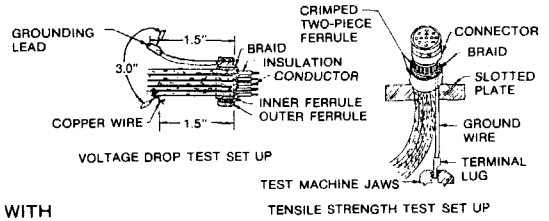
STEP 2 - ASSEMBLY OF THIRD RING

A SECOND OUTER RING IS PLACED OVER THE OUTER SHIELDING BRAID. THIS RING MUST BE LARGE ENOUGH TO GO OVER THE ASSEMBLY IN STEP 1 PLUS THE OUTER BRAID. FOLD THE OUTER SHIELDING BRAID OVER THE COMPRESSED GROUNDING RING. TRIM OUTER BRAID EVEN WITH THE INNER RING. CAREFULLY LOCATE THE OUTER RING IN THE CENTER OF THE GROUNDING ASSEMBLY.

STEP 3 - COMPRESSION

SELECT THE PROPER COMPRESSION DIE AND COMPRESS THE SECOND OUTER RING OVER THE FIRST OUTER RING.

TESTS FOR GROUNDING RING CONNECTORS



STEP 1 - VOLTAGE DROP TEST

MILLIVOLT DROP ACROSS THE COMPRESSED CONNECTION FROM THE INTERSECTION OF THE TONGUE AND THE BARREL OF THE GROUNDING WIRE TERMINAL LUG TO A POINT ON EACH SHIELD WIRE. USING ONE AMPERE FOR TEST CURRENTS WITH ASSEMBLY AT ROOM TEMPERATURE. SHALL BE IN ACCORDANCE WITH TABLE 1.

STEP 2-TEMPERATURE CYCLING

PREPARE CONNECTIONS WITH MINIMUM AND MAXIMUM BRAID SHIELD FILL AND SUBJECT THEM TO ALTERNATE HEATING-COOLING CYCLES. COMPLETE THE CYCLE BY HEATING TO 300 DEGREE F IN AIR CIRCULATION OVEN FOR 30 MINUTES, COOLING TO 85 DEGREE F FOR 30 MINUTES. PERFORM VOLTAGE DROP, STEP 1, BEFORE AND AFTER HEAT CYCLING TO INDICATE QUALITY OF THE JOINT.

STEP 3 - TENSILE STRENGTH

THE TENSILE STRENGTH BETWEEN THE GROUND WIRE AND COMPRESSION RINGS AND INDIVIDUAL BRAIDS AND RINGS SHALL BE IN ACCORDANCE WITH TABLE 1.

TABLE 1

INNER COLLECTOR RING		OUTER COMPRESSION RING		1/8" BRAID APPROX NO. BRAIDS	NUMBER GROUND LEADS	AVERAGE m'V. DROP 1 AMP	AVERAGE TENSILE STRENGTH LBS.
I.D.	O.D.	I.D.	O.D.				
.430	.500	.590	.670	5 TO 14	2 # 20 STR	1.03	39.6
.550	.620	.710	.790	5 TO 17	2 # 20 STR	1.04	33.9
.670	.750	.840	.920	5 TO 20	2 # 20 STR	0.77	35.9
.810	.880	1.010	1.090	5 TO 23	2 # 20 STR	0.86	38.6
.920	1.000	1.130	1.210	5 TO 27	2 # 20 STR	0.89	30.0
1.040	1.120	1.250	1.330	5 TO 30	2 # 20 STR	0.83	39.0
1.122	1.192	1.332	1.412	5 TO 34	2 # 20 STR	0.82	36.0
1.224	1.294	1.440	1.520	5 TO 37	2 # 20 STR	0.90	36.5
1.353	1.423	1.563	1.643	5 TO 41	2 # 20 STR	0.87	35.4
1.425	1.545	1.670	1.750	5 TO 43	2 # 20 STR	0.73	31.0
1.550	1.670	1.795	1.875	5 TO 47	2 # 20 STR	0.70	31.0
1.675	1.795	1.920	2.000	5 TO 52	2 # 20 STR	0.71	30.0
1.800	1.920	2.045	2.125	5 TO 56	2 # 20 STR	0.71	30.0
1.925	2.045	2.170	2.250	5 TO 62	2 # 20 STR	0.69	29.0

NOTES:

1. INSTALLING ACTIVITY SHALL RUN DIELECTRIC AND INSULATION RESISTANCE TESTS IN ACCORDANCE WITH MIL STD 202, METHODS 301 AND 302, ON SAMPLES OF EACH DIFFERENT RING SIZE AND METHOD FOR EACH TYPICAL CABLE TYPE TO ASCERTAIN NO DAMAGE IS BEING DONE TO DON CONDUCTOR OR CABLE INSULATION.
2. THIS FIGURE SUPERSEDES SECTION 4, SHEET 135, OF DRAWING, NAVSEC NO. 9000-S6202-72980, AND SHEET 1A23 OF DRAWING 803-5001027.

FIGURE 1A23. Grounding of shields of multiple conductor cable.

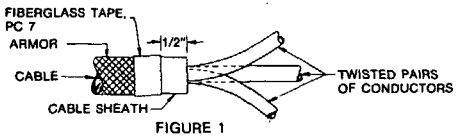


FIGURE 1
END PREPARATION OF CABLE SHEATH

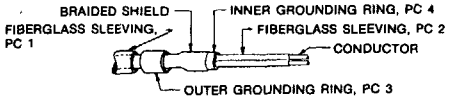


FIGURE 2
PREPARATION OF CONDUCTORS

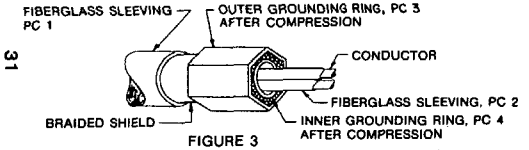


FIGURE 3
PREPARING BRAIDED SHIELD TERMINATION
WHEN GROUNDING IS NOT REQUIRED

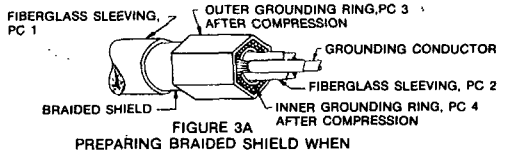


FIGURE 3A
PREPARING BRAIDED SHIELD WHEN
GROUNDING IS REQUIRED

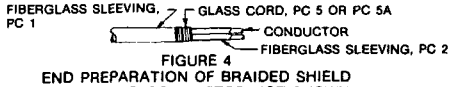


FIGURE 4
END PREPARATION OF BRAIDED SHIELD
(GROUNDING CONDUCTOR NOT SHOWN)

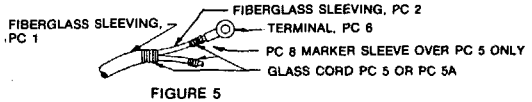


FIGURE 5
END PREPARATION OF CONDUCTOR
(GROUNDING CONDUCTOR NOT SHOWN)

STEP 1 (SEE FIGURE 1)

WRAP CABLE WITH PLASTIC TAPE AT POINT WHERE CABLE ARMOR IS TO BE CUT. CUT THROUGH TAPE AND ARMOR BEING CAREFUL NOT TO INJURE THE RUBBER CABLE SHEATH. REMOVE THE TAPE FROM THE EXCESS ARMOR AND SLIP THE ARMOR OFF END OF CABLE. REMOVE THE REMAINDER OF PLASTIC TAPE AND REPLACE WITH FIBERGLASS TAPE, PC 7. CUT CABLE SHEATH 1/2" FROM END OF GLASS TAPE AND REMOVE ALONG WITH ALL OTHER MATERIAL OUTSIDE OF THE GLASS BRAID (OVER THE BRAIDED SHIELD) ON EACH SHIELDED PAIR. THE GLASS BRAID SHALL ONLY BE CUT BACK (AND SECURED WITH TAPE, PC 7) AS NECESSARY TO INTALL PC 3 ON SHIELD.

STEP 2 (SEE FIGURE 2)

REMOVE A SUFFICIENT LENGTH OF THE BRAIDED SHIELD TO ALLOW FOR SEPARATION OF INDIVIDUAL CONDUCTORS. ENCLOSE SHIELDED PAIR OF CONDUCTORS WITH FIBERGLASS SLEEVING, PC 1. LENGTH TO BE CUT WILL BE DETERMINED BY DISTANCE FROM BUTT OF CABLE TO 1/2" BEYOND END OF BRAIDED SHIELD. FORCE LENGTH OF FIBERGLASS SLEEVING TOWARD BUTT FAR ENOUGH FOR END OF SLEEVING TO CLEAR END OF BRAIDED SHIELD AND SECURE TEMPORARILY WITH PLASTIC TAPE. SLIDE OUTER GROUNDING RING, PC. 3, OVER CONDUCTORS AND BRAIDED SHIELD. ENCLOSE SEPARATE CONDUCTORS WITH FIBERGLASS SLEEVING, PC. 2. SLIDE INNER GROUNDING RING, PC. 4, OVER FIBERGLASS SLEEVING ENCLOSING CONDUCTORS TO A POINT WHERE BRAIDED SHIELD MAY BE DRAWN OVER INNER RING. SEE GROUNDING METHODS 1A22 & 1A25.

STEP 3 (SEE FIGURE 3)

DRAW THE BRAIDED SHIELD AND THE OUTER GROUNDING RING, PC 3, OVER THE INNER GROUNDING RING, PC. 4, TO A POINT WHERE THEIR EDGES ARE IN ALIGNMENT. BE CERTAIN THAT THE FIBERGLASS SLEEVING, PC. 2, ON CONDUCTORS IS WELL UNDER THE INNER GROUNDING RING, PC. 4. COMPRESS GROUNDING RINGS IN PLACE USING A THOMAS AND BETTS CO. SHURESTAKE TOOL OF THE PROPER WT 400 SERIES, OR EQUAL.

ALTERNATE STEP 3 (SEE FIGURE 6)

AS AN ALTERNATE TO USE OF INNER & OUTER RINGS USE SIZE II (OR SIZE TO SUIT) FIBERGLASS SLEEVING, MIL-I-3190/6, CLASS 200, TYPE D, CATEGORY C, EXCEPT SILICONE OIL IMPREGNATED IN PLACE OF SILICONE RUBBER COATED, BENTLY-HARRIS MFG. COMPANY CATALOG NO. 0211001M OR EQUAL. USE ON THE INDIVIDUAL LEADS EXTENDING 0.25 INCHES UNDER THE COPPER BRAID OF THE TWISTED PAIRS. COVER THE OVERLAPPED JOINT WITH TAPE, PC. 7, AND SERVE WITH GLASS CORD, PC. 5 OR 5A OVER TAPE.

STEP 3A (SEE FIGURE 3A)

WHEN GROUNDING OF BRAIDED SHIELD IS REQUIRED, A GROUNDING CONDUCTOR AT LEAST AS LARGE IN CIRCULAR MIL AREA AS THE INDIVIDUAL CONDUCTOR SHALL BE USED AND THE BARE PORTION OF THE CONDUCTOR IS TO BE INSERTED BETWEEN THE SHIELDED BRAID AND THE OUTER RING AND INCLUDED IN THE COMPRESSION PROCESS. WHERE GROUNDING TAKES PLACE AT EQUIPMENT END OF CABLE, AND HIGH TEMPERATURE IS A FACTOR, GROUNDING CONDUCTOR SHALL BE OF P1 CABLE.

STEP 4 (SEE FIGURE 4)

REMOVE PLASTIC TAPE FROM FIBERGLASS SLEEVING, PC. 1. DRAW SLEEVING OVER COMPRESSED GROUNDING RING AND CONDUCTORS AND SERVE WITH GLASS CORD, PC. 5 OR PC. 5A. SLEEVING SHALL ALSO BE SERVED WITH GLASS CORD, PC. 5 OR PC. 5A AT BUTT END OF CABLE.

STEP 5 (SEE FIGURE 5)

SECURE TERMINAL, PC. 6, TO CONDUCTOR. DRAW CONDUCTOR SLEEVING DOWN AND SECURE TO TERMINAL WITH INSULATION GRIP OF TERMINAL, FOR TYPE WTG LUG TERMINAL ONLY. SERVE CONDUCTOR SLEEVING WITH GLASS CORD, PC. 5 OR PC. 5A AT TERMINAL CONNECTION.

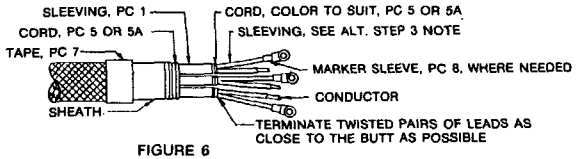


FIGURE 6
PREPARING BRAIDED SHIELD TERMINATION
WHEN GROUNDING IS NOT REQUIRED

MATERIAL

PC.1 FIBERGLASS SLEEVING, SPEC. MIL-I-3190 /6, CLASS 200, TYPE D, CATEGORY C. EXCEPT SILICONE OIL IMPREGNATED IN LIEU OF SILICONE RUBBER COATED. NATURAL COLOR, SIZE 3 (OR SIZE TO SUIT), SINGLE WALL. BENTLY HARRIS MFG. CO., CATALOG NO. 0203001M, OR EQUAL.

PC.2 FIBERGLASS SLEEVING, SPEC. MIL-I-3190 /6, CLASS 200, TYPE D. CATEGORY C. EXCEPT SILICONE OIL IMPREGNATED IN LIEU OF SILICONE RUBBER COATED, NATURAL COLOR, SIZE 12 (OR SIZE TO SUIT), SINGLE WALL, BENTLY HARRIS MFG. CO., CATALOG NO. 0212006M, OR EQUAL.

PC.3 OUTER GROUNDING RING, THOMAS AND BETTS COMPANY STYLE GSC, OR EQUAL, EXCEPT THAT PRE-INSULATED TYPE UNIRINGS SHALL NOT BE INSTALLED WHERE THE TEMPERATURE MAY EXCEED 250°F.

PC.4 INNER GROUNDING RING, THOMAS AND BETTS COMPANY, STYLE GSS-X, OR EQUAL, EXCEPT THAT PRE-INSULATED TYPE UNIRINGS SHALL NOT BE INSTALLED WHERE THE TEMPERATURE MAY EXCEED 250°F. (SEE NOTE 5).

PC.5 FOR HIGH TEMPERATURE APPLICATION OVER 93°C (200°F) USE GLASS CORD MIL-Y-1140, TYPE EC9-2-U, .020 TO .026 DIA. (PRIOR TO TREATMENT) NATURAL COLOR, EXCEPT THAT IT SHALL BE SILICONE TREATED IN PLACE OF CORD COLOR CODING FOR CONDUCTOR ENDS, USE MARKER SLEEVE PC. 8 OVER SHORT SERVING OF PC. 5 AS SHOWN IN FIG'S. 5 AND 6. MARK WITH APPROPRIATE DESIGNATION BY STAMPING OR HAND LETTERING WITH MARKING INK (AND THEN BAKING OR SEALING WITH TEFLON SPRAY) OR BY AN EQUIVALENT (APPROVED) HIGH TEMPERATURE METHOD. WHERE CONDUCTOR SLEEVING IS SECURED WITH INSULATION GRIP OF TERMINAL, THE SHORT SERVING OF PC. 5 MAY BE OMITTED.

PC.5A FOR TEMPERATURE APPLICATION LESS THAN 93°C (200°F), USE GLASS CORD, MIL-I-3158, TYPE SR-5, COLORS BLACK, GREEN, RED AND WHITE.

PC.6 SELECT APPROPRIATE MIL-E-15386 OR MIL-T-7928 (TYPE 1) WT OR WTG LUG TERMINAL. LUG TERMINALS ON CONDUCTORS FOR RESISTANCE TEMPERATURE DETECTORS AND VALVE POSITION TRANSMITTERS OR OTHER UNITS WHERE AMBIENT TEMPERATURE IS 175°C (347°F) OR ABOVE SHALL BE SILVER PLATED.

PC.7 FIBERGLASS TAPE, PRESSURE SENSITIVE, TYPE GFT, MIL-I-15126 OR SILICONE TAPE, PRESSURE SENSITIVE, MIL-I-19166, EXCEPT THAT THE MIL-I-15126 TAPE SHALL NOT BE INSTALLED WHERE THE TEMPERATURE MAY EXCEED 250°.

PC.8 MARKER SLEEVE, MIL-I-3190C/6, CLASS 200, TYPE D, CATEGORY C, SIZE TO SUIT. MARK WITH APPROPRIATE DESIGNATION BY STAMPING OR HAND LETTERING WITH MARKING INK (AND THEN BAKING OR SEALING WITH TEFLON SPRAY) OR BY AN EQUIVALENT (APPROVED) HIGH TEMPERATURE METHOD.

PC.9 MARKER SLEEVES TO BE PRINTED WITH INDELIBLE INK SPEC. TT-I-1795 OR EQUIVALENT.

NOTES

1. SYNTHETIC RESIN TUBING (FORM U), MIL-I-631, MAY BE USED IN LIEU OF GLASS CORD FOR FINISHING CONDUCTOR ENDS IN ENCLOSURES WHERE NORMAL TEMPERATURES ARE ANTICIPATED.
2. FIBERGLASS SLEEVING, PC. 1 (ONLY), SHALL NOT BE REQUIRED IN COMPONENTS SUCH AS CONNECTION BOXES AND SWITCHBOARDS WHERE POSSIBILITY OF MECHANICAL DAMAGE IS NOT EVIDENT.
3. WIRE IDENTIFICATION MARKING INK SHOULD BE TYPE 8646, PURPLE. MANUFACTURED BY THE MARKEM MACHINE CO., KEENE N.H., OR EQUAL.
4. USE OF STUFFING TUBES INSTALLED IN REACTOR EQUIPMENT EXPOSED TO HIGH TEMPERATURE IS SHOWN ON FIGURE 1B7.
5. SELECT THE PROPER INNER GROUNDING RING, PC. 4, TO BE .005 TO .010 LARGER THAN THE CONDUCTOR INSULATION AND FIBERGLASS SLEEVING, PC. 2. THE OUTER GROUNDING RING, PC. 3, SHOULD BE SELECTED FOR A SNUG FIT OVER THE BRAIDED SHIELD (ALLOWING FOR THE INNER GROUNDING RING, PC. 4, BRAIDED SHIELD AND GROUNDING WIRE OR WIRES).
6. LUG TERMINALS, PC. 6, TYPE 1 OR WT, SHALL BE CRIMPED AND THEN SOLDERED TO THE CONDUCTOR FOR ALL PRIMARY PLANT RESISTANCE TEMPERATURE DETECTOR CABLES. SOLDER TYPE AT DETECTOR END SHALL BE Sb5-W-R-P3, SPEC. QQ-S-571, AND TYPE Sn60-W-R-P3, SPEC. QQ-S-571, AT THE TERMINAL BOX END OF THE CABLE.
7. PI CABLE HANDLING: DUE TO THE NATURE OF ITS CONSTRUCTION, PI CABLE IS MORE SUSCEPTIBLE TO INTERNAL DAMAGE WHEN HANDLED IMPROPERLY THAN ARE OTHER TYPES OF CABLE. THEREFORE, THE FOLLOWING GENERAL HANDLING REQUIREMENTS MUST BE STRICTLY ADHERED TO FOR PI CABLE:
   A. NEVER BEND THE CABLE TIGHTER THAN ITS MINIMUM BEND RADIUS.
   B. WHENEVER REMOVING CABLE FROM A REEL OR COILING OR UNCOILING PRE-CUT LENGTHS, EXERCISE EXTREME CARE TO INSURE THAT THE CABLE IS NOT KINKED OR TWISTED.
   C. ALWAYS UNROLL CABLE FROM A REEL OR COIL, SINCE LOOPING IT OFF THE SIDE CAUSES HARMFUL KINKS.
   D. NEVER USE MECHANICAL MEANS, SUCH AS ROPE OR CHAIN FALLS TO PULL CABLE TAUT.
   E. ENSURE THAT CABLES ARE PROTECTED FROM MECHANICAL DAMAGE AT ALL TIMES, ESPECIALLY IN AREAS WHERE PERSONNEL WOULD BE LIKELY TO STEP ON, OR PLACE OBJECTS UPON THE CABLE.
8. THIS FIGURE SUPERSECES SECTION 4, SHEET 102 AND SECTION 5, SHEET 94 OF DRAWING NAVSEC NO. 9000-S6202 -73980, AND SHEET 1A24 OF DRAWING 803-5001027.

SH 132316967

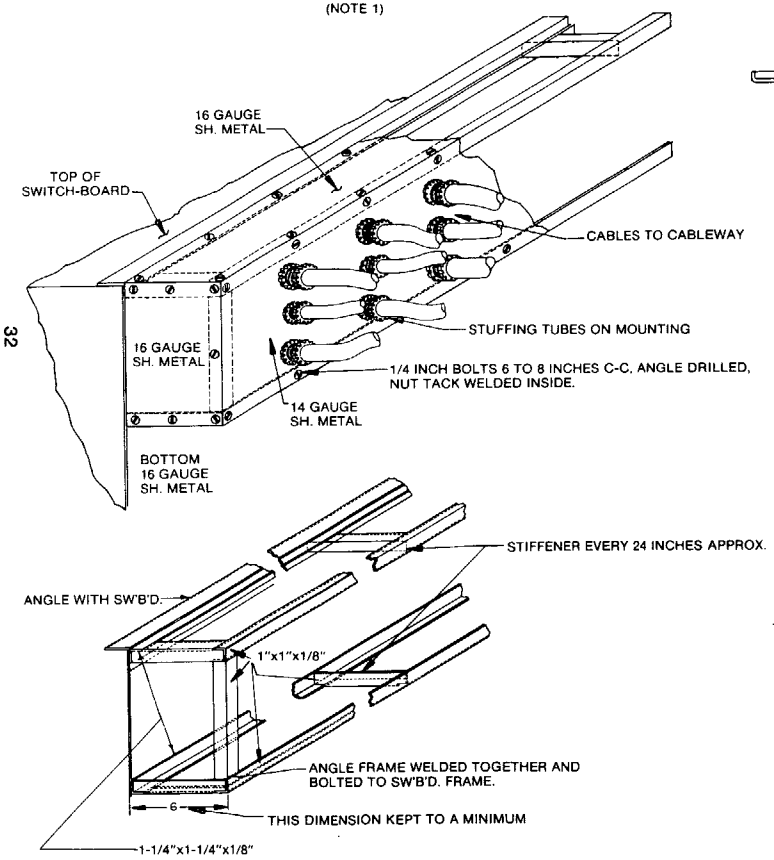
FIGURE 1A24. End preparation of Position Indicator type cables.

NOTES:

1. THIS METHOD OF CABLE ENTRANCE TO SWITCH-BOARDS MAY BE USED WHERE INSTALLATION OR WIRING OF STRAIGHT OR ANGLE STUFFING TUBES, ATTACHED DIRECTLY TO SWITCHBOARD CASE, IS NOT FEASIBLE.
2. THIS FIGURE SUPERSEDES SECTION 3, SHEET 86 AND 87 OF DRAWING, NAVSEC NO. 9000-S6202-73980, AND SHEET 1B1 OF DRAWING 803-5001027.

1B11

CABLE ENTRANCE TO SWITCHBOARDS
USING A SHEET METAL ENCLOSURE FOR
STUFFING TUBES AND A LARGE NUMBER
OF CABLES
(NOTE 1)



SH 132316968

1B12

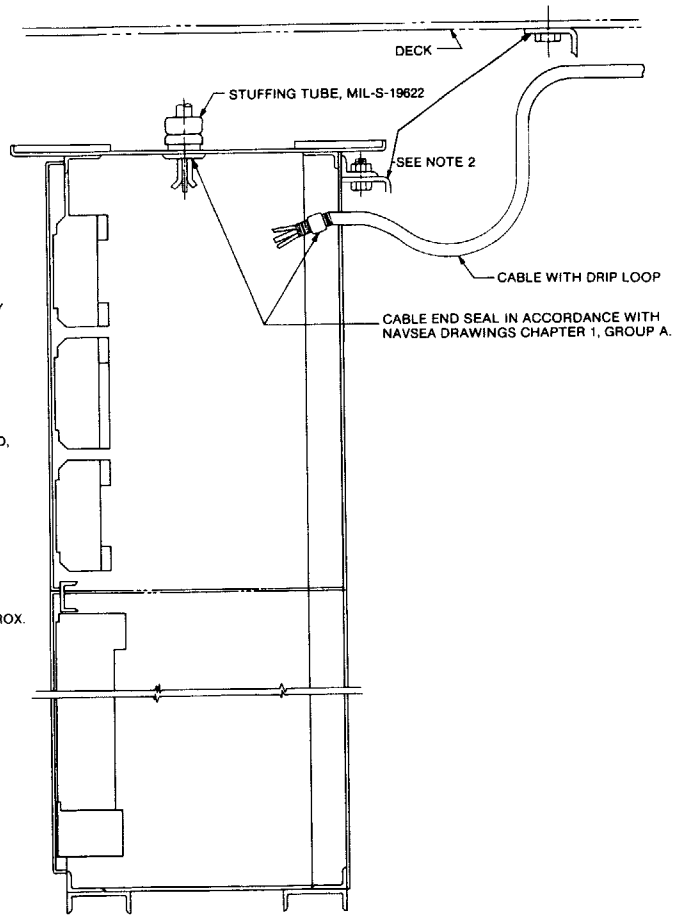
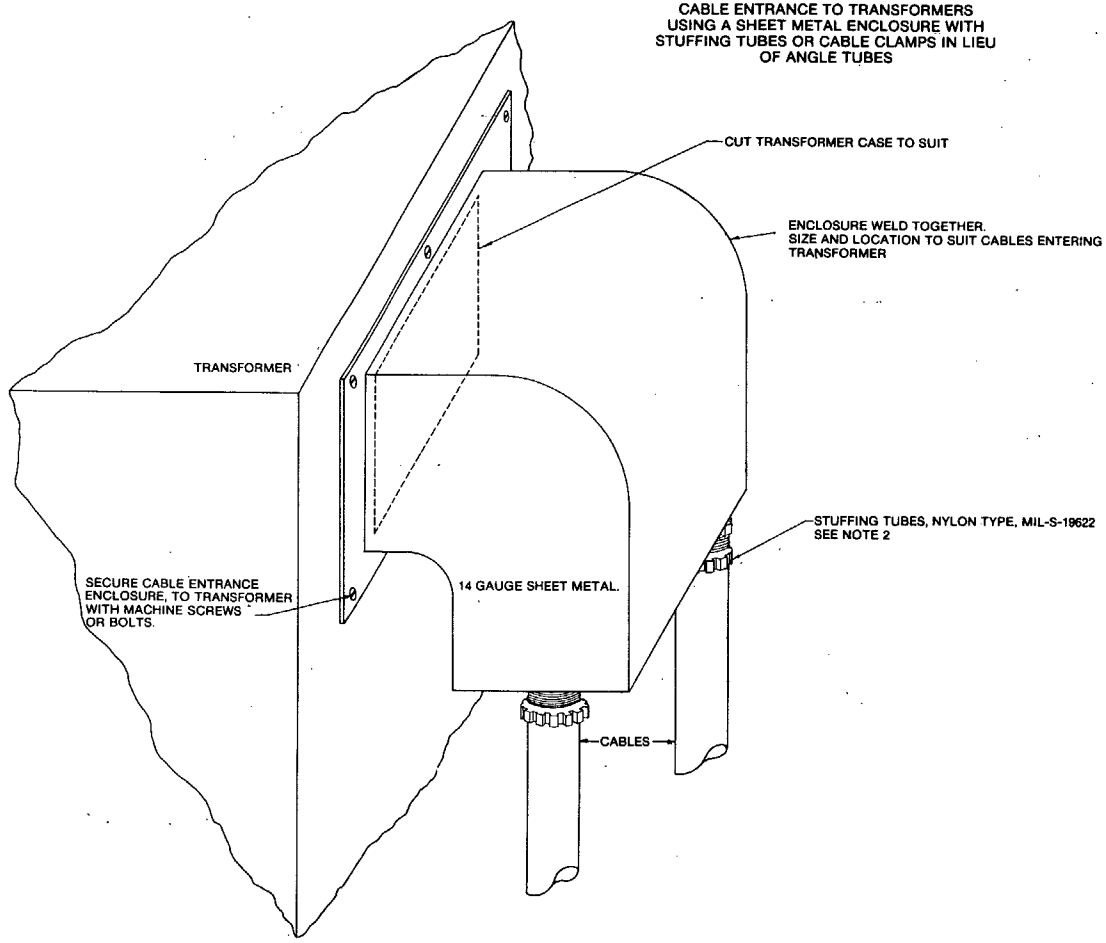


FIGURE 1B1. Cable entrance to switchboards.

1B21

CABLE ENTRANCE TO TRANSFORMERS
USING A SHEET METAL ENCLOSURE WITH
STUFFING TUBES OR CABLE CLAMPS IN LIEU
OF ANGLE TUBES



SH 132316969

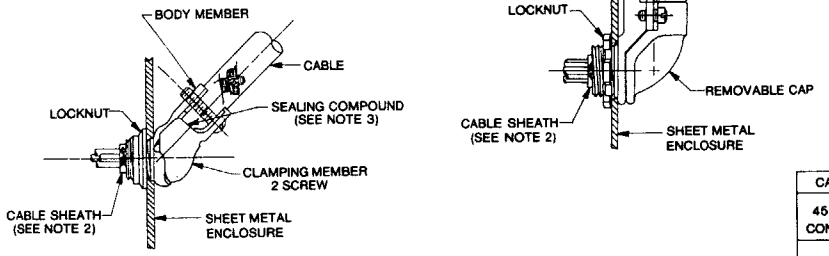
NOTES

1. THIS METHOD OF CABLE ENTRANCE TO TRANSFORMERS MAY BE USED WHERE INSTALLATION OR WIRING OF STRAIGHT OR ANGLES TYPE STUFFING TUBES, ATTACHED DIRECTLY TO TRANSFORMER CASE IS NOT FEASIBLE.
2. CABLE CLAMPS MAY BE USED IN LIEU OF STUFFING TUBES WHEN ENCLOSURE IS NONWATERTIGHT EXCEPT FOR CABLES ENTERING THROUGH TOP OF HORIZONTAL OR SLOPING SURFACES.
3. THIS FIGURE SUPERSEDES SECTION 3, SHEET 88 OF DRAWING, NAVSEC NO. 9000-S6202-73980, AND SHEET 1B2 OF DRAWING 803-5001027.

FIGURE 1B2. Cable entrance to transformers.

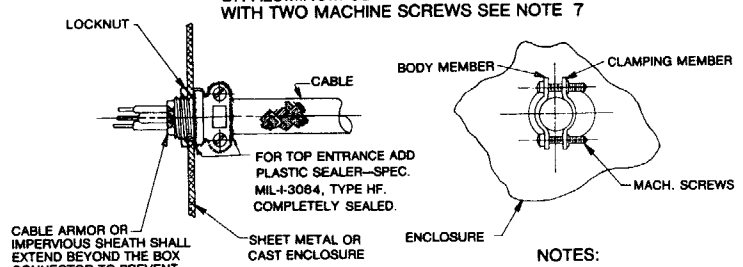
1 B 31

ANGLE CONNECTORS FOR CABLES
5/16 TO 3/4 DIA.



1 B 33

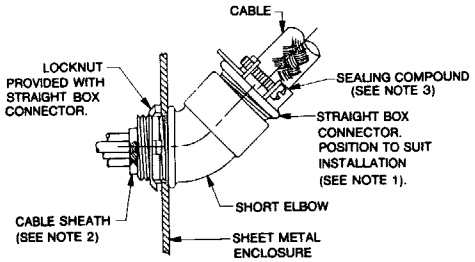
COMMERCIAL TYPE I STEEL, BRASS
OR ALUMINUM CLAMPING MEMBER SECURED
WITH TWO MACHINE SCREWS SEE NOTE 7

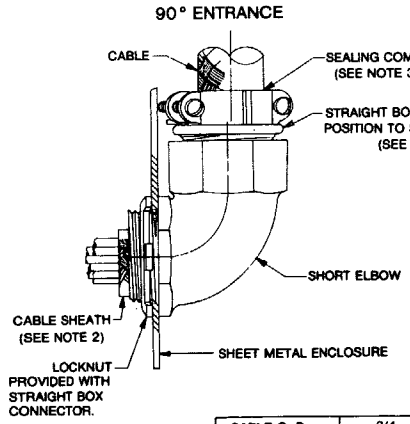


CABLE O.D.	5/16 — 17/32	1/2 — 3/4
45° ANGLE CONNECTOR	APPLETON #7245V T. & B. #265 OR EQUAL	METHOD 1B32 (SEE NOTE 4)
90° ANGLE CONNECTOR	APPLETON #7380V GEDNEY #963 T. & B. #266 OR EQUAL	GEDNEY #964B OR EQUAL

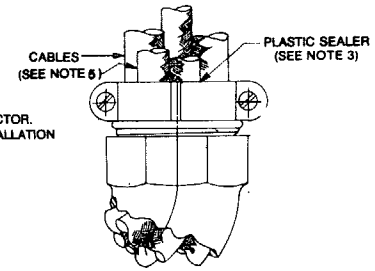
1 B 32

COMBINATION SHORT ELBOW AND
STRAIGHT BOX CONNECTOR FOR CABLES
3/4 to 1 11/16 DIA.





MULTIPLE CABLE ENTRANCE (SEE NOTE 6)



NOTES:

1. STRAIGHT BOX CONNECTORS SHALL BE EQUIVALENT TO TYPE-I (TWO SCREW CLAMP) OF SPECIFICATION MIL-C-17277 FOR ALL SIZES.
2. WHEN RETAINING LIPS ARE ABSENT ON THE CONNECTOR, CABLE ARMOR OR IMPERVIOUS SHEATH SHALL EXTEND A MINIMUM OF 1/8" BEYOND THE THROAT OF THE CONNECTOR OR SHORT ELBOW. WHEN RETAINING LIPS ARE PRESENT ON THE CONNECTOR, WHEN RETAINING LIPS ARE PRESENT ON THE CONNECTOR, THE CABLE ARMOR OR SHEATH SHALL BE INSTALLED OVER THE RETAINING TAB AND BUTTED UP AGAINST THE RETAINING LIP.
3. CONNECTORS SHOWN HEREON SHALL BE SEALED WITH PLASTIC SEALER-SPECIFICATION MIL-I-3065, TYPE HF-TO PROVIDE A DRIPPROOF CABLE ENTRANCE. HOWEVER, WHEN ENTRANCE IS MADE IN THE BOTTOM OR SIDE OF THE ENCLOSURE, AND A DRIP LOOP CAN BE PROVIDED, PLASTIC SEALER IS NOT REQUIRED.
4. FOR CABLE SIZES 1/2 TO 3/4 IN., 45° SHORT ELBOW (GEDNEY #8-475 OR EQUAL) AND 3/4 NOMINAL SIZE STRAIGHT CONNECTOR SHALL BE USED.
5. FOR COMMUNITY APPLICATIONS, MULTIPLE CABLE ENTRANCE MAY BE USED FOR ALL CONNECTOR SIZES SHOWN HEREON. CONNECTOR SIZE (MAXIMUM DIAMETER) SHALL BE APPROXIMATELY THE DIAMETER OF CABLE GROUP FOR PROPER CLAMPING.
6. IN LOCATIONS WHERE 45° OR 90° ENTRANCE IS NOT REQUIRED, STRAIGHT CONNECTORS MAY BE USED FOR MULTIPLE CABLE ENTRANCE.
7. THIS FIGURE SUPERSEDES SECTION 4, SHEET 54 AND SECTION 5, SHEET 158 OF DRAWING, NAVSEC NO. 9000-S6202-73980, AND SHEET 1B3 OF DRAWING 803-5001027.

7. BOX CONNECTORS SHALL BE STEEL EXCEPT THAT ON MINESWEEPERS THEY SHALL BE OF ALUMINUM, BRASS OR STEEL TO CONFORM WITH THE MATERIAL OF THE ENCLOSURE IN WHICH INSTALLED. STEEL BOX CONNECTORS MAY BE USED ALSO WITH ALUMINUM ENCLOSURES. "STRAIGHT DUPLEX" BOX CONNECTORS MAY BE USED FOR CABLE ENTRANCE INTO NWT ENCLOSURES. HOWEVER CABLES SHALL BE THE TYPE HAVING NYLON COVERED CONDUCTORS. DUPLEX CONNECTORS ARE NOT TO BE USED FOR CABLES HAVING WEAK SILICONE COVERED CONDUCTORS.

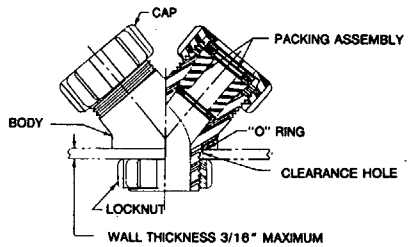
CABLE O. D.	3/4 — 7/8	7/8 — 1 3/16	1 3/16 — 1 3/8	1 3/8 — 1 11/16
45° SHORT ELBOW	GEDNEY #8-4100 OR EQUAL	GEDNEY #8-4125 OR EQUAL	GEDNEY #8-4150 OR EQUAL	GEDNEY #8-4200 OR EQUAL
90° SHORT ELBOW	T. & B. #4252 OR EQUAL	T. & B. #4253 OR EQUAL	T. & B. #4254 OR EQUAL	T. & B. #4256 OR EQUAL
NORMAL SIZE STRAIGHT CONN.	1	1 1/4	1 1/2	2

SH 132316970

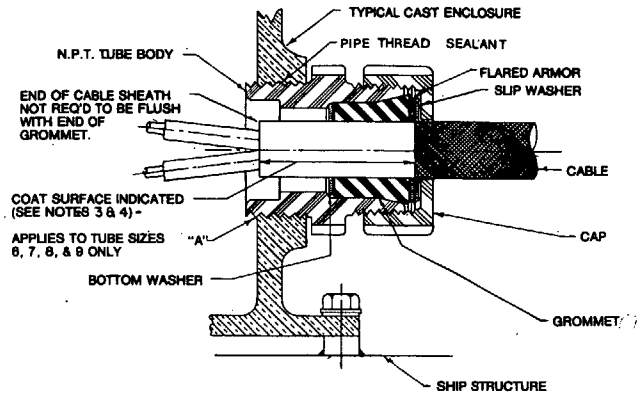
FIGURE 1B3. Cable entrance to non-watertight equipment.

1B41

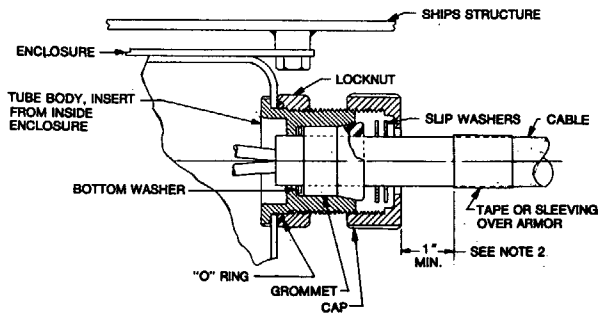
"Y" TYPE, 45° ENTRANCE ANGLE



1B43

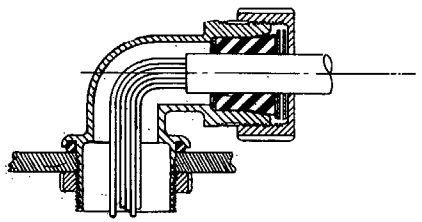


1B42



1B44

90° ANGLE TUBE

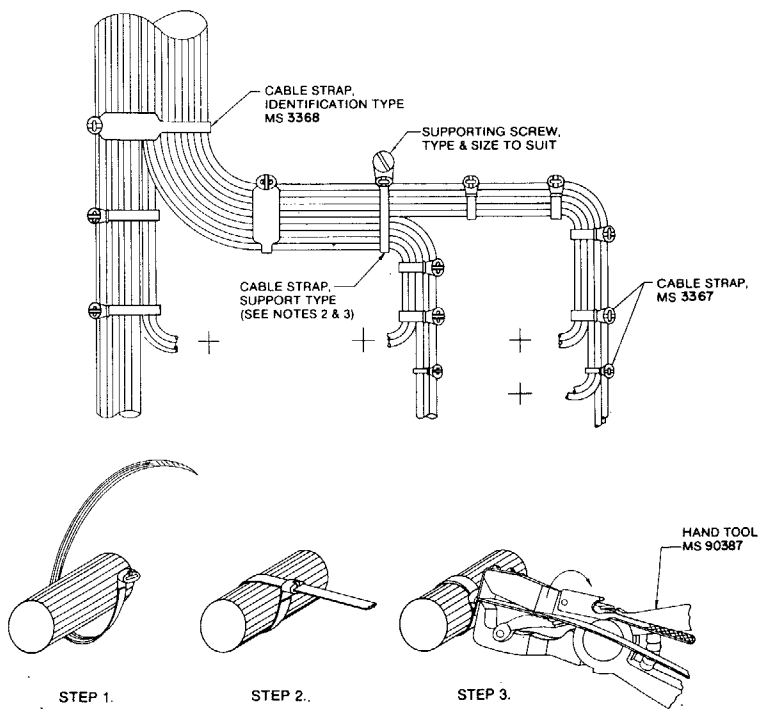


SH 132316971

NOTES:

1. SEE FIGURE 3C1, 3C2 AND 3C3 FOR DETAILS ON NYLON STUFFING TUBES AND INSTALLATION REQUIREMENTS, AS WELL AS TUBE CABLE ASSIGNMENT.
2. SECURE ARMOR ON CABLE A MINIMUM OF 1" FROM PLASTIC TUBE FACE WITH PRESSURE SENSITIVE VINYL TAPE, MIL-I-7798, OR BY A SHRINK FIT PLASTIC SLEEVE. METAL SQUEEZE RINGS SIMILAR TO BURNDY-HYRING MAY BE USED.
3. APPLY ONE COAT OF GATES ENGINEERING COMPANY BONDING AGENT N-29 (ACCELERATED WITH N-39) OR EQUAL, TO THE SHEATHING OF THE CABLE BEYOND THE FLARED ARMOR FOR GROUNDED INSTALLATION AND TO THE CABLE END INCLUDING THE TAPE IN NONGROUNDED INSTALLATION. THIS NOTE APPLIES TO TUBE SIZES 6, 7, 8, AND 9 ONLY.
4. COAT THE INNER SURFACE OF THE GROMMET WITH N-29 (ACCELERATED WITH N-39) BONDING AGENT AND IMMEDIATELY SLIDE IN PLACE ON THE CABLE. THIS NOTE APPLIES TO TUBE SIZES 6, 7, 8, AND 9 ONLY. NOTES 3 AND 4 DO NOT APPLY TO TOP ENTRANCE IN NWT BOXES.
5. THIS FIGURE SUPERSEDES SECTION 4, SHEET 65, 66, AND 104 OF DRAWING NAVSEC NO. 9000-86202-73980, AND SHEET 1B4 OF DRAWING 803-5001027.

FIGURE 1B4. Cable entrance to watertight enclosures.



STRAPPING PROCEDURE

1. SLIP STRAP AROUND WIRE BUNDLE AS SHOWN.
2. THREAD TIP THROUGH EYE AND DRAW UP SNUG.
3. A) FOR STRAPS NOT EQUIPPED WITH LOCKING DEVICE: APPLY TOOL, CINCH TIGHT, TWIST 120° AND SQUEEZE TO CUT OFF EXCESS.
   B) FOR SELF-CLINCHING STRAPS: PULL TIGHT AND CLIP OFF EXCESS.

SH 132316972

NOTES:
1. ALL PLASTIC CABLE STRAPS SHALL CONFORM TO SPECIFICATION MIL-S-23190.
2. COMMERCIAL SUPPORT TYPE CABLE STRAPS MAY BE USED PROVIDED THE LOCKING DEVICE IS AS SHOWN ON MS 3367.
3. SPACE BETWEEN STRAPS SHALL BE AS REQUIRED TO SUIT INSTALLATION, BUT NOT MORE THAN 2-1/2 TIMES THE DIAMETER OF THE BUNDLE. MAXIMUM DISTANCE BETWEEN SUPPORT TYPE STRAPS SHALL BE 10 INCHES.
4. SELF-CLINCHING CABLS STRAPS MAY BE HAND INSTALLED. HOWEVER, FOR GREATER EFFICIENCY , USE OF TOOL, AS REFERENCED ON CABLE STRIP DRAWINGS, IS RECOMMENDED.
5. THE FOLLOWING PRECAUTIONS SHALL BE TAKEN:
   a. AVOID USE OF STRAPS IN EQUIPMENT HAVING PROLONGED EXCESSIVELY HIGH TEMPERATURES.
   b. CARE IN FORMING AND SECURING WIRE BUNDLES TO PREVENT CUTTING OF CONDUCTOR INSULATION.
6. THIS FIGURE SUPERSEDES SECTION 4, SHEET 155 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1B5 OF DRAWING 803-5001027.

FIGURE 1B5. Strapping and supporting wire bundles in electrical equipment.

1B61

LACING PROCEDURE
ALTERNATE TO ELECTRONIC INSTALLATION
PRACTICES MANUAL NAVSHIPS 900.171 CHAPTER 9-7

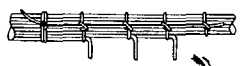


FIG. 1

FIG. 2 FIG. 3

FIG. 4 FIG. 5 FIG. 6

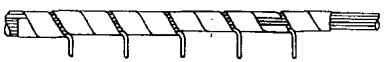
FIG. 7 FIG. 8

LACING PROCEDURE

1. THE LACING OF THE MAIN CABLE, AUXILIARY LINES AND FINAL BREAKOUTS SHALL BE STARTED WITH A CLOVE HITCH AS SHOWN IN FIGURE 2. AN OVERHAND KNOT SHALL BE TIED OVER THE CLOVE HITCH AS INDICATED IN FIGURE 3. A LOCKSTITCH SHALL THEN BE TIED AS SHOWN IN FIGURES 4, 5 AND 6. THE CABLE SHALL BE LACED ITS ENTIRE LENGTH USING THE LOCKSTITCH AS SHOWN IN FIGURE 1. THE LACING SHALL BE TERMINATED WITH TWO LOCKSTITCHES. THE SAME PROCEDURE SHALL BE USED WHEN USING A DOUBLE WRAP OF LACING TWINE.
2. LOCKSTITCHING ON THE MAIN CABLE AND AUXILIARY LINES SHALL BE PLACED IMMEDIATELY ADJACENT TO AND ON BOTH SIDES OF BREAKOUTS THAT ARE TO BE LACED. THE LACING OF AUXILIARY LINES AND FINAL BREAKOUTS SHALL BE ANCHORED TO THE MAIN SECTION BY PASSING THE LACING TWINE THROUGH THE TWO LOCKSTITCHES ON THE MAIN SECTION AND THEN USING THE STARTING HITCH AND KNOT SHOWN IN FIGURES 2 AND 3.
3. THE SPACING BETWEEN LOCKSTITCHES ON CABLE SECTIONS 5/8" OR SMALLER IN DIAMETER SHALL BE 1/2" TO 3/4". ON CABLE SECTIONS LARGER THAN 5/8" IN DIAMETER, THE SPACING SHALL BE 1/2" TO 1". IN ADDITION, ON CABLE SECTIONS LARGER THAN 5/8" IN DIAMETER, A DOUBLE WRAP OF LACING SHALL BE USED.
4. IF IT IS NECESSARY TO SPLICE TWO PIECES OF LACING TOGETHER, A KNOT AS SHOWN IN FIGURES 7 AND 8 SHALL BE USED.
5. A BINDER SUCH AS GLYPTOL SHALL BE APPLIED TO ALL STARTING TERMINATING AND SPLICING KNOTS.

1B62

WRAPPING PROCEDURE
ALTERNATE TO METHOD 41501



WRAPPING PROCEDURE

1. CUT A LENGTH OF WRAPPING AS NEEDED. FOR GREATEST SPEED USE IN A TWO FOOT LENGTH. ENDS MAY BE CUT DIAGONALLY.
2. HOOK THE END OF THE WRAPPING INTO THE BUNDLE SO THAT THE TIP CURLS AROUND IN AN INNER WIRE.
3. STRAIGHTEN THE FIRST 2 TO 4 INCHES OF WRAPPING, THEN WRAP STRAIGHTENED PORTION AROUND THE BUNDLE OF CONDUCTORS. STRAIGHTEN ANOTHER 2 TO 4 INCHES AND WRAP. CONTINUE THE PROCESS UNTIL THE ENTIRE STRIP OF WRAPPING IS ATTACHED.
4. LOCK FINISHING END OF WRAPPING INTO BUNDLE. TWIST ENDS OF BUNDLE IN OPPOSITE DIRECTION WITH HANDS FOR TIGHTER WRAP IS IF DESIRED.
5. REPEAT THE PROCESS WITH NEXT STRIP OF WRAPPING.

NOTES:

1. SPECIAL CARE SHALL BE TAKEN IN FORMING AND SECURING THE BUNDLE TO PREVENT CHAFING OF CONDUCTOR INSULATION UNDER VIBRATION.
2. THE WRAPPING MATERIAL SHALL BE OF A FIRE RETARDANT PLASTIC SUCH AS NYLON "AMP-SPIRAP" OR EQUAL. THE USE OF VINYL OR POLYETHYLENE PLASTIC MATERIAL WHICH MAY YIELD TOXIC COMBUSTION PRODUCTS IS PROHIBITED.
3. THE LACING SHALL BE OF A NON-NUTRIENT MATERIAL SUCH AS NYLON.
4. WHERE TEMPERATURE MAY EXCEED 250° F OR WHERE FLAME RESISTANCE IS SPECIFIED, THE LACING OR TYING MATERIALS SHALL CONFORM TO THE FOLLOWING: GLASS CORD, MIL-Y-1140, TREATED WITH SILICONE RESIN. THE CORD (OR TAPE) SHALL BE TREATED TO PREVENT UNRAVELING BY APPLICATION OF A NEOPRENE CEMENT (COMMERCIAL) TO THE ENDS OF THE CORD OR TAPE.
5. THIS FIGURE SUPERSEDES SECTION 4, SHEET 150 , OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 186 OF DRAWING 803-5001027.

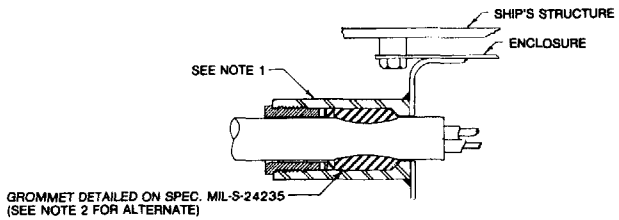
SH132316973

FIGURE 1B6. Lacing and wrapping wire bundles in electrical and electronics equipment.

NOTES:
1. THE METAL STUFFING TUBE USED IN METHOD 1B71 MAY CONSIST OF THE FOLLOWING:
   a. HALF OF THE DOUBLE GLAND STUFFING TUBE, SHOWN ON FIGURE 3A10.
   b. TUBE BODY, SHOWN ON FIGURE 3A14.
   c. STUFFING TUBE, SHOWN ON FIGURE 3B12.
2. PACKING FOR METALLIC STUFFING TUBES USED ABOVE 105°C SHALL BE SILICONE RUBBER TYPE RTV, SILICONE RUBBER ROPE, OR ASBESTOS ROPE IMPREGNATED WITH SILICONE RUBBER.
3. NYLON STUFFING TUBES IN ACCORDANCE WITH MIL-S-19622, EXCEPT USING SILICONE RUBBER GROMMET, MAY BE USED IN TEMPERATURES UP TO 200°C.
4. THIS FIGURE SUPERSEDES SECTION 4, SHEET 63 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1B7 OF DRAWING 803-5001027.

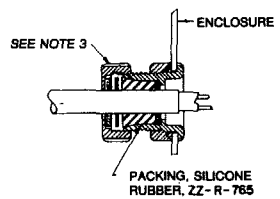
1 B 71

METAL TUBE, SPEC. MIL-S-24235



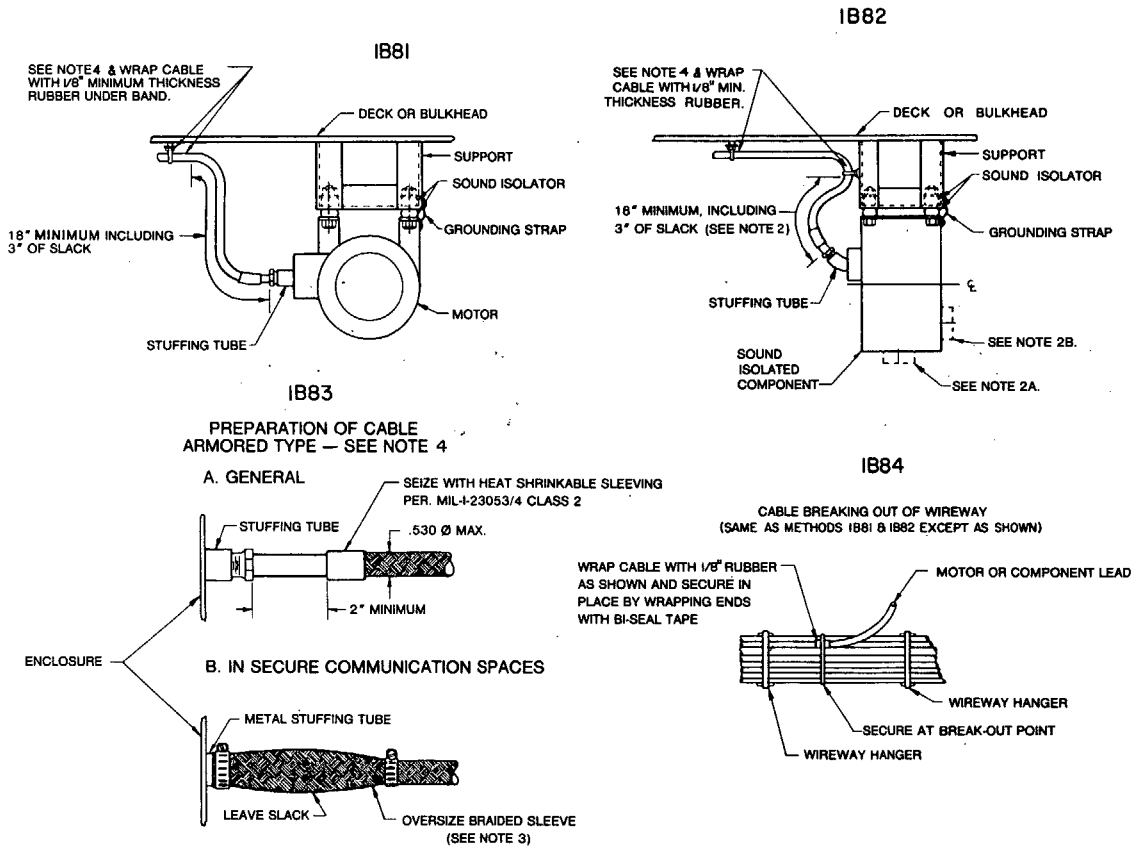
1 B 72

NYLON TUBE, MIL-S-19622



SH 132316974

FIGURE 1B7. Stuffing tubes installed on equipment exposed to high temperature.



SH 132316975

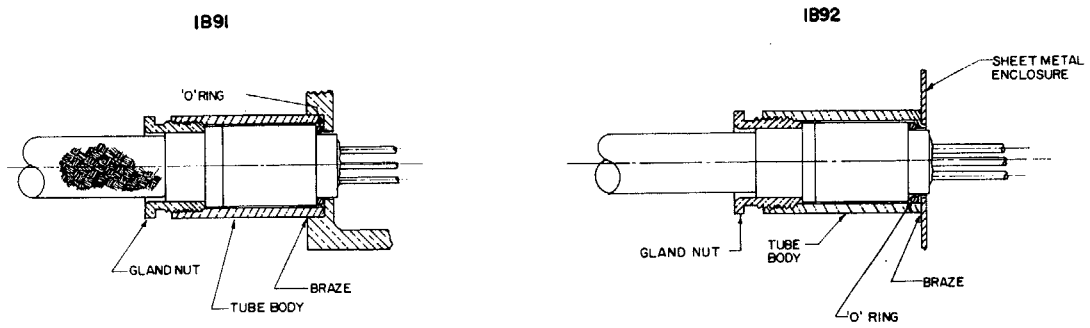
NOTES:

1. POSITION CABLE LOOP SO THAT IT WILL NOT TOUCH STRUCTURES OR ADJACENT EQUIPMENT.
2. AMOUNT OF SLACK (GREATER THAN 3" MIN.) SHALL BE DETERMINED BY APPLICABLE EQUIPMENT DEFLECTION DIAGRAM IF THE FOLLOWING EXIST:
   A. CABLE ENTRANCE IS OPPOSITE MOUNTING FEET.
   B. IF SIDE ENTRANCE IS BEYOND CENTER OF TALL EQUIPMENT. (I.E. HEIGHT IS GREATHER THAN THE SMALLER DIMENSION OF BASE).
3. BRAIDED SLEEVE SHALL IN GENERAL BE OF THE SAME MATERIAL AS THE CABLE ARMOR. CLEAR CONTACT SURFACES TO BRIGHT METAL AND SECURE SLEEVE TO STUFFING TUBE AND CABLE ARMOR WITH PLATED BANDING STRAPS, OR CLAMPS AS SHOWN. DO NOT STRETCH SLEEVE TIGHT BETWEEN STUFFING TUBE AND CABLE ARMOR.
4. BASED ON INFORMATION CONTAINED IN NAVSHIPS 0900-004-7001(SHIP NOISE CONTROL). STRIPPING OF ARMOR IS APPLICABLE ONLY TO CABLES OF .503 AND LESS. RUBBER BANDING SHALL BE USED UNDER CABLE CLAMPS ON ALL CABLE SIZE INCLUSIVE.
5. FOR SUITABLE CABLE SUPPORT SEE SECTION MIL-STD-XXX-4
6. THIS FIGURE SUPERSEDES SECTION 5, SHEET 108 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1B8 OF DRAWING 803-5001027.

FIGURE 1B8. Installation of cables on sound isolated motors.

NOTES:

1. STUFFING TUBES DELINEATED HEREON ARE FOR USE ON INBOARD FITTINGS ONLY.
2. INSTRUCTIONS FOR PREPARING CABLE ENDS AND DETAIL DIMENSIONS ARE SHOWN IN SECTION 1, GROUP A.
3. THIS FIGURE SUPERSEDES SECTION 5, SHEET 3, OF DRAWING, NAVSEC NO. 9000 -S6202-73980, & SHEET 1B9 DRAWING 803-5001027.

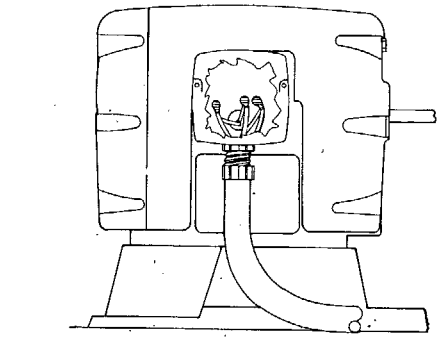


SH 132316976

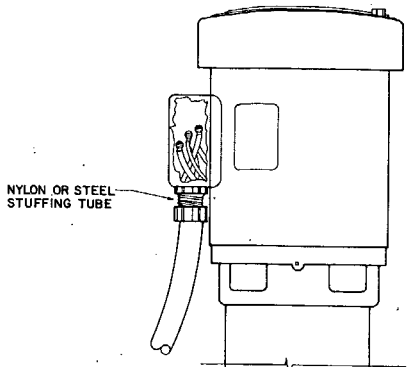
FIGURE 1B9. Inboard stuffing tubes for submarines.

NOTES:

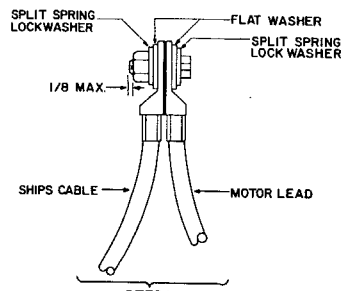
1. FOR 9000CM CABLES AND SMALLER
   A.) APPLY THREE HALF LAP LAYERS OF PRESSURE SENSITIVE GLASS BACKED TAPE PER MIL-I-15126 .007 (.7MIL) THICK.
2. FOR CABLES OVER 9000CM
   A) APPLY ONE HALF LAP LAYER OF ELECTRICAL FILLER TAPE 5970-00-184-2002 SPEC HH-I-553.
   B) APPLY THREE HALF LAP LAYERS OF PRESSURE SENSITIVE GLASS BACKED TAPE, MIL-I-15126 (007) THICK.
3. THIS FIGURE SUPERSEDES SHEET 1B10 OF DRAWING 803-5001027.



TYPICAL HORIZONTAL MOUNTED MOTOR

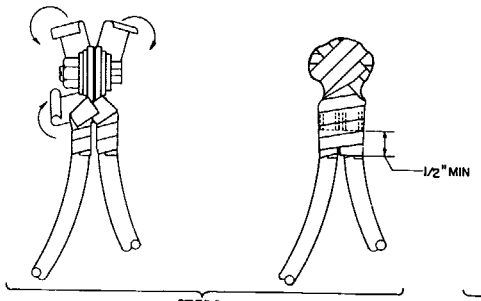


TYPICAL VERTICAL MOUNTED MOTOR



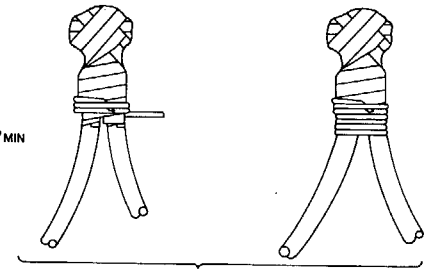
STEP 1

INSTALL SOLDERLESS LUGS ON BOTH SHIPBOARD CABLES AND MOTOR CABLES. LUGS SHALL BE CONNECTED AS SHOWN AND PROPERLY TIGHTENED.



STEP 2

APPLY TAPE AS REQUIRED IN NOTE 1 AND 2.



STEP 3

SERVE WITH FIBROUS GLASS CORD. SPEC MIL-I-3158

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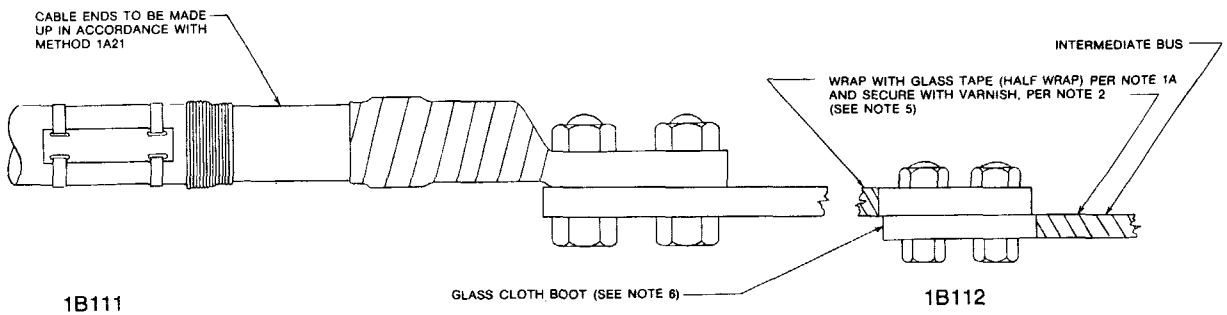
FIGURE 1B10. Cable termination for motor connection boxes (surface ships and submarines).



NOTES:

1. TAPES USED SHALL BE THE FOLLOWING:
   A. GLASS TAPE, SPEC MIL-Y-1140, CLASS C, 1 1/2" WIDE, .007 TO .010 THICK.
   B. MICA TAPE – G.E. CO. TYPE NO 1604, REINFORCED MICA TAPE SEVEN MILS THICK, 1" WIDE OR EQUIVALENT.
2. INSULATING VARNISH TO BE SPEC. MIL-I-24092.
3. SEE FIGURE 2C9 FOR BATTERY BUS INTERCELL INSULATION.
4. IN LIEU OF TAPING A COATING OF APPROVED PLASTISOL INSULATION APPLIED TO A THICKNESS OF 1/16 INCH MAY BE USED AS AN ALTERNATE, OR TUBING PER METHOD 1B112 USED.
5. VARNISH, PAINT OR PLASTISOL INSULATION SHALL NOT BE APPLIED TO BOLTED BUS CONNECTIONS FOR PERSONNEL PROTECTION, EXCEPT AT CELL TERMINALS AND EXCEPT QUICK OPENING DISCONNECTS. BOLTED JOINTS SHALL BE COVERED WITH A VARNISH IMPREGNATED GLASS CLOTH REMOVEABLE BOOT SECURELY TIED IN PLACE. GLASS CLOTH SHALL COMPLY WITH MIL SPEC MIL-I-17205, FORM "C", GRADE "O", 0.010 INCHES THICK.
6. THE EDGES OF ALL BUS BARS TO BE TAPED SHALL BE ROUNDED WITH A RADIUS EQUAL TO 1/2 THEIR THICKNESS.
7. THIS FIGURE SUPERSEDES SECTION 5, SHEET 66, OF DRAWING, NAVSEC NO. 9000-S6206-73980 & SHEET 1B11 OF DRAWING 803-5001027.

MOTOR AND GENERATOR CONNECTIONS

BUS BARS TO BE BARE. APPLY THREE COATS OF VARNISH (SEE NOTE 2). PROVIDE DRIP PROOF BOX OVER TERMINALS. GLASS CLOTH BOOT SHALL NOT BE INSTALLED.

FWD & AFT BATTERY TERMINALS (SEE NOTE 4)

ALL BUS BARS IN BATTERY TANKS, EXCEPTING INTERCELL CONNECTORS SHALL BE TAPED WITH AT LEAST TWO LAYERS OF HALF-LAPPED GLASS TAPE. IN ALL CASES WHERE BUSES OF OPPOSITE POLARITIES PASS WITHIN THREE INCHES OF EACH OTHER OR WITHIN THREE INCHES OF GROUND (EXCEPTING INTERCELL CONNECTORS). TWO LAYERS OF HALF-LAPPED MICA TAPE SHALL BE *APPLIED UNDER THE* GLASS TAPE. SUCH MICA TAPE SHOULD EXTEND APPROXIMATELY SIX INCHES BEYOND WHERE THE BUSES ARE IN PROXIMITY TO EACH OTHER OR TO GROUND. THE GLASS AND MICA TAPES PER NOTES 1A & 1B SHALL EACH BE NOT LESS THAN SEVEN MILS THICK AND EACH LAYER SHOULD BE WELL COATED WITH INSULATING VARNISH PER NOTE 2. TAPING OF BUS BARS SHALL BE ACCOMPLISHED AS FOLLOWS:

WHERE MICA AND GLASS TAPE ARE REQUIRED, COAT THE BUS BAR WITH INSULATING VARNISH PER NOTE 2 AND WHILE STILL TACKY, APPLY A LAYER OF HALF LAPPED MICA TAPE. APPLY A SECOND COAT OF VARNISH, AND WHILE STILL TACKY, WRAP A SECOND LAYER OF HALF-LAPPED MICA TAPE. REPEAT THE APPLICATION OF VARNISH AS BEFORE. AND WRAP ON A LAYER OF GLASS TAPE HALF-LAPPED. *REPEAT THE APPLICATION OF VARNISH AS BEFORE AND* WRAP ON A SECOND LAYER OF GLASS TAPE HALF-LAPPED. COAT THE FINISHED TAPING COMPLETELY WITH INSULATING VARNISH (SEE NOTE 5).

WHERE MICA TAPE IS NOT REQUIRED, APPLY TWO LAYERS OF GLASS TAPE IN SEQUENCE. INTERPOSING A COATING OF INSULATING VARNISH BEFORE EACH LAYER IS WRAPPED ON AND HALF-LAPPING EACH LAYER OF TAPE. APPLY A COATING OF INSULATING VARNISH ON COMPLETION OF TAPING (SEE NOTES 5 & 6).

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PROPULSION CONTROL CUBICLE

WRAP ALL BUS BARS IN MAIN CONTROL CUBICLE WITH UNTREATED GLASS TAPE PER NOTE 1A: APPLY TWO LAYERS OF TAPE HALF-LAPPED. APPLY ONE OR MORE COATS OF VARNISH PER NOTE 6 BEFORE EACH LAYER OF TAPE IS WRAPPED AND AFTER THE FINAL LAYER OF TAPE IS APPLIED, SUFFICIENT TO HOLD THE GLASS TAPE IN PLACE. BAKE THE TAPED BUS 3 TO 4 HOURS AT 350°F.

BECAUSE OF NON-ACCESSIBILITY TO THE INSIDE OF THE CUBICLE WHEN ENERGIZED, GLASS BOOTS ARE NOT GENERALLY REQUIRED BUT SHOULD BE INSTALLED ON BOLTED JOINTS WHERE NECESSARY FOR PERSONNEL PROTECTION.

BOLTED DISCONNECTS OF OPPOSITE POLARITIES WITHIN THREE INCHES OF EACH OTHER, OR DISCONNECTS CLOSER THAN THREE INCHES TO GROUND, SHALL HAVE SHEETS OF APPROVED INSULATING MATERIAL INSTALLED AS BAFFLES, OR COVERING AN AREA OF THE GROUND SURFACE, SO THAT THE DISTANCE IN AIR BETWEEN OPPOSITE POLARITIES, OR TO GROUND, SHALL EXCEED THREE INCHES.

ALTERNATE BUS BAR INSULATION

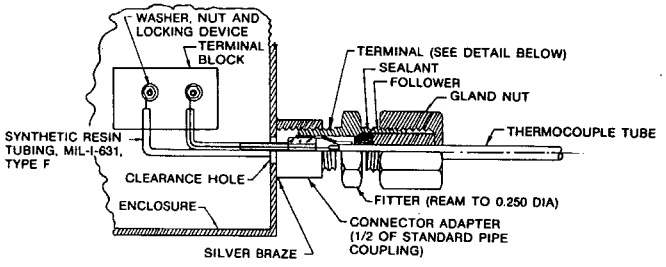
(NOT TO BE USED ON PROPULSION CONTROL CUBICLE)

IN LIEU OF TAPING METHODS SHOWN HEREON, THE USE OF NON-RIGID, THIN WALL, HEAT REACTIVE TUBING, MIL-I-23053/15, CLASS I, FOR INSULATION OF EXPOSED BUS BARS IS APPROVED, EXCEPT HEAT REACTIVE TUBING SHALL NOT *BE USED ON PROPULSION CONTROL CUBICLE.*

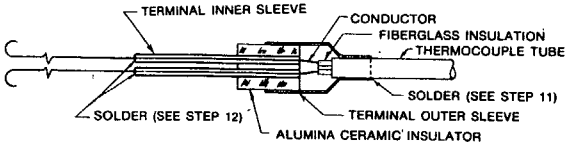
3. TUBING SHALL BE SLIPPED OVER BUS BAR SECTIONS AND, BY APPLICATION OF HEAT (300°F FOR 10 MINUTES), WILL CONTRACT TO FORM A UNIFORM WALL THICKNESS OF INSULATION OVER BUS BAR.
4. TUBING MAY BE HEATED BY USE OF A HEAT LAMP OR COMMERCIAL BLOWERS. HEATING TO LESS THAN 250° *WILL NOT PROVID A SATISFACTORY SHRINK.*
5. HEAT REACTIVE TUBING SHALL NOT BE USED WHERE TEMPERATURE RISE OF EQUIPMENT PLUS AMBIENT IS OVER 105°C.
6. EXTREME CARE SHOULD BE EXERCISED IN CUTTING AND TRIMMING THE TUBING TO THE DESIRED LENGTH FOR THE BUS BAR. UTILIZE A SHARP KNIFE OR BLADE AND CUT THE *TUBING IN SMOOTH CONTINUOUS STROKES.* AVOID IRREGULAR CUTS OR NICKS WHEN TRIMMING THE EDGES AND FACE OF THE BUS BARS. POSITION TUBING SO THAT BOLTING, CLAMPING OR OTHER FORCES DO NOT PINCH, CUT OR SIMILARLY STRESS THE TUBING.

FIGURE 1B11. Insulating bus terminals and bus bars on submarines.

1B121
THERMOCOUPLE TUBE ENTERING
FIXTURE OR FITTING



TERMINAL — ELECTRIC (HERMETIC SEAL)
ASSEMBLY



THERMOCOUPLE INSTALLATION STEPS

1. DETERMINE LENGTH OF BARE CONDUCTORS REQUIRED TO PERMIT PROPER INSTALLATION OF THE TERMINAL AND THERMOCOUPLE TUBE AND MARK THE LENGTH ON THE TUBE. REMOVE TUBE TO THIS MARK BY NOTCHING APPROXIMATELY 2" SECTIONS WITH A FILE AND FLEXING SLIGHTLY TO BREAK. EXERGISE CARE IN FLEXING THE TUBE NOT TO EXCESSIVELY BEND CONDUCTORS.
2. TRIM EXPOSED FIBERGLASS INSULATION ON INDIVIDUAL CONDUCTORS RETAINING APPROXIMATELY 1/4" FROM END OF TUBE.
3. CLEAN THE TUBE BACK A MAXIMUM OF 1" FROM CUT AND INDIVIDUAL CONDUCTORS IN WAY OF SOLDER JOINT TO TERMINAL INNER SLEEVE USING A FINE GRADE SANDPAPER.
4. CONDUCT AN INSULATION TEST AS OUTLINED IN STEP 18, ONLY IF THE THERMOCOUPLE JUNCTION HAS BEEN OPENED.
5. TEST THE INSULATION BETWEEN THE TUBE AND THE CONDUCTORS BY USE OF AN OHMMETER. THE READINGS, TO BE SATISFACTORY, MUST BE OVER 0.2 MEGOHMS.
6. PLACE THE GLAND NUT, FOLLOWER AND SEALANT ON THE TUBE.
7. SLIDE THE TERMINAL ONTO THE TUBE. THE TUBE SHALL BE INSERTED APPROXIMATELY ONE HALF THE DISTANCE TO THE CERAMIC PORTION OF THE TERMINAL.
8. PLACE ASSEMBLY IN A POSITION WHICH WILL PERMIT SOLDERING. SOLDERING TO TOP OF TERMINAL WHEN IN A VERTICAL POSITION IS NOT RECOMMENDED.
9. APPLY TO JUNCTION OF THE OUTER SLEEVE OF TERMINAL AND TUBE, AN ABSOLUTE MINIMUM OF LOW TEMPERATURE SOLDERING FLUX MEETING GE SPECIFICATION NO. A10-B18.
10. USING OXY-ACETYLENE OR HYDROGEN TORCH FLAME PREHEAT THE TUBE AND TERMINAL. THE FLAME SHOULD BE DIRECTED TO THE OUTER SLEEVE OF THE TERMINAL USING CARE NOT TO DIRECT THE FLAME AT THE CERAMIC PORTION.
11. SOLDER OUTER SLEEVE OF TERMINAL TO THE TUBE USING A SOFT SOLDER MEETING SPECIFICATION QQ-S-5718 AND A MINIMUM AMOUNT OF HEAT.
12. SOLDER THE INNER SLEEVES OF THE TERMINAL TO CONDUCTORS AS OUTLINED IN STEPS 9, 10 AND 11.
13. INSPECT ALL SOLDERED JOINTS VISUALLY FOR PIN HOLES.
14. REPEAT THE TEST OUTLINED IN STEP 5.
15. DRILL CONNECTION BOX, CLEAN SURFACE IMMEDIATELY AROUND HOLE, AND BRAZER CONNECTOR ADAPTER IN PLACE. INSERT FITTER INTO CONNECTOR ADAPTER AND TIGHTEN.
16. INSERT SOLDERED TERMINAL THROUGH INSTALLED FITTER AND TIGHTEN GLAND NUT AGAINST FOLLOWER AND SEALANT.
17. IN MAKING THE ELECTRICAL CONNECTION IN THE CONNECTION BOX, THE THERMOCOUPLE CONDUCTOR SHALL BE WRAPPED AROUND ITS SPECIFIED TERMINAL POST AND SECURED BY MEANS OF A FLAT WASHER, NUT AND LOCKING DEVICE. THE ENTIRE EXPOSED PORTION OF THE CONDUCTOR BETWEEN THE TERMINAL POST AND THE CERAMIC SHALL BE COVERED WITH SYNTHETIC RESIN TUBING, SPECIFICATION MIL-I-631. WHEN SHIPBOARD CABLE, PER MIL-C-24640 AND MIL-C-24643 IS USED TO CONNECT THE THERMOCOUPLE CONDUCTORS AT THE TERMINAL POST, LUGS SHALL BE ATTACHED TO THE SHIPBOARD CABLE CONDUCTORS AND SECURED IN DIRECT CONTACT WITH THE THERMOCOUPLE CONDUCTORS.
18. SHOULD THE THERMOCOUPLE JUNCTION BE OPENED, THE INSULATION BETWEEN CONDUCTORS AND BETWEEN EACH CONDUCTOR AND THE TUBE SHALL BE TESTED BY AN OHMMETER. EACH READING TO BE SATISFACTORY MUST BE OVER 0.2 MEGOHMS. THE END HOLE SHALL BE MADE WATERTIGHT BY FILLING WITH A SILVER BASE BRAZING ALLOY, SPECIFICATION QQ-B-654 GRADE IV. THE OUTSIDE DIAMETER OF THE TUBE SHALL NOT BE INCREASED AT THE TIP DUE TO THIS CLOSURE. CONDUCT AN INSULATION TEST ON THIS REMADE THERMOCOUPLE IN ACCORDANCE WITH STEP 5.
19. IDENTIFICATION BETWEEN CHROMEL AND ALUMEL CONDUCTORS CAN BE MADE BY USE OF A PERMANENT MAGNET. THE ALUMEL CONDUCTOR IS THE MORE MAGNETIC.

NOTES:

1. THIS FIGURE SUPERSEDES SECTION 5, SHEET 97 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1B12 OF DRAWING 803-5001027.

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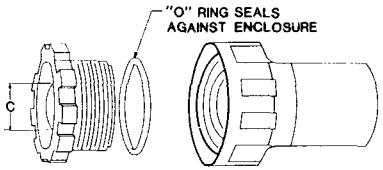
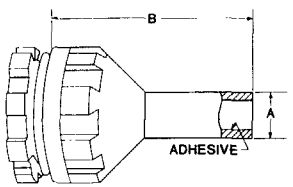
FIGURE 1B12. Installation of thermocouple cable entering equipment.

TYPE I





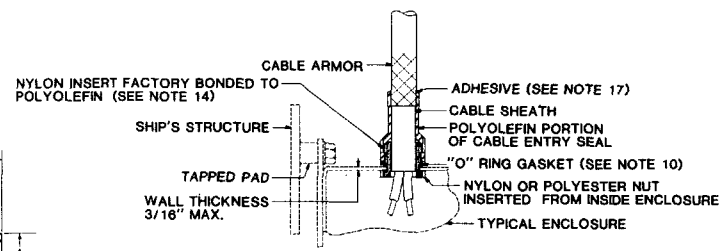


TABLE 1
CABLE ENTRY SEAL
DIMENSIONS (INCHES)

PART NO.	A		B	C	DRILL
	EXP.	REC.	NOM.	MIN.	SIZE
1B13-01	.750	.250	2.750	.750	1.00
1B13-02	1.200	.500	3.750	1.100	1.38
1B13-03	1.700	.750	4.500	1.600	2.00

(ALSO AVAILABLE IN MULTIPLE CONDUCTOR SIZES FROM APPROVED MANUFACTURES)

18. THESE SEALS SHALL NOT BE INSTALLED IN AREAS EXPOSED TO WEATHER.
19. THIS FIGURE SUPERSEDES SHEET 1B13 OF DRAWING 803-5001027.

INSTALLATION NOTES:

1. INSPECT THE CLEARANCE HOLE WHICH HAS BEEN DRILLED OR PUNCHED IN THE ENCLOSURE FOR THE TUBE AS INDICATED IN TABLE I, AND REMOVE ANY BURRS OR IRREGULARITIES. THE SURFACE MUST MEET THE SPECIFICATION FOR A NORMAL "O" RING SEAL. (SEE NOTE 2, FIGURE 1C1).
2. TYPE I: PLACE RIGID, EXTERNALLY THREADED NUT THROUGH HOLE SO THAT THE FLANGED END IS ON THE INSIDE OF THE CAN OR CABINET. TYPE II: PLACE THE END NUT INSIDE THE CABINET AND INSERT THE EXTERNALLY THREADED INTO THE NUT.
3. PLACE "O" RING OVER THREADED END AND POSITION AGAINST OUTSIDE OF CAN OR CABINET.
4. SCREW SHRINKABLE, INTERNALLY THREADED COMPONENT (SHRINK PORTION) ON RIGID NUT. TIGHTEN THE MALE AND FEMALE PARTS WITH APPROPRIATE SPANNER WRENCHES.
5. TO PREPARE THE CABLE FOR ENTERING THE ELECTRICAL ENCLOSURE, PROCEED IN THE NORMAL MANNER BY REMOVING ENOUGH ARMOR TO ALLOW FOR THE CONDUCTORS TO REACH THE REMOTEST LOCATION ON THE CONNECTION BLOCK WITH REASONABLE AMOUNT OF SLACK. WHEN REMOVING THE SHEATH FROM THE CONDUCTORS, BE SURE TO LEAVE ENOUGH SHEATH EXTENDING THROUGH THE ARMOR TO OBTAIN A MAXIMUM SEAL BETWEEN THE SHRINKABLE NOSE AND THE SHEATH. NORMALLY, 1/4" TO 3/8" OF THE ARMOR MUST BE INSIDE THE CABLE ENTRY SEAL, THEN THE SHEATH SHOULD EXTEND THROUGH THE NOSE (SHRINK SECTION). SEE METHOD 1B131, THIS SHEET, FOR PROPER INSTALLATION. (NOTE: THE WATERSEAL IS ACCOMPLISHED BY THE FACTORY APPLIED SEALANT FORMING A MECHANICAL BOND BETWEEN THE NOSE OF THE CABLE ENTRY SEAL AND THE CABLE SHEATH, WHEN THE NOSE IS SHRUNK TO THE CABLE). AVOID UNNECESSARY CUTTING OF THE SHEATH AND CONDUCTOR INSULATION DURING THE PROCESS OF PREPARATION. IF IT IS NOT POSSIBLE OR DESIRABLE TO SECURE THE ARMOR UNDER THE SHRINKABLE NOSE, THEN USE TAPE OR SHRINK TUBING TO KEEP THE ARMOR FROM UNRAVELLING AS DESCRIBED IN METHOD 3C21.
6. PREPARE THE CONDUCTORS FOR MAKING THE ELECTRICAL CONNECTIONS.
7. INSERT THE CABLE THROUGH THE PREVIOUSLY ASSEMBLED UNIT AND INTO THE ENCLOSURE SO AS TO "TRAP" THE ARMOR INSIDE THE NOSE AND EXTEND THE CABLE SHEATH THROUGH THE SHRINK PORTION OF THE ENTRY SEAL. THE CONDUCTORS MAY BE CONNECTED AT THIS POINT, BEFORE SHRINKING, IF NECESSARY, TO ELECTRICALLY CHECK OUT. IT MAY BE DESIRABLE TO WAIT UNTILL ALL CABLES ARE INSTALLED AND CHECKED OUT BEFORE SHRINKING ANY OF THE CABLE ENTRY SEALS.
8. SHRINK EXPANDED OPENING IN THE CABLE ENTRY SEAL BY APPLYING HEAT (250°-275°F), USING HOT AIR BLOWER (HEAT GUN WITH CIRCULAR DEFLECTOR), GAS TORCH (E.G.: PROPANE OR BUTANE), OR OTHER HEAT SOURCE. WHEN PART HAS BEEN FULLY SHRUNK AND ASSUMES THE CONFIGURATION OF THE CABLE, DISCONTINUE HEATING. ADDITIONAL HEATING WILL NOT MAKE THE COMPONENT SHRINK TIGHTER.
9. "O" RINGS SHALL BE FURNISHED BY THE MANUFACTURER, AS A PART OF THE COMPLETE CABLE ENTRY SEAL.
10. THE CABLE ENTRY SEAL SHOWN ON THIS SHEET IS SUITABLE FOR ALL THIN WALL ENCLOSURES UP TO AND INCLUDING 3/16" THICK.
11. GROUNDING, IF REQUIRED, WILL BE ACCOMPLISHED ACCORDING TO THE APPLICABLE REQUIREMENTS OF MIL-STD-1310.
12. THE RIGID PLASTIC PARTS SHALL BE MADE FROM POLYAMIDE MATERIAL IN ACCORDANCE WITH TYPE II OF MIL-M-20693 OR POLYESTER PER MIL-M-24519 PARAGRAPH 4.7.
13. MATERIAL SHALL CONFORM TO THE REQUIREMENTS OF MIL-I-81765/1, TYPE I.
14. THE ADHESIVE USED TO BOND THE POLYOLEFIN TO THE NYLON (POLYAMIDE) INSERT MUST BE IN ACCORDANCE WITH MIL-A-46050.
15. SEALS MUST NOT BE INSTALLED IN ANY CABINET OR DEVICE IN WHICH NORMALIZED TEMPERATURE (AMBIENT PLUS TEMP RISE) WILL EXCEED 185°F (85°C). APPLICATION IS LIMITED TO 20 PSI WATER PRESSURE MAX. THESE SEALS ARE NOT TO BE USED WITH ANY CABLE IN WHICH THE NORMALIZED TEMP. WILL EXCEED 185°F (85°C)
16. THESE SEALS ARE CONSIDERED AS AN ALTERNATE TO NYLON STUFFING TUBES WHEN MEETING THE PERFORMANCE REQUIREMENTS OF MIL-S-19622.
17. THE SEAL SHALL BE COATED WITH AN ADHESIVE WHICH MEETS THE ADHESIVE REQUIREMENTS SPECIFIED IN SECTION 1, GROUP A, SHEET 6. FOR APPROVED MANUFACTURERS LIST CONTACT CMDR. DEPT. OF THE NAVY, WASH DC 20362 NAVSEA CODE 56Z34.

SH 132316980

FIGURE 1B13. Heatshrink cable entry seal applicable to watertight and non-watertight enclosures.

CANCELED (REPLACED BY SECTION 5)

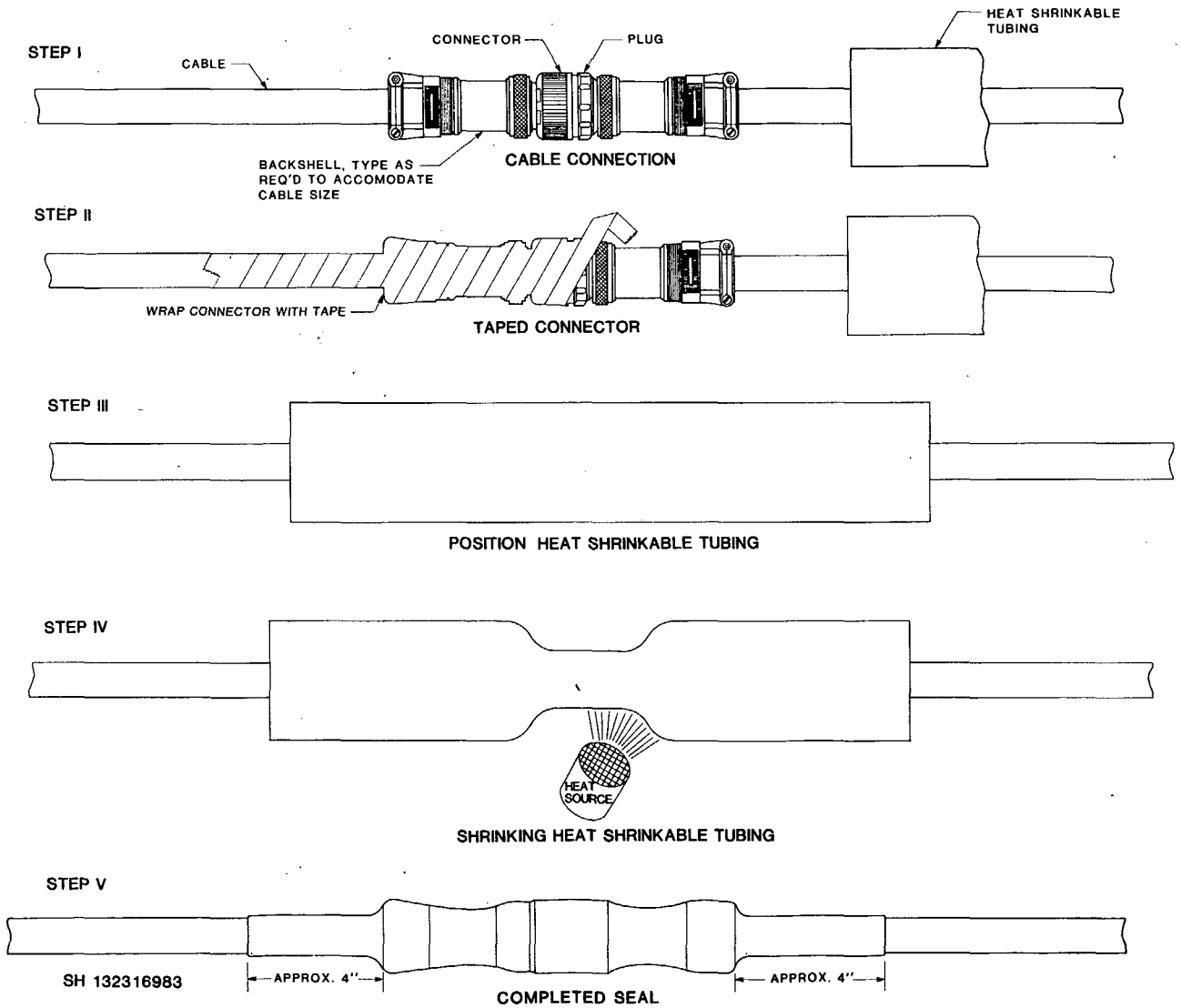
SH 132316981

FIGURE 1C1. Cable termination to multi-pin "MS" connectors.

C A N C E L E D (R E P L A C E D B Y S E C T I O N 5)

SH 132316982

FIGURE 1C2. Cable termination to multi-pin "MS" connectors.



NOTES:

1. THE PROCEDURE OUTLINED ON THIS FIGURE IS SUITABLE FOR COVERING IN-LINE CONNECTORS LOCATED TOPSIDE, WITH HEAT SHRINKABLE TUBING TO PROTECT AGAINST CORROSION BY MAKING THE CONNECTORS WATERTIGHT.
2. INSTALL THE HEAT SHRINKABLE TUBING PER THE FOLLOWING STEPS:
   - STEP 1 - INSTALL HEAT SHRINKABLE TUBING OF PROPER DIAMETER AND LENGTH (APPROXIMATELY 8" INCHES LONGER THAN MATED CONNECTORS) ON ONE OF THE CABLES. CONNECT THE CONNECTORS TOGETHER. ABRADE THE CABLE JACKET (PAINTED OR UNARMORED) CIRCUMFERENTIALLY AND CLEAN WITH APPROPRIATE SOLVENT (MEK OR EQUIVALENT).
   - STEP 2 - WRAP CONNECTOR IN TAPE.
   - STEP 3 - POSITION HEAT SHRINKABLE TUBING. PLACE HEAT SHRINKABLE TUBING CENTERED OVER CONNECTORS.
   - STEP 4 - USING A HOT AIR BLOWER OR A GAS (BUTANE OR PROPANE) TORCH WITH A FLAME SPREADER OR OTHER HEAT SOURCE, HEAT THE CENTER OF TUBING UNTIL IT SHRINKS OVER CONNECTORS. START WORKING TOWARDS ONE END. APPLYING THE HEAT UNIFORMLY AND SMOOTH. WHEN ONE HALF OF THE TUBING IS SHRUNK REPEAT THE SAME PROCEDURE ON THE UNSHRUNK HALF.
   - STEP 5 - REMOVE HEAT AND ALLOW TUBING TO COOL. DO NOT TRY TO MOVE.
3. HEAT SHRINKABLE TUBING SHALL BE PER MIL-I-23053/5, CLASS (WITHOUT SEALANT).
4. THIS FIGURE SUPERSEDES SHEET 1C3 OF DRAWING 803-5001027.

FIGURE 1C3. Protection of connectors topside.

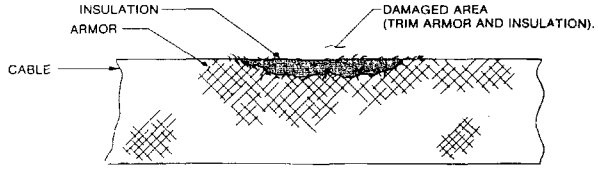


FIGURE 1

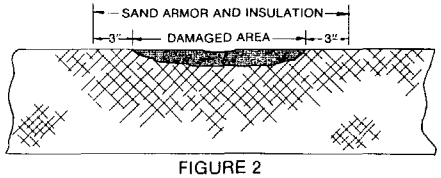


FIGURE 2

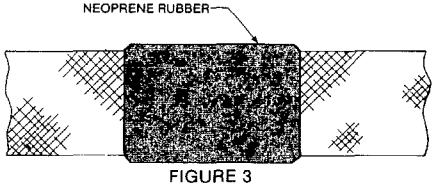


FIGURE 3

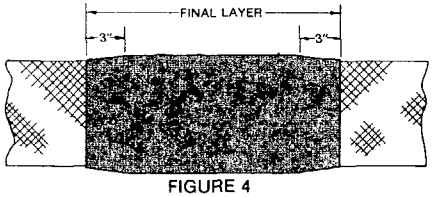


FIGURE 4

SH 132316984

NOTES:
1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 164 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1D1 OF DRAWING 803-5001027.

METHOD 1D11

1. THE PROCEDURE OUTLINED IS SUITABLE FOR REPAIRING CABLES WITH ARMOR AND SHEATH DAMAGE ONLY, WITH CONDUCTORS AND WATERSEALING COMPOUNDS BEING INTACT.
2. TRIM DAMAGED INSULATION AND ARMOR TO REMOVE FRAYED AREAS. SEE FIGURE 1.
3. SAND INSULATION AND ARMOR TO BE REPAIRED PROVIDING A ROUGH SURFACE THAT EXTENDS THREE INCHES EACH SIDE OF THE DAMAGED AREA. SEE FIGURE 2.
4. CLEAN AREA WITH XYLOL OR EQUIVALENT SOLVENT.
5. APPLY SUCCESSIVE LAYERS OF GACO TYPE N29 ADHESIVE AND TYPE N3SG 1/16" THICK CURED NEOPRENE RUBBER, OR THE EQUAL, TO OBTAIN A RESULTANT THICKNESS GREATER THAN THAT OF THE DAMAGED MATERIAL. SEE FIGURE 3.
6. THE FINAL LAYER OF NEOPRENE RUBBER SHOULD EXTEND 3" EACH SIDE OF THE DAMAGED AREA. SEE FIGURE 4.
7. APPLY A SUFFICIENT AMOUNT OF GACO TYPE N29 ADHESIVE COATING, OR EQUAL, TO COVER THE REPAIR AND TO SATURATE THE ADJACENT EXPOSED ARMOR.

FIGURE 1D1. Repair of damaged cables, insulation & armor.

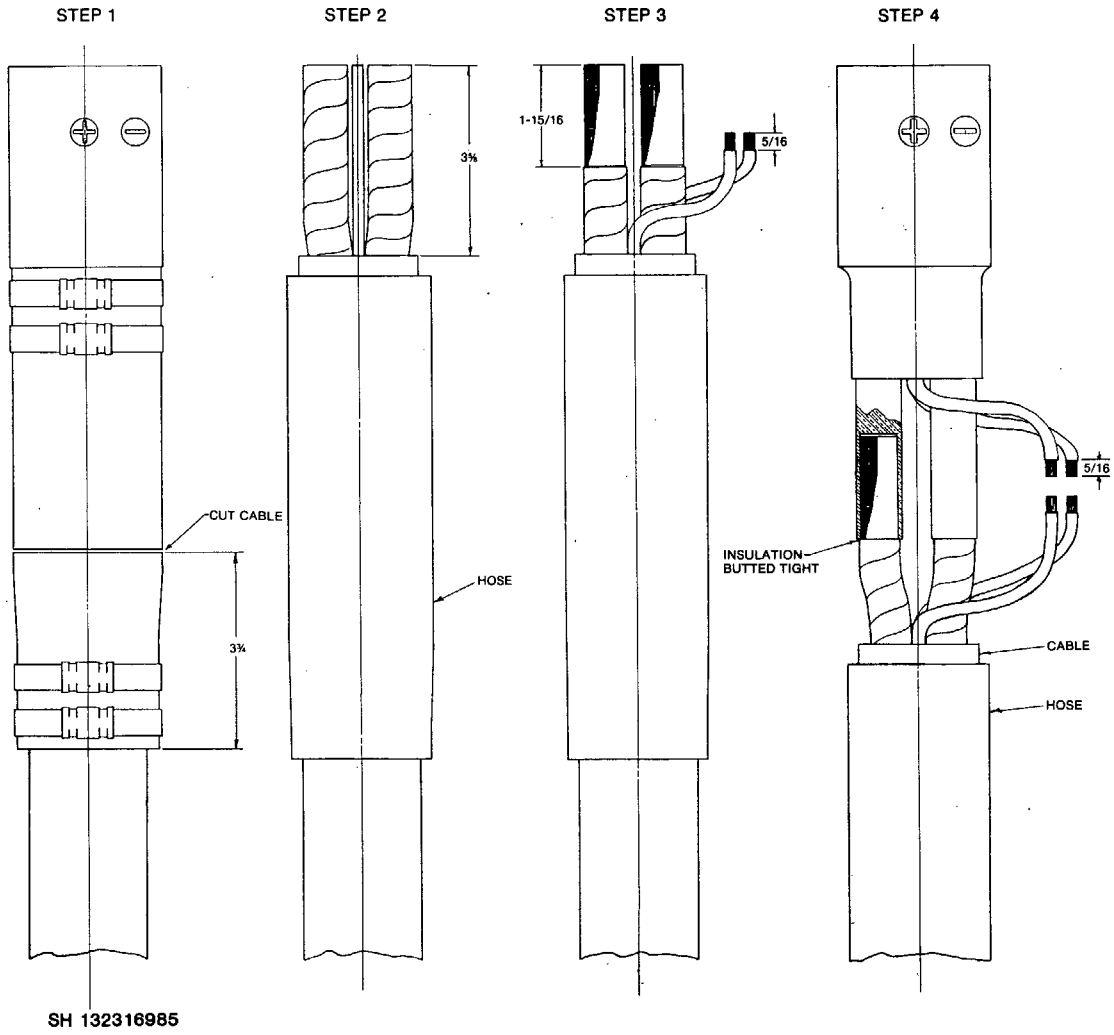


FIGURE 1D2. Repair of jet aircraft and starting cables.

NOTES:
1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 80 OF DRAWING NAVSEC NO. 9000-S6202-72980, AND SHEET 1D2 OF DRAWING 803-5001027.

THIS METHOD REFERS TO MOLDED TYPE PLUG ASSEMBLY SHOWN ON BU SHIPS DWG 815-1197060.

STEP 1
CUT DAMAGED CONNECTOR PLUG FROM THE CABLE.

STEP 2
SLIDE NEW HOSE IN PLACE ON THE CABLE, REMOVE OUTER CABLE SHEATH FOR THE LENGTHS SHOWN IN DETAIL.

STEP 3
REMOVE A SUFFICIENT LENGTH OF INSULATION FROM THE CONDUCTOR TO RECEIVE THE PLUG FERRULES FOR FULL LENGTH OF RECESS. CARE SHALL BE TAKEN TO PREVENT CUTTING THE STRANDS WHEN REMOVING INSULATION.

STEP 4
ARRANGE THE PLUG TIP ASSEMBLY (OVAL OR RECTANGULAR AS REQ'D) AS SHOWN IN DETAIL AND INSERT THE PREPARED ENDS OF THE LARGE CONDUCTORS (250 MCM) IN THE APPROPRIATE FERRULE, CARE SHALL BE TAKEN TO INSURE THAT ALL THE STRANDS ARE IN PLACE WITHIN THE FERRULE.

(CONTINUED ON FIGURE 1D3)

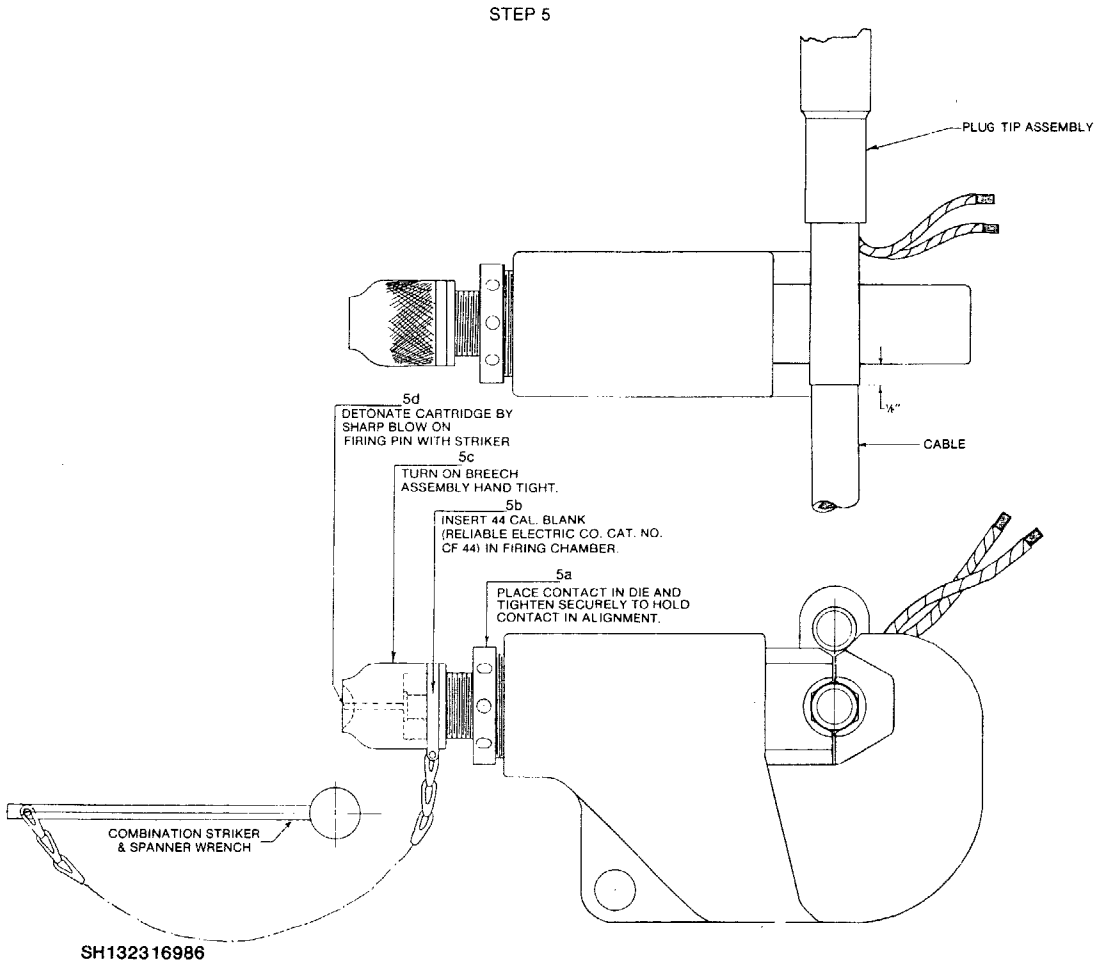


FIGURE 1D3. Repair of jet aircraft servicing and starting cables.

STEP 5

CRIMP CONTACT FERRULES WITH PERCUSSION TYPE CRIMPING TOOL (CONNECTOR REPAIR KIT, BU SHIPS DWG. 9000-S6202-74408) IN ACCORDANCE WITH INSTRUCTION GIVEN ON THIS SHEET.

(CONTINUED ON FIGURE 1D4)

NOTES:
1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 81 OF DRAWING NAVSEC NO. 9000-S6202-72980, AND SHEET 1D3 OF DRAWING 803-5001027.

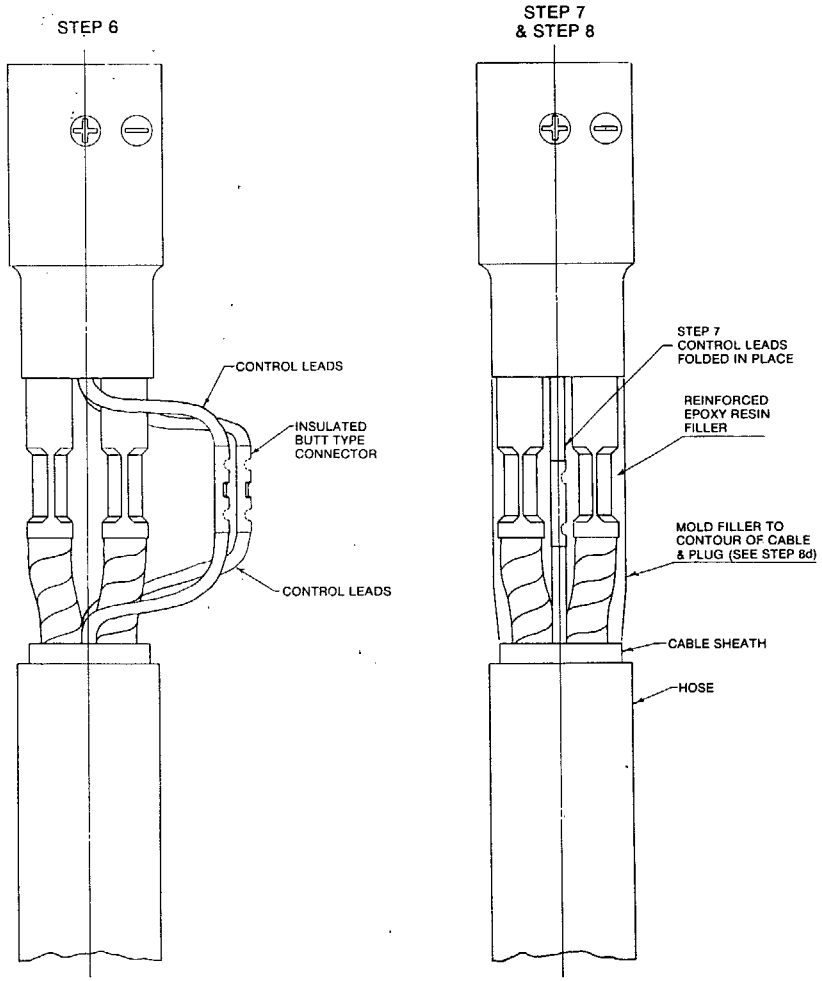


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FIGURE 1D4. Repair of jet aircraft servicing and starting cable.

STEP 6

INSERT THE PREPARED ENDS OF THE CONTROL LEADS FROM THE PLUG TIP ASSEMBLY & THE CABLE IN THE INSULATED BUTT CONNECTOR. CRIMP IN PLACE WITH THE HAND CRIMPING TOOL.

STEP 7

FOLD THE CONTROL LEADS IN PLACE AS SHOWN IN DETAIL.

STEP 8

PREPARE REINFORCED EPOXY RESIN FILLER AS FOLLOWS:

a. OBTAIN AND HAVE READY AN EXPENDABLE CONTAINER AND SPATULA OR PUTTY KNIFE FOR MIXING THE EPOXY RESIN AND MILLED FIBER.

b. MIX TOGETHER THE RESIN AND HARDENER CONTAINED IN ONE 2¾ OZ. SIZE PACKAGE OF EPOXY RESIN MIL-S-22266, TYPE I (FSN 9G5970-752-5430) IN ACCORDANCE WITH MRF'S INSTRUCTIONS. NOTE: RESIN WILL SET UP HARD IN 10 TO 15 MINUTES.

c. POUR THE EPOXY RESIN MIXTURE (b ABOVE) ONTO ABOUT 2/3 CUP OF MILLED FIBER* AND MIX TO THE CONSISTENCY OF SOFT PUTTY.

d. MOLD THE PUTTY TO DESIRED SHAPE, FILLING VOIDS BETWEEN PLUG TIP AND CABLE SHEATH. SLIDE HOSE IN PLACE AND SECURE WITH BANDING AS SHOWN IN STEP 1 DETAIL.

*NOTE: THE MILLED FIBER SHALL CONSIST OF ⅛ INCH STRANDS OF KATONIC BINDER. POSSIBLE SOURCE ARE MANUFACTURERS & PROCESSORS OF FIBER GLASS.

NOTES:
1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 82 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1D4 OF DRAWING 803-5001027.

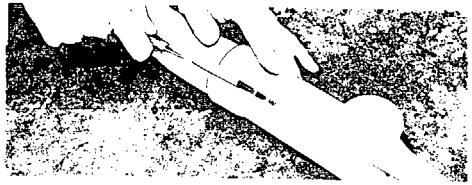

FIGURE 1

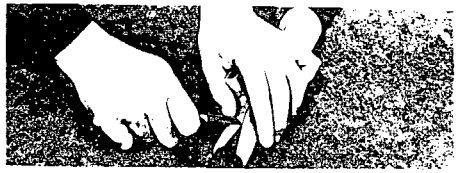

FIGURE 2

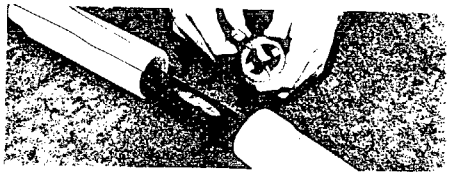

FIGURE 3

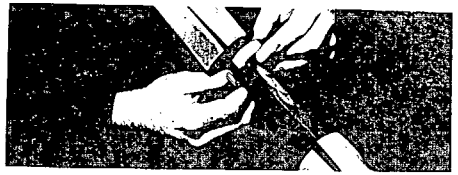

FIGURE 4

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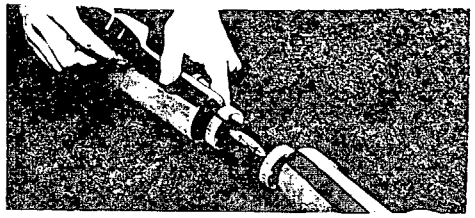


FIGURE 5

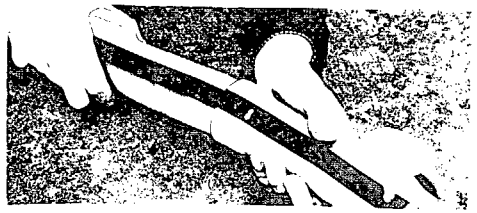


FIGURE 6

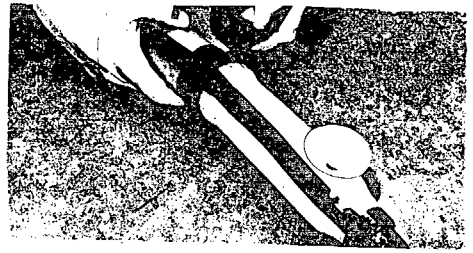


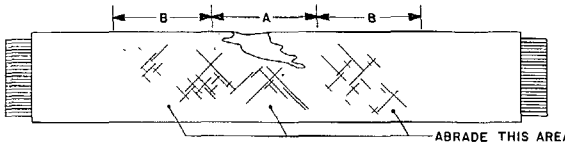
FIGURE 7

METHOD 1D51

1. THE PROCEDURE OUTLINED IS SUITABLE FOR REPAIRING CABLES HAVING POLYETHYLENE CABLE JACKET OR INSULATION BY USING CASTING MOULDS WITH EPOXY OR POLYURETHANE AS A CASTING RESIN IN CONJUNCTION WITH THE PROPER CABLE PRIMER WHICH ACTS AS A SEALER BETWEEN THE CABLE JACKET AND CASTING RESIN. SEE TABLE 3, SECTION I, GROUP E, SHEET 3, AND NOTES 10E, 10E1 AND 11 TO 13 AND SECTION I, GROUP E, SHEET 1 FOR MATERIAL SPECIFICATIONS.
2. ROUGHEN OUTER JACKET OF CABLE WITH EMERY CLOTH. BE SURE TO ROUGHEN COMPLETE AREA THAT WILL BE COVERED WITH MOULD. PRIME ROUGHENED AREA WITH CABLE PRIMER FOR SUPERIOR ADHESION AND BEST MOISTURE PROTECTION. BRUSH ON LIBERAL QUANTITY AND LET DRY.
3. PUT CASE TOGETHER AND CUT LENGTHWISE, 1/2 INCH TO RIGHT OF FILLER NECK AND AIR VENT. REMOVE CLOSED ENDS OF BOTH HALVES BY CUTTING OFF TAPERED SECTIONS AT SMALLEST POSSIBLE DIAMETER. SEE FIGURE 1.
4. TO DETERMINE CABLE END SIZE, SQUEEZE SPLIT CASE AROUND CABLE UNTIL SPLIT IN CASE TOUCHES TOGETHER. CUT OFF EXCESS TAPERED END WHERE SPLIT IN CASE SEPARATES. SEE FIGURE 2.
5. CLIP SPOKES OF CENTERING WAFER TO EQUAL LENGTHS TO FIT CABLE DIAMETER. THEN CUT OUTER RING OF WAFER AS SHOWN.
6. SLIP WAFER OVER CABLE. SEE FIGURE 4.
7. PLACE EACH HALF OF CASE AROUND CABLE AND TAPE SEAM. SEE FIGURE 5.
8. SLIDE THE TWO HALVES TOGETHER. SEE FIGURE 6.
9. SEAL BOTH ENDS AND CENTER SEAMS WITH TAPE. SEE FIGURE 7. COMPLETE ENCAPSULATION AS SHOWN IN STEPS 8, 9, AND 10 ON SHEET 17 OF SECTION 1 GROUP E, MAKING SURE CASE IS IN LEVEL POSITION BEFORE POURING ENCAPSULATING RESIN.

NOTES:
1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 132 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1D5 OF DRAWING 803-5001027.

FIGURE 1D5. Repair of cables power, control, telephone and electronic.



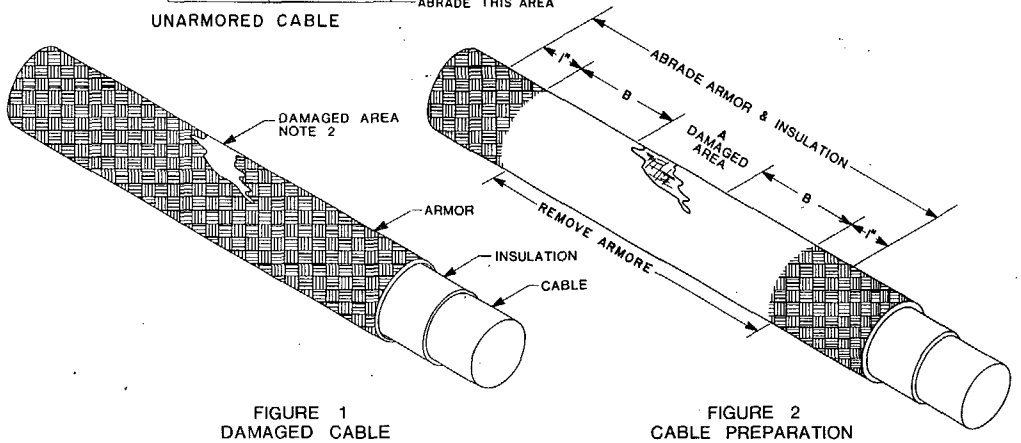


FIGURE 1
DAMAGED CABLE

FIGURE 2
CABLE PREPARATION

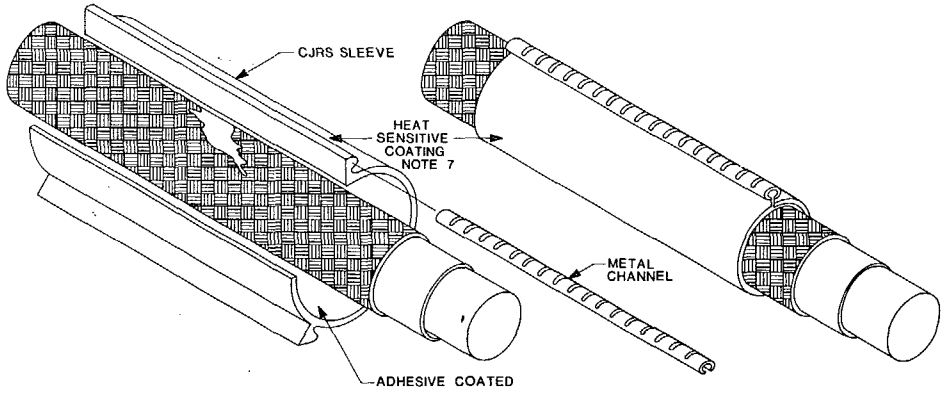


FIGURE 3
INSTALLING SLEEVE

FIGURE 4
FINISHED REPAIR

NOTES AND INSTALLATION INSTRUCTIONS

1. THE PROCEDURE OUTLINED IS SUITABLE FOR REPAIRING CABLES WITH ARMOR AND OR SHEATH DAMAGE ONLY, WITH CONDUCTORS AND WATERSEALING COMPOUNDS BEING INTACT AS AN ALTERNATE TO FIGURE 1D11.
2. TRIM DAMAGED INSULATION AND OR ARMOR TO REMOVE FRAYED AREAS. SEE FIGURE 1.
3. ABRADE INSULATION AND OR ARMOR TO BE REPAIRED, PROVIDING A ROUGH SURFACE AS SHOWN ON FIGURE 2. PAINTED SURFACES MUST BE ABRADED TO REMOVE LOOSE, PEELING OR CHIPPED PARTICLES.
4. CLEAN AREA WITH APPROPRIATE SOLVENT (MEK OR EQUIVALENT).
5. USE A HOT AIR BLOWER OR A GAS (BUTANE OR PROPANE) TORCH WITH A FLAME SPREADER OR OTHER HEAT SOURCE. APPLY HEAT TO ALL PARTS OF THE CABLE JACKET TO WHICH THE REPAIR SLEEVE IS TO BE APPLIED. DO NOT OVERHEAT. THE JACKET SHOULD BE HEATED UNIFORMLY UNTIL WARM TO THE TOUCH.
6. ASSEMBLE CJRS AS SHOWN IN FIGURES 3 & 4. PLACE THE RAIL SECTION OF THE CJRS ON TOP OF THE CABLE. SLIDE THE METAL CHANNEL OVER THE RAILS. LEAVE 1/2" OVERHANG OF THE CHANNEL ON EITHER END OF THE REPAIR SLEEVE.
7. CENTER THE ASSEMBLED SLEEVE OVER THE DAMAGED AREA. APPLY HEAT SOURCE TO OUTER SURFACE OF SLEEVE TO SHRINK SLEEVE AND MELT ADHESIVE. WHEN THE SLEEVE IS IN INTIMATE CONTACT WITH CABLE JACKET AND THE ADHESIVE HAS MELTED AND FLOWED, THE INSTALLATION IS COMPLETE. THE COLORED PAINT COATING ON THE OUTSIDE OF THE REPAIR SLEEVE IS HEAT SENSITIVE AND WILL CHANGE COLOR TO INDICATE SUFFICIENT HEAT HAS BEEN APPLIED FOR A CORRECT INSTALLATION.
8. CONFIGURATION AND USE OF CABLE JACKET REPAIR SLEEVES SHALL CONFORM TO TABLE 1. MATERIAL, CONFORMING TO THE PERFORMANCE REQUIREMENTS OF MIL-I-23053/15, SHALL BE FABRICATED INTO A WRAP-AROUND SLEEVE WITH A RAIL CHANNEL CLOSURE SYSTEM AS SHOWN IN FIGURES 3 AND 4. INSIDE SURFACE OF SLEEVE SHALL BE COATED WITH AN ADHESIVE.

TABLE 1 (DIMENSIONS IN INCHES)

PART NO. FOR CABLE DIA RANGE	B	USE ON CABLE DIA. RANGE	SLEEVE LENGTH MINIMUM FOR UNARMORED CABLE	SLEEVE LENGTH MINIMUM FOR ARMORED CABLE	RAIL TO RAIL AS SUPPLIED	RAIL TO RAIL AFTER SHRINKING	WALL THICKNESS AFTER SHRINKING
1D61-A	3"	.30 - .60	A + 2B	A+2B+ 2	1.8	.94	.080 ± .010
1D61-B	3"	.61 - 1.00	A + 2B	A+2B+ 2	3.14	1.91	.080 ± .010
1D61-C	3"	1.01 - 1.60	A + 2B	A+2B+ 2	5.03	3.17	.080 ± .010
1D61-D	4"	1.61 - 2.30	A + 2B	A+2B+ 2	7.22	5.06	.080 ± .010
1D61-E	5"	2.31 - 3.62	A + 2B	A+2B+2	11.37	7.26	.080 ± .010

9. SLEEVES MAY BE CUT FROM STOCK LENGTHS.
10. THIS REPAIR TO BE ACCOMPLISHED **ONLY ON INSTALLED CABLES.**
11. **THIS FIGURE SUPERSEDES SHEET 1D6 OF DRAWING 803-5001027.**

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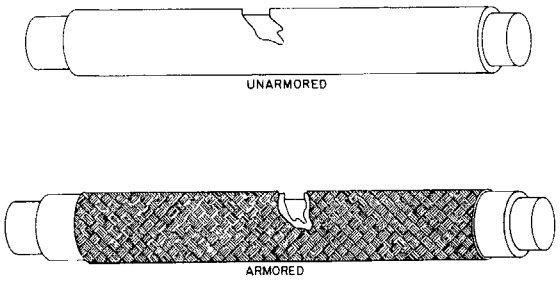
FIGURE 1D6. Cable jacket repair sleeve, installation.



DAMAGED CABLE
(NOTE 1)

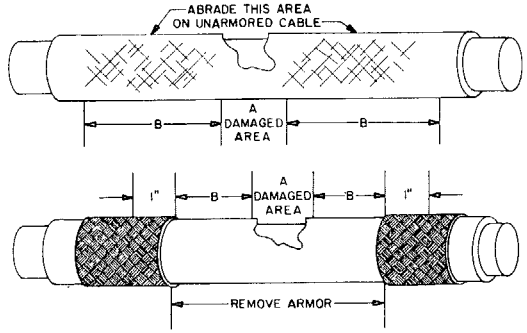


FIGURE 1
CABLE PREPARATION
(STEP 1)

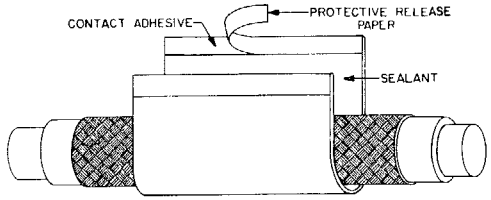


FIGURE 2
INSTALLING
REPAIR SLEEVE
(STEP 2)

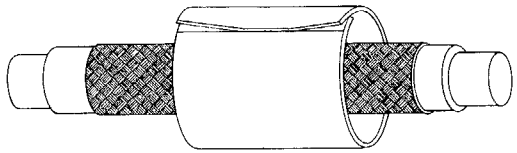


FIGURE 3
INSTALLING
REPAIR SLEEVE
(STEP 3)

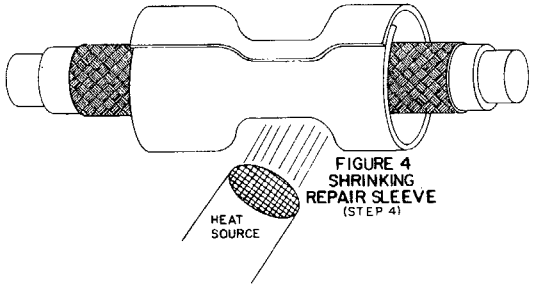


FIGURE 4
SHRINKING
REPAIR SLEEVE
(STEP 4)

FIGURE 5
COMPLETED REPAIR

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NOTES:

1. THE PROCEDURE OUTLINED ON THIS FIGURE IS SUITABLE FOR REPAIRING CABLES WITH ARMOR AND/OR SHEATH DAMAGE ONLY, WITH CONDUCTORS AND WATERSEALING COMPOUNDS BEING INTACT. THIS METHOD IS AN ALTERNATE TO FIGURE 1D1.

2. INSTALL THE REPAIR SLEEVE PER THE FOLLOWING STEPS:

   STEP 1 —
   TRIM DAMAGED INSULATION AND OR ARMOR TO REMOVE FRAYED AREAS. REMOVE ARMOR ON ARMORED CABLES AS SHOWN IN FIGURE 1. ABRADE THE CABLE JACKET CIRCUMFERENTIALLY AND CLEAN AREA WITH APPROPRIATE SOLVENT (MEK OR EQUIVALENT).

   STEP 2 —
   SELECT PROPER REPAIR SLEEVE AND CUT TO PROPER LENGTH AS SHOWN IN TABLE I. ROLL THE SLEEVE TIGHTLY TO GIVE IT A CIRCULAR SHAPE. REMOVE THE PROTECTIVE RELEASE PAPER FROM BOTH FLAPS. THIS WILL EXPOSE THE SURFACE OF THE CONTACT ADHESIVE.

   STEP 3 —
   PLACE THE REPAIR SLEEVE AROUND CABLE SO THAT THE SEALANT SIDE OF THE SLEEVE IS NEXT TO THE CABLE. ALIGN THE CENTER OF THE TOP FLAP OVER THE CENTER OF THE LOWER FLAP, AS WELL AS ALIGNING THE EDGE OF THE TOP FLAP WITH THE WHITE LINE RIDGE OF LOWER FLAP. PRESS DOWN FIRMLY ON THE CENTER OF THE FLAPS TO MATE THE CONTACT ADHESIVE SURFACE'S. WORKING FROM THE CENTER TO ONE END, ALIGN FLAPS AND PRESS THEM TOGETHER USING FIRM PRESSURE. THEN CONTINUE WITH THE OTHER END BY STARTING AT THE CENTER. DO NOT TRY TO TAKE THE FLAPS APART ONCE THE SURFACE'S HAVE MADE CONTACT TO EACH OTHER.

   STEP 4 —
   CENTER THE REPAIR SLEEVE OVER THE DAMAGED AREA, PLACING THE FLAP ON THE TOP OF THE CABLE. USING A HOT AIR BLOWER OR A GAS (BUTANE OR PROPANE) TORCH WITH A FLAME SPREADER OR OTHER HEAT SOURCE, HEAT THE FLAP LIGHTLY ALONG ITS FULL LENGTH, THEN HEAT THE CENTER UNTIL IT SHRINKS OVER CABLE. START WORKING TOWARDS ONE END, APPLYING THE HEAT UNIFORMLY AND SMOOTH. APPLY MORE HEAT TO THE FLAP AREA SO THAT THE LETTERS OF THE MANUFACTURER'S NAME BECOME SHALLOW AND FLATTEN OUT. MAKE SURE THE SEALANT IS FLOWING AROUND THE END. WHEN ONE HALF OF THE REPAIR SLEEVE IS SHRUNK REPEAT THE SAME PROCEDURE ON THE UNSHRUNK HALF. CHECK ENTIRE FLAP LENGTH TO ENSURE THAT THE LETTERS HAVE FLATTENED OUT.

   STEP 5 —
   REMOVE HEAT AND ALLOW REPAIR SLEEVE TO COOL. DO NOT TRY TO REMOVE REPAIR SLEEVE WHILE STILL HOT.

3. CONFIGURATON OF CABLE JACKET REPAIR SLEEVE SHALL CONFORM TO TABLE I. MATERIAL SHALL CONFORM TO THE PERFORMANCE REQUIREMENTS OF MIL-I-23053/15 AND BE FABICATED INTO A WRAPAROUND SLEEVE WITH EDGES HAVING A CONTACT ADHESIVE TO FORM A CIRCULAR TUBE. THE MANUFACTURER'S NAME SHALL BE STAMPED OR MOLDED IN RECESSED LETTERS ON THE TOP OF THE TOP FLAP. THESE LETTERS ARE USED AS A GAUGE TO VERIFY THAT PROPER HEAT WAS APPLIED. NORMAL ORDERING LENGTHS SHALL BE 36".

TABLE I. DIMENSIONS IN INCHES

PART NO. FOR CABLE DIA. RANGE	B DIM	USE ON CABLE DIA. RANGE	SLEEVE LENGTH MINMUM FOR UNARMORED CABLE	SLEEVE LENGTH MINMUM FOR ARMORED CABLE	ID MINIMUM EXPANDED	ID MAXIMUM RECOVERED	WALL THICKNESS AFTER SHRINKING
1D71-A	3"	.50-1.10	A+2B	A+2B+2	1.25	.50	.080 ± .010
1D71-A	3"	.80-1.80	A+2B	A+2B+2	2.00	.75	.080 ± .010
1D71-A	4"	1.20-3.30	A+2B	A+2B+2	3.60	1.10	.080 ± .010
1D71-A	5"	1.60-4.00	A+2B	A+2B+2	4.50	1.50	.080 ± .010

4. THIS METHOD OF REPAIR TO BE ACCOMPLISHED ONLY ON INSTALLED CABLE.

5. THIS FIGURE SUPERSEDES SHEET 1D7 OF DRAWING 803-5001027.

FIGURE 1D7. Cable jacket repair sleeve, installation.

NOTES

1. CABLE ARMOR WILL BE OMITTED OVER SPLICES OF ARMORED TO UNARMORED CABLE, AND OVER SPLICES OF UNARMORED CABLES. ARMOR OVER SPLICES OF ARMORED CABLES SHALL BE OMITTED EXCEPT IN THOSE AREAS WHERE ARMORED CABLE IS MANDATORY, HOWEVER, A JUMPER CAN BE INSTALLED AT THE SPLICE TO MAINTAIN ELECTRICAL CONTINUITY.
2. THE SPLICING OF MDGY CABLES SHALL BE UTILIZED FOR SHIPS IN REPAIR ONLY.
3. MATCH THE GEOMETRICAL ARRANGEMENT OF THE CONDUCTOR COLOR CODE BEFORE PULLING IN A CABLE TO BE SPLICED TO AN EXISTING CABLE. MATCHED COLOR CODE ARRANGEMENT WILL ELIMINATE CROSSOVERS WHEN SPLICING.
4. SUPPORT CABLE ENDS TO BE SPLICED BY TYING OR CLAMPING IN A POSITION AS CLOSE AS PRACTICAL TO THE POSITION THEY WILL BE IN AFTER THE SPLICE HAS BEEN COMPLETED.
5. CARE SHOULD BE EXERCISED WHEN PREPARING CABLE ENDS SO THAT UNDERLYING INSULATION IS NOT CUT WHEN REMOVING THE ARMOR AND SHEATH. SIMILAR CARE IS NECESSARY WHEN REMOVING INSULATION TO PROTECT THE COPPER CONDUCTOR STRANDS FROM CUTS AND NICKS.
6. THE EXCESS STRAND SEALING COMPOUND SHOULD BE WIRE BRUSHED AND CLEANED OFF THE OUTER SURFACE OF THE OUTER LAYER OF COPPER STRANDS OF EACH CONDUCTOR BEFORE THE CONDUCTOR IS INSERTED IN THE CONNECTOR. CONNECTORS SHOULD BE INSTALLED SO THAT THE CONDUCTOR END IS FULLY INSERTED TO THE "STOP" AT THE CENTER OF THE CONNECTOR AND THE INDENT SHOULD BE SPACED HALF WAY BETWEEN THE END OF THE CONNECTOR AND THE "STOP".
7. TEMPORARY BINDING SHOULD BE APPLIED OVER THE ENDS OF TAPES ON CONDUCTORS TO PREVENT UNWINDING OF THE INSULATION. THESE BINDINGS SHOULD BE REMOVED UNLESS PRESSURE SENSITIVE SILICONE RUBBER GLASS TAPE WAS USED FOR THIS PURPOSE.
8. CABLE SHEATHS SHOULD BE TAPERED AT THE ENDS TO ALLOW A GOOD TAPING OPERATION. CLEAN AND ROUGHEN THE SHEATH MATERIAL 3 INCHES FROM THE TAPERED EDGE. EXTRUDED INSULATION SHOULD ALSO BE TAPERED WHENEVER PRACTICAL.
9. SPLICING TAPES SHOULD BE KEPT AS CLEAN AS POSSIBLE DURING APPLICATION SO THAT FOREIGN MATTER OR CONTAMINANTS ARE NOT WITHIN THE SPLICE.
10. THE SPLICING MATERIALS PRESCRIBED IN THESE METHODS WERE SELECTED FOR THEIR EASE OF HANDLING AND FOR REQUIRED PHYSICAL AND ELECTRICAL PROPERTIES. THE FOLLOWING INFORMATION IS PRESENTED TO FAMILIARIZE PERSONNEL WITH THESE COMPONENTS.
    A. INSULATING AND BINDER TAPE. THE WHITE PRESSURE SENSITIVE SILICONE RUBBER GLASS TAPE IS USED AS PRIMARY INSULATION DIRECTLY OVER THE CONDUCTOR AND AS A BINDER TAPE OVER THE CABLED CONDUCTORS FOR CABLES WITH TWO CONDUCTORS OR MORE. IT SHOULD BE APPLIED AS SMOOTHLY AND TIGHT AS POSSIBLE. SLIGHT TRANSFER OF THE ADHESIVE TO UNDERLYING TAPES IS NOT CONSIDERED DETRIMENTAL AND IS INHERENT IN THIS TYPE OF TAPE. CARE SHOULD BE EXERCISED TO KEEP THIS TAPE CLEAN BECAUSE IT IS DIFFICULT TO APPLY WHEN THE ADHESIVE BECOMES COATED WITH DIRT. CONTAMINANTS WILL ALSO CAUSE DEGRADATION FO THE TAPE'S ELECTRICAL PROPERTIES.
    B. FILLER TAPE. THIS TAPE IS A PARTIALLY CURED MATERIAL THAT HAS A RELATIVELY SHORT SHELF LIFE AND SHOULD NOT BE USED IF THE DATE OF MANUFACTURE IS OLDER THAN ONE YEAR. IT IS USED BOTH TO FILL THE INDENTS ON LARGE CONNECTORS TO PROVIDE A SMOOTH TAPING SURFACE AND AS A CABLE JACKETING MATERIAL. WHEN USED AS A TAPE IT SHOULD BE PULLED TO APROXIMATELY ONE-HALF ITS ORIGINAL THICKNESS AND HALF LAPPED. IF THE TAPE ADHERES TOO STRONGLY TO THE SEPARATOR TAPE A STRETCHING OF THE FILLER TAPE WILL BREAK THE BOND BETWEEN THE TWO TAPES. AFTER APPLICATION, IT CAN BE MOLDED BY HAND TO FORM A UNIFORM SURFACE.
    C. OUTER SHEATHING TAPE. THIS TAPE IS A PRESSURE SENSITIVE VINYL TAPE EMPLOYED AS SHEATHING OVER THE FILLER TAPE 10B. IT SHOULD BE APPLIED TIGHT AND SMOOTH AND CAN BE BUILT UP TO PRODUCE A SPLICE OF UNIFORM CROSS SECTION.
    D. COATING MATERIAL. NEOPRENE CEMENT SHALL BE BRUSHED ON IN SEVERAL THIN COATS. ALLOW TO DRY BETWEEN COATS. THIS MATERIAL SHOULD NOT BE APPLIED NEAR OPEN FLAME.
    E. CASTING COMPOUNDS (EPOXY.)

    EPOXY CASTING RESIN IS A TWO PART MATERIAL (RESIN AND HARDNER) SUPPLIED IN CONTAINERS IN PROPER PROPORTIONS. SHOULD BE PURCHASED TO CONFORM TO MIL-S-22266.

    WHEN READY TO USE THE BASE RESIN SHOULD BE STIRRED THOROUGHLY BEFORE THE CATALYST OR HARDNER IS ADDED. THERE WILL BE SPACE ENOUGH IN THE RESIN CONTAINER TO ADD ALL OF THE CATALYST OR HARDNER. AFTER ADDING THE CATALYST OR HARDNER FURTHER STIRRING IS REQUIRED. SOME RESIN AND HARDNERS ARE SUPPLIED IN TWO COLORS, WHERE THE RESIN WILL BE BLUE AND THE HARDNER YELLOW. THIS IS DONE FOR EASY MIXING CONTROL. WHEN THE TWO PARTS ARE PUT TOGETHER AND MIXED THEY WILL BECOME A GREEN COLOR, AND WHEN A UNIFORM GREEN IS ATTAINED THE MIXING WILL BE SATISFACTORY AND THE COMPOUND IS READY FOR POURING INTO THE MOLD. ALSO, AT THE POINT OF MIXING WHEN THE MATERIAL BECOMES SLIGHTLY WARM THE MIXTURE IS READY FOR POURING.

    THE CABLES AND MOLD SHOULD NOT BE DISTURBED WHILE THE MIXTURE IS SOLIDIFYING. THE RESIN REQUIRES APPROXIMATELY ONE HOUR TO SET AT NORMAL ROOM TEMPERATURE (70 DEGREES F.), BUT WILL REQUIRE MORE TIME AT LOWER AMBIENT TEMPERATURES. THE HARDNESS OF THE MATERIAL CAN BE TESTED AT THE POURING HOLES WITH A SCREW-DRIVER. THE COMPLETE ASSEMBLY SHOULD NOT BE MOVED UNTIL RESIN HAS HARDNED THOROUGHLY.

    E.1 CASTING COMPOUNDS (POLYURETHANE)

    POLYURETHANE CASTING COMPOUND IS A TWO PART MATERIAL (PART A, AND PART B.) SUPPLIED IN CONTAINERS IN PROPER PROPORTIONS. SHOULD BE PURCHASED TO CONFORM TO MIL-M-24041.

    WHEN USING THIS COMPOUND THE BASE RESIN (PART A) SHOULD BE STIRRED THOROUGHLY BEFORE THE CATALYST (PART B IS ADDED. THERE WILL BE SPACE ENOUGH IN THE PART A CONTAINER TO ADD ALL OF THE CATALYST OR PART B.

    AFTER ADDING THE PART B, FURTHER STIRRING IS REQUIRED. THESE MATERIALS (PART A AND PART B) ARE SUPPLIED IN TWO COLORS. THE PART A WILL BE BLUE AND PART B, WILL BE YELLOW. THEY ARE SUPPLIED IN COLORS FOR EASY MIXING CONTROL. WHEN THE TWO PARTS ARE PUT TOGETHER AND MIXED THEY WILL BECOME A GREEN COLOR AND WHEN A UNIFORM GREEN IS ATTAINED THE MIXING WILL BE SATISFACTORY AND THE COMPOUND IS READY FOR POURING INTO THE MOLD.

    THE CABLES AND MOLD SHOULD NOT BE DISTURBED WHILE THE MIXTURE IS SOLIDIFYING. COMPOUND REQUIRES APPROXIMATELY ONE HOUR TO SET. THE COMPLETE ASSEMBLY SHOULD NOT BE MOVED UNTIL COMPOUND HAS HARDENED THOROUGHLY.
    F. CONNECTORS. CONNECTORS SUITABLE FOR EACH CONDUCTOR SIZE ARE LISTED ON TABLE 3,SHEET 1E3. THE CONDUCTOR MUST BE LONG ENOUGH TO REACH THE FULL DEPTH OF THE CONNECTOR AND THE CONDUCTOR INSULATION MUST BE FLUSH WITH THE BUTT OF THE CONNECTOR. SEE MIL-C-22520 AND MS 25441 FOR CRIMPING TOOL AND DIES. TWO-PIECE COMPRESSION RINGS AS APPROVED BY MIL-I-983B (3.8.9.2.1) AND MIL-E-16400D (3.9.13.4) ARE USED FOR CONNECTING THE GROUNDING SHIELDS OF TYPE TTRSU CABLE. EXAMPLES SHOWN ON SHT 1E10 ARE BURNDY "HY RING" SERIES AND REQUIRE A BURNDY TYPE MR 8PV-3 HAND COMPRESSION TOOL OR EQUIVALENT.
11. AN APPROVED SUBSTITUTE FOR THE FILLER TAPE, OUTER SHEATHING TAPE, AND COATING MATERIAL, 10, B, C, & D, IS A ROOM-TEMPERATURE-CURING EPOXY RESIN (MIL-S-22266) OR, PREFERABLY POLYURETHANE RUBBER POTTING COMPOUND, APPLIED WITH A SPLIT MOLD SIMILAR TO THAT OF METHOD 16G1 (SEE NOTE 13 & 16).
12. THE MATERIALS AND METHODS OF NOTE 11 ABOVE ARE AUTHORIZED FOR CABLE SPLICING APPLICATIONS IN-BOARD AND OUTBOARD ON SURFACE SHIPS.
13. THE EPOXY OR URETHANE MATERIAL OF NOTE 11 ABOVE SHALL BE OF FORMULATION, TYPE, AND GRADE RECOMMENDED BY THE MANUFACTURERS FOR BEST ADHESION OR BINDING WITH THE TYPE OF MATERIAL OF WHICH THE CABLE SHEATH IS MADE.
    A. WHEN SPLICING WITH EPOXY, APPLY A PRIMER IF CABLE JACKET IS POLYETHYLENE.
    B. WHEN SPLICING WITH URETHANE, APPLY A PRIMER IF CABLE JACKET IS PVC (POLYVINYL CHLORIDE) OR - NEOPRENE.
    C. IF IN DOUBT AS TO MATERIAL OF CABLE JACKET, THE FOLLOWING TEST IS A ROUGH GUIDE: APPLY A FLAME TO A SMALL PIECE OF THE JACKET REMOVED FROM CABLE END, (FLAME MAY BE MATCH OR LIGHTER).
        (1) POLYETHYLENE: WILL IGNITE AND WILL CONTINUE TO BURN AFTER FLAME IS REMOVED.
        (2) POLYVINYL CHLORIDE (PVC) AND NEOPRENE: WILL IGNITE BUT WILL NOT CONTINUE TO BURN AFTER MATCH FLAME IS REMOVED.
14. CABLE SPLICES SHALL BE ADEQUATELY SUPPORTED AT BOTH ENDS.
15. WHERE POSSIBLE, CABLE SPLICES SHALL BE ACCESSIBLE AND SHALL NOT BE LOCATED BEHIND PERMANENTLY INSTALLED EQUIPMENT OR OTHER FIXED BARRIERS.
16. THE MANUFACTURERS RECOMMENDATIONS ON SURFACE CLEANING AND PREPARATION OF THE MOLDING COMPOUNDS & PRIMER SHALL BE FOLLOWED EXPLICITLY.

NOTES:

1. THIS SHEET SUPERSEDES SECTION 4, SHEET 116 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1E1 OF DRAWING 803-5001027.
2. NO MORE THAN TWO SPLICES SHALL BE ALLOWED IN A CABLE.
3. CABLES FOR REPEATED FLEXING SERVICE, CABLES IN VOIDS AND CABLES IN NORMALLY INACCESSABLE SPACES SHALL NOT BE SPLICED.

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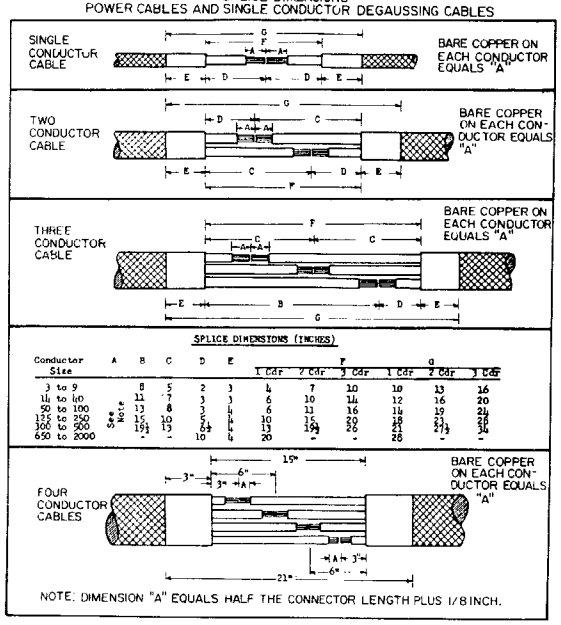
FIGURE 1E1. Splicing cables-power, control, telephone and electronic.

TABLE I
SPLICE DIMENSIONS
POWER CABLES AND SINGLE CONDUCTOR DEGAUSSING CABLES



SPLICE DIMENSIONS (INCHES)

Conductor Size	A	B	C	D	E	F 1 Cdr	F 2 Cdr	F 3 Cdr	G 1 Cdr	G 2 Cdr	G 3 Cdr
3 to 9	See Note	8	5	2	3	4	7	10	10	13	16
11 to 40		11	7	3	3	6	10	14	12	16	20
50 to 100		13	8	3	4	6	11	16	14	19	24
125 to 250		15	10	5	4	10	15	20	18	23	28
300 to 500		16½	13	6½	4	13	19½	26	21	27½	34
650 to 2000		-	-	10	4	20	-	-	28	-	-

NOTE: DIMENSION "A" EQUALS HALF THE CONNECTOR LENGTH PLUS 1/8 INCH.

TABLE 2 SPLICING MATERIALS (SEE SHEET 1E1)

MATERIAL	USE	WIDTH (IN)	MIL SPEC	STOCK NO.
BRAIDED SHIELD WIRE	REPLACEMENT SHIELD OVER SHIELDED CONDUCTORS	3/8		
VINYL SOLVENT	CLEANING CABLE JACKET	–		
NEOPRENE CEMENT	BONDING COMPOUND TO CABLE JACKET	–		
NEOPRENE JACKET COMPOUND	JACKETING CABLE SPLICE	1		
APISWAX	MOLD RELEASE	–		
PORTABLE CABLE VULCANIZER AND MOLDS	VULCANIZING CABLE JACKET OVER SPLICE	–		
PRESSURE SENSITIVE SILICONE RUBBER GLASS TAPE	PRIMARY INSULATION OVER CONDUCTOR* AND BINDER OVER CABLED CONDUCTORS	1/2 1	MIL-I-22444	9G5970-00-841-1172
FILLER TAPE	FILLER FOR CONNECTOR INDENTS AND INNER SHEATHING TAPE	1½	MIL-I-17695	00-284-9642
PRESSURE SENSITIVE VINYL TAPE	OUTER SHEATHING TAPE	1	MIL-I-24391	00-419-3164
COATING MATERIAL	OVER OUTER SHEATHING TAPE	–	NEOPRENE CEMENT	
EPOXY RESIN	CASTING RESIN	–	MIL-S-22266	9G5970-00-752-5430
POLYURETHANE	MOLDING AND POTTING	–	MIL-M-24041, TYPE I	

* THE ½" WIDTH TAPE IS USED AS PRIMARY INSULATION ON CONDUCTOR SIZES 23 AND SMALLER. THE 1" WIDTH TAPE IS USED FOR ALL OTHER BINDING APPLICATIONS.

NOTES:
1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 117 OF DRAWING NAVSEC NO. 9000-S6202-73980.

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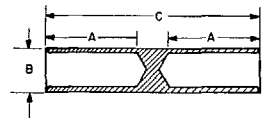
FIGURE 1E2. Splicing cables–power, control, telephone and electronic.

TABLE 3 TYPE CCBC CONNECTOR DATA

CABLE TYPE											CONDUCTOR SIZE	NUMBER ON CONNECTOR	MIL SPEC	STOCK NUMBER	MINIMUM DIMENSIONS A	B	C
MSCA-7 TO 61 MHOF-7 TO 61 MSS-6 DSS-2		TSP-11 MHFF-7 TO 44 FSS-2	TTHFWA-1 1/2 TO 60 TTRSA-2 TO 16		MSCU-7 TO 61						1(7) 2(7) 3/5(7)	1-2	MIL-E-16366	9G5940-186-2878	1/4	0.150	5/8
SSGA-3 SHOF-3		DSGA-3 DHOF-3	DSGU-3 DPS-3 DSS-3	TSGA-3 TSGU-3	TPS-3 THOF-3	FHOF-3 FSGA-3 FSGU-3				7SGU-3 7SGA-3	3(7)	2-1/2-4		2877	1/4	0.150	5/8
SSGA-4		DSGA-4 DHOF-4	DSGU-4 DPS-4 DSS-4	TSGA-4 TSS-4	TSGU-4 TPS-4 THOF-4	FHOF-4 FSGU-4	FSGA-4 FSS-4			7SGU-4 7SGA-4	4(7)	2-1/2-4		2877	1/4	0.150	5/8
		DHOF-6 DPS-6		THOF-6 TPS-6				MDGA-19(6) MDGL-19(6) MDU-6	MDX-6		6(7)	6-9		2876	5/16	0.212	3/4
SSGA-9		DHOF-9 DSGA-9	DSGU-9 DPS-9	TSGA-9 THOF-9	TSGU-9 TPS-9	FSGA-9 FSGU-9	FHOF-9				9(7)	6-9		2876	5/16	0.212	3/4
SSGA-14		DHOF-14 DSGA-14	DSGU-14 DPS-14	TSGA-14 TSGU-14	TPS-14 THOF-14			MDU-14 MDY-14 MDGA-19(14)	MDGL-19(14) MGDT-91(9)		9(7)# 14(7)	14		258-5891	13/16	1/4	1-3/4
SSGA-23 SHOF-23		DHOF-23 DSGA-23	DSGU-23 DDGT-17	THOF-23 TSGA-23	TSGU-23 TPS-23	FSGU-23		MDGA-19(23) MDY-23 MDU-23			8(7) # 23(7)	23		5890	13/16	1/4	1-3/4
SSGA-30		DSGA-30 DHOF-30		TSGA-30 TPS-30							30(19)	30		5893	1-1/8	5/16	2-3/8
SSGA-40		DSGA-40						MDGY-17(4) MDGA-29(40) MDGT-34(4)	MDY-40 MDU-40		4(7)# 40(19)	40		5892	1-1/8	5/16	3/8
SSGA-50 SSGU-50		DSGA-50 DSGU-50	DDGT-53	TSGA-50 TSGU-50	THOF-42	FSGU-50 FHOF-42		MDGY-15(3) MDGT-30(3)			3(7)# 50(19)	50		5907	1-1/4	3/8	2-5/8
SHOF-60		DSGA-60		TSGA-60		FHOF-60		MDGY-12(2) MDU-60 MDGT-24(2)	MDY-60		2(7)# 60(37)	60		5895	1-1/4	3/8	2-5/8
SSGA-75 SSGU-75		DSGA-75 DSGU-75		TSGA-75 TSGU-75		FSGU-75					75(37)	75		5894	1-3/8	1/2	2-7/8
SSGA-100 SSGU-100		DSGA-100 DSGU-100	DHOF-83	TSGA-100 TSGU-100		FSGU-100				5KVTSGU-100 6SGU-100 6SGA-100	100(61)	100		5897	1-3/8	1/2	2-7/8
		DSGA-125 DDGT-105		TSGA-125						6SGU-125 6SGA-125	0(19)# 125(61)	125		5896	1-1/2	9/16	3-1/8
SSGA-150 SHOF-150		DSGA-150		TSGA-150 TSGU-150	THOF-150	FHOF-133 FSGU-150				5KVTSGU-150 6SGU-150 6SGA-150	150(61)	150		5898	1-1/2	5/8	3-1/8
SSGA-200 SSGU-200	SHOF-200	DSGA-200 DSGU-200		TSGA-200 TSGU-200		FSGU-200				6SGU-200 6SGA-200	200(61)	200		5899	1-5/8	11/16	3-3/8
	SHOF-250	DSGA-250 DHOF-250	DDGT-212	TSGA-250 THOF-250						5KVTSGU-250	0000(37)# 250(61)	250		5900	1-5/8	3/4	3-3/8
SSGA-300 SSGU-300		DSGA-300 DSGU-300		TSGA-300 TSGU-300							300(91)	300		5901	2	13/16	4-1/8
				TSGA-350						5KVTSGU-350	350(91)	350		5902	2	7/8	4-1/8
SSGA-400 SSGU-400	SDGA-400	DSGA-400 DSGU-400	DDGT-400	TSGA-400	TSGU-400					5KVTSGU-400	400(61) 400(127)	400		5903	2-1/8	15/16	4-3/8
SSGA-500 SDGA-500		DHOF-400		THOF-400							500(127)	500		5904	2-1/4	1-1/16	4-5/8
SSGA-650 SSGU-650	SDGA-650 SHOF-500			THOF-500							650(127)	650		5905	2-13/16	1-1/4	5-3/4
SSGA-800 SSGU-800	SDGA-800 SHOF-650										800(127)	800		5906	2-15/16	1-3/8	6
SDGA-1000 SSGU-1000	SHOF-800										1000(127)	1000			3	1-1/2	6-1/8
SDGA-1300											1300(127)	1300					
SDGA-1600 SSGU-1600											1600(127)	1600			3-3/16	1-15/16	6-3/8
SSGA-2000 SSGU-2000											2000(127)	2000					

AWG.



TYPE CCBC CONNECTOR

NOTES:
1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 117 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1E3 OF DRAWING 803-5001027.

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FIGURE 1E3. Splicing cables-power, control, telephone and electronic.

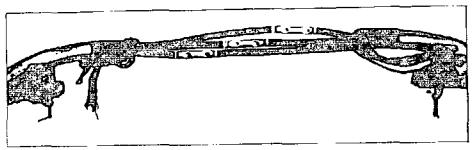

FIGURE 1

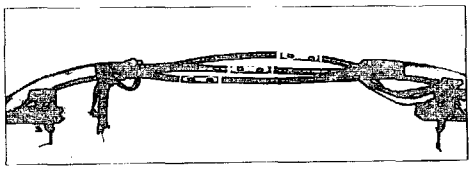

FIGURE 2

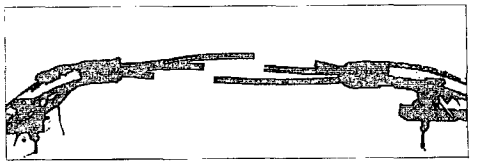

FIGURE 3

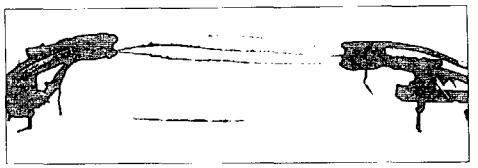

FIGURE 4

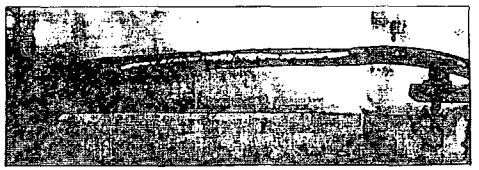

FIGURE 5

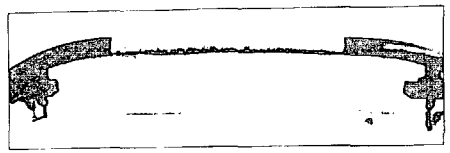

FIGURE 6

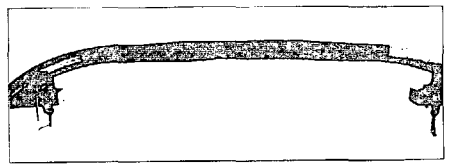

FIGURE 7

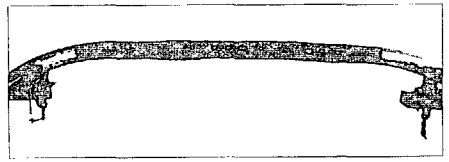

FIGURE 8

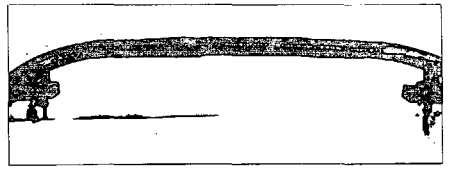

FIGURE 9

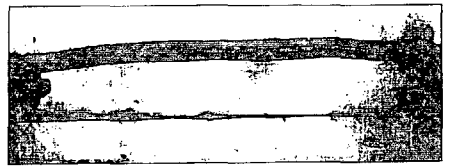

FIGURE 10

12. WHEN SPLICING UNARMORED CABLES TO ARMORED CABLES OMIT STEPS PERTAINING TO ARMOR ON CABLE WITH ARMOR APPLY SEVERAL LAYERS OF VINYL TAPE TO KEEP ARMOR FROM FRAYING.

1. THE PROCEDURE OUTLINED IS SUITABLE FOR SPLICING THE FOLLOWING TYPES AND SIZES OF NAVY SHIPBOARD CABLE:

SSGU-3 TO 800	FSGU-3 TO 50	TSGA-3 TO 400
DSGU-3 TO 800	SSGA-3 TO 800	FSGA-3 TO 9
TSGU-3 TO 400	DSGA-3 TO 400	SDGA-400 TO 2000

NOTE: TYPE-SGU CABLES MAY BE SPLICED TO TYPE — SGA CABLES OF IDENTICAL CONDUCTOR SIZE. (SEE NOTE 12)

2. OBTAIN A SECTION OF BASKET WEAVE ARMOR OF SLIGHTLY LARGER DIAMETER THAN THE CABLES TO BE SPLICED AND LENGTH TO SUIT. SLIDE SECTION OF ARMOR OVER ONE CABLE AND SECURE IT AWAY FROM THE SPLICE AREA. REFER TO NOTE 1 FIGURE 1E1
3. PREPARE CABLE ENDS AS SHOWN ON FIGURE 1E2 DIMENSIONS SHOWN ARE AFTER THE INDIVIDUAL CONDUCTORS HAVE BEEN STRAIGHTENED (LAY REMOVED). DO NOT CUT FILLER BETWEEN CONDUCTORS, IT WILL BE REPLACED DURING THE SPLICING OPERATION TAPER THE EXPOSED END OF CABLE SHEATH AND APPLY A TEMPORARY BINDING OF VINYL TAPE ON THE ARMOR.
4. SPLICE CONDUCTORS AS FOLLOWS:
   A. SELECT THE PROPER CONNECTORS, SEE FIGURE 1E2.
   B. INSERT CONDUCTORS AND CRIMP CONNECTOR.
   C. ON CONDUCTORS SIZE 50 OR LARGER FILL THE CONNECTOR INDENTS WITH WADS OF FILLER TAPE. APPLY THREE HALF LAPPED LAYERS OF SILICONE RUBBER GLASS INSULATING TAPE OVER THE SPLICE AND 1" BEYOND EACH END OF THE CONNECTOR. SEE FIGURES 1, 2, AND 3.
   D. APPLY ONE HALF LAPPED LAYER OF SILICONE RUBBER GLASS TAPE OVER THE EXPOSED LENGTH OF THE CONDUCTOR. SEE FIGURE 4.
   E. REPEAT STEPS 4A THROUGH 4D FOR EACH CONDUCTOR IN THE CABLE
5. LAY FILLER BACK IN PLACE. THE FILLER MAY BE HELD IN PLACE BY TYING WITH GLASS CORD FOR CONVENIENCE WHEN TAPING. SEE FIGURE 5.
6. APPLY ONE HALF LAPPED LAYER OF SILICONE RUBBER GLASS BINDER TAPE OVER THE GROUPED CONDUCTORS BETWEEN THE CABLE SHEATH ENDS. SEE FIGURE 6.
7. APPLY ONE HALF LAPPED LAYER OF FILLER TAPE. WHEN TAPING PULL TAPE TO APROXIMATELY 1/2 OF ITS ORIGINAL THICKNESS. TAPE OVER ENDS OF CABLE SHEATH FOR ABOUT 2 INCHES SEE FIGURE 7.
8. APPLY TWO HALF LAPPED LAYERS OF VINYL TAPE. TAPE TO WITHIN 1/2 INCH OF THE ARMOR. SEE FIGURE 8.
9. APPLY TWO COATS OF LIQUID COATING MATERIAL. ALLOW FIRST COAT TO DRY THOROUGHLY BEFORE APPLYING SECOND COAT. SEE FIGURE 9.
10. REMOVE TEMPORARY VINYL TAPE BINDING AND SLIDE ARMOR SECTION OVER SPLICE AREA. PULL ARMOR TO A SNUG FIT AND SECURE ENDS OVER EXISTING ARMOR WITH STAINLESS STEEL "BANDIT" CLAMPS. TRIM PROTRUDING ARMOR STRANDS. SEE FIGURE 10.
11. SEE FIGURE 1E1 NOTES 11 & 12 FOR ALTERNATE METHOD TO STEPS 7 8 AND 9 ABOVE.

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 1E4 OF DRAWING 803-5001027 & SECTION 4, SHEET 118 OF DRAWING NAVSEC NO. 9000-S6202-73980

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FIGURE 1E4. Splicing cables-power, control, telephone and electronic.

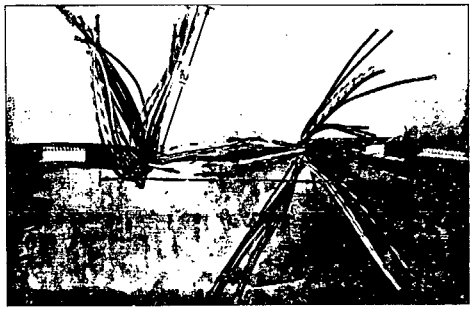

FIGURE 11

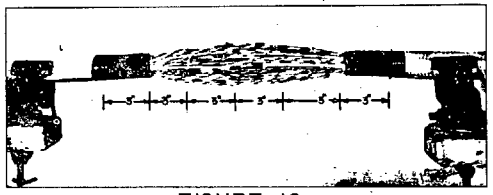

FIGURE 12

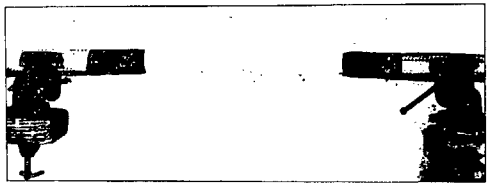

FIGURE 13

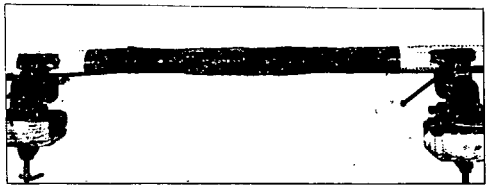

FIGURE 14

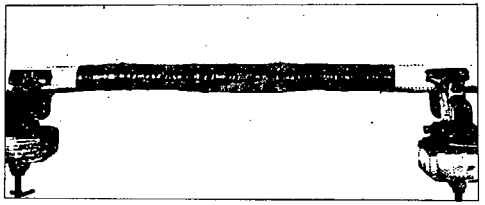

FIGURE 15

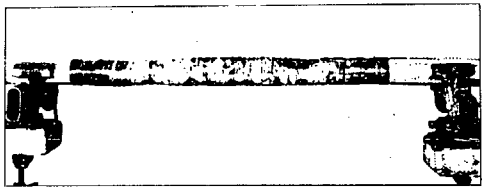

FIGURE 16

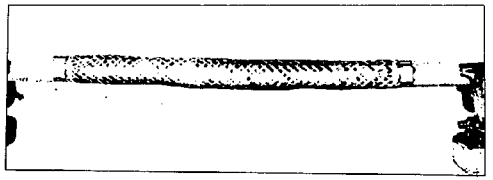

FIGURE 17

11. WHEN SPLICING UNARMORED CABLES TO ARMORED CABLES OMIT STEPS PERTAINING TO ARMOR. ON CABLE WITH ARMOR APPLY SEVERAL LAYERS OF VINYL TAPE TO KEEP ARMOR FROM FRAYING.

METHOD 1E51

1. THE PROCEDURE OUTLINED IS SUITABLE FOR SPLICING THE FOLLOWING TYPES AND SIZES OF NAVY SHIPBOARD CABLE:
   MSCU-7 TO 61 MSCA-7 TO 61 MDGA-19(6) TO 19(40)
   NOTE: THE METHOD IS SUITABLE FOR SPLICING MSCU CABLE TO MSCA CABLE. (SEE NOTE 11).
2. OBTAIN A SECTION OF BASKET WEAVE ARMOR OF SLIGHTLY LARGER DIAMETER THAN THE CABLES TO BE SPLICED AND LENGTH TO SUIT. SLIDE SECTION OF ARMOR OVER ONE CABLE AND SECURE IT AWAY FROM THE SPLICE AREA. REFER TO NOTE 1, SHEET 1.
3. PREPARE THE CABLE ENDS AS SHOWN ON FIGURE 11. TAPER THE EXPOSED END OF THE CABLE SHEATH AND APPLY A TEMPORARY BINDING OF VINYL TAPE ON THE ARMOR.
4. SPLICE CONDUCTORS AS FOLLOWS:
   A. FROM EACH CABLE, SELECT CONDUCTORS WITH THE SAME COLOR CODE. HOLD CONDUCTORS TOGETHER AND PARALLEL TO THE CABLE AXIS. LOCATE SPLICES AS SHOWN ON FIGURE 12.
   B. SELECT THE PROPER CONNECTOR, SEE FIGURE 1E2.
   C. STRIP CONDUCTOR INSULATION. REMOVE APPROXIMATELY ONE-HALF INCH OF THE CONDUCTOR BRAID (AND ASBESTOS WHERE APPLICABLE), INSERT CONDUCTOR AND CRIMP THE CONNECTOR.
   D. APPLY TWO HALF LAPPED LAYERS OF SILICONE RUBBER GLASS INSULATING TAPE OVER THE SPLICE AND 1" BEYOND EACH END OF THE CONNECTOR.
   E. REPEAT STEPS 4A THROUGH 4D FOR EACH CONDUCTOR. START WITH THE CONDUCTORS IN THE CENTER OF THE CABLES, AND STAGGER THE SPLICES.
5. APPLY ONE HALF LAPPED LAYER OF SILICONE RUBBER GLASS BINDER TAPE OVER THE GROUPED CONDUCTORS, BETWEEN THE CABLE SHEATH ENDS. SEE FIGURE 13.
6. APPLY ONE HALF LAPPED LAYER OF FILLER TAPE. WHEN TAPING, PULL TAPE TO APPROXIMATELY ONE HALF OF ITS ORIGINAL THICKNESS. EXTEND TAPE OVER ENDS OF CABLE SHEATH FOR ABOUT 2". SEE FIGURE 14.
7. APPLY TWO HALF LAPPED LAYERS OF VINYL TAPE. TAPE TO WITHIN 1/2" OF THE ARMOR. SEE FIGURE 15.
8. APPLY TWO COATS OF LIQUID COATING MATERIAL. ALLOW FIRST COAT TO DRY THOROUGHLY BEFORE APPLYING THE SECOND COAT. SEE FIGURE 16.
9. REMOVE TEMPORARY VINYL TAPE BINDING AND SLIDE ARMOR SECTION OVER SPLICE AREA. PULL ARMOR TO A SNUG FIT AND SECURE ENDS OVER EXISTING ARMOR WITH STAINLESS STEEL "BANDIT" CLAMPS. TRIM PROTRUDING ARMOR STRANDS. SEE FIGURE 17.
10. SEE FIGURE NOTES 11 & 12 FOR ALTERNATE METHOD TO STEPS 6, 7, AND 8 ABOVE.

NOTES:
1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 119 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1E5 OF DRAWING 803-5001027.

SH 132316995

FIGURE 1E5. Splicing cables-power, control, telephones and electronic.

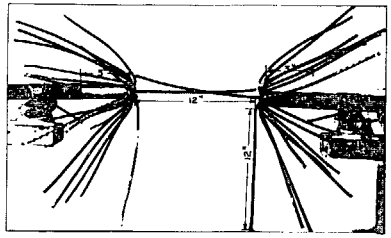

FIGURE 18

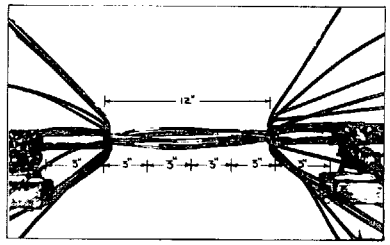

FIGURE 19

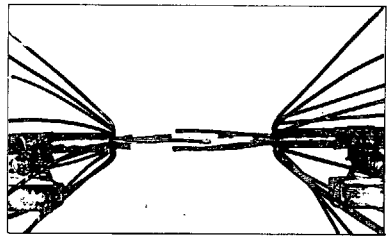

FIGURE 20

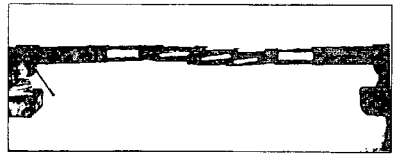

FIGURE 21

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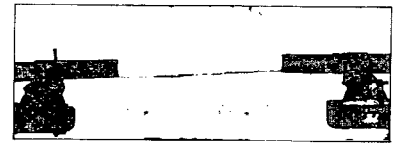

FIGURE 22

FIGURE 23

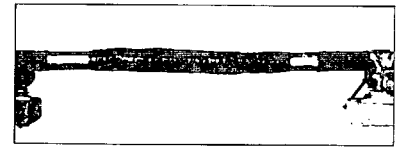

FIGURE 24

FIGURE 25

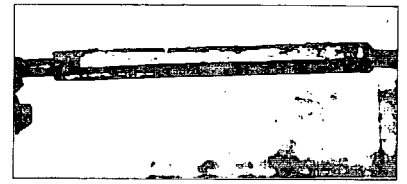

FIGURE 26

METHOD 1E61

1. THE PROCEDURE OUTLINED IS SUITABLE FOR SPLICING THE FOLLOWING TYPES AND SIZES OF NAVY SHIPBOARD CABLE.

   MDGL-19(6) MDGL-19(14)

   NOTE: THIS METHOD IS SUITABLE FOR SPLICING MDGA CABLE OF IDENTICAL SIZE. THE SPLICE MAY BE LOCATED WHERE IT IS SUBJECT TO IMMERSION IN WATER OR OIL. METHOD 1E51 IS ALSO SUITABLE FOR SPLICING MDGA CABLE TO MDGL CABLE OF IDENTICAL SIZE. HOWEVER THIS SPLICE SHOULD BE LOCATED WHERE IT IS NOT SUBJECT TO IMMERSION.
2. PREPARE CABLE ENDS AS SHOWN ON FIGURE 18.
3. SPLICE CONDUCTORS AS FOLLOWS:
   A. FROM EACH CABLE, SELECT CONDUCTORS WITH THE SAME COLOR CODE. HOLD CONDUCTORS TOGETHER AND PARALLEL TO THE CABLE AXIS. LOCATE SPLICE AS SHOWN ON FIGURE 19.
   B. SELECT THE PROPER CONNECTOR. SEE TABLE 3, SHEET 3
   C. STRIP INSULATION, INSERT CONDUCTORS, AND CRIMP THE CONNECTOR.
   D. APPLY TWO HALF LAPPED LAYERS OF SILICONE RUBBER GLASS INSULATING TAPE OVER THE SPLICE AND 1" BEYOND EACH END OF THE CONNECTOR. SEE FIGURE 20.
   E. REPEAT STEPS 3A THROUGH 3D FOR EACH CONDUCTOR. START WITH THE CONDUCTORS IN THE CENTER, AND STAGGER THE SPLICES. SEE FIGURE 21.
4. APPLY ONE HALF LAPPED LAYER OF SILICONE GLASS RUBBER BINDER TAPE OVER THE GROUPED CONDUCTORS BETWEEN THE CABLE SHEATH ENDS. SEE FIGURE 22.
5. APPLY ONE HALF LAPPED LAYER OF FILLER TAPE. WHEN TAPING, PULL TAPE TO APPROXIMATELY ONE HALF OF ITS ORIGINAL THICKNESS. TAPE OVER THE LEAD SHEATH FOR ABOUT 2". SEE FIGURE 23.
6. APPLY TWO HALF LAPPED LAYERS OF VINYL TAPE. TAPE OVER THE SPLICE AREA AND 1" BEYOND EACH END OF THE FILLER TAPE. SEE FIGURE 24.
7. PLACE SPLIT MOLD OVER THE SPLICE AREA. THE ENDS OF THE MOLD SHOULD OVERLAP THE LEAD SHEATH APPROXIMATELY 3" ON EACH END. LEVEL MOLD AND POUR CASTING RESIN (SEE NOTE 10E) UNTIL THE MOLD IS COMPLETELY FILLED. DO NOT DISTURB POUR UNTIL CAST IS COMPLETELY SET. SEE FIGURE 25. COMPLETED SPLICE IS SHOWN IN FIGURE 26.

NOTES:
1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 120 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1E6 OF DRAWING 803-5001027.

FIGURE 1E6. Splicing cables-power, control, telephone and electronic.

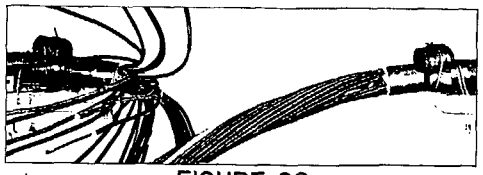

FIGURE 28

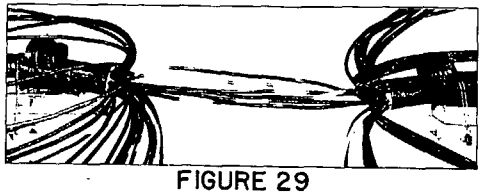

FIGURE 29

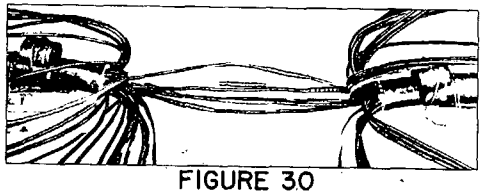

FIGURE 30

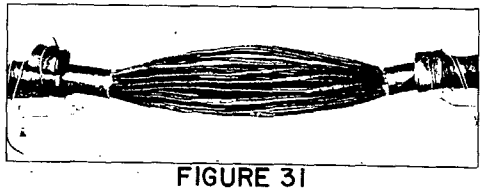

FIGURE 31

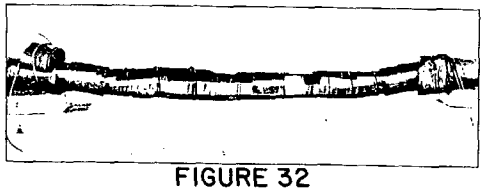

FIGURE 32

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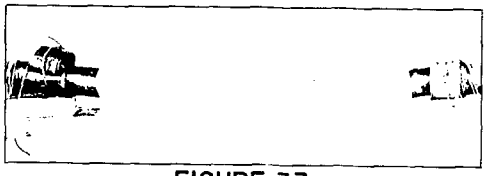

FIGURE 33

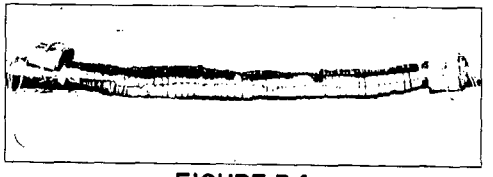

FIGURE 34

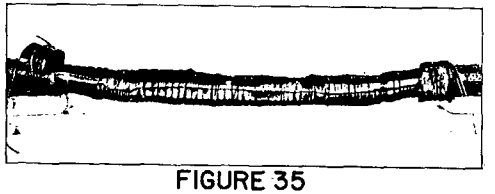

FIGURE 35

NOTE:
CONTINUED ON FIGURE 1E8.

METHOD 1E71

1. METHOD FOR SPLICING MULTI-CONDUCTOR DEGAUSSING CABLES (TYPE MDGT).
2. THIS SECTION DESCRIBES THE METHOD FOR SPLICING THE FOLLOWING SIZES OF TYPE MDGT DEGAUSSING CABLES

   MDGT-91 (9) MDGT-30 (3)
   MDGT-34 (4) MDGT-24 (2)

3. PLACE CABLE ENDS IN A POSITION AS CLOSE AS PRACTICAL TO THE POSITION THE CABLE WILL BE IN AFTER INSTALLATION AND SUPPORT THEM RIGIDLY IN THIS POSITION BY TEMPORARY TIES OR CLAMPS. UNWIND THE OUTER DUCK TAPE 27 INCHES FROM THE END OF EACH CABLE AND SECURE THE ROLLED TAPE BEYOND THE SPLICE AREA. REMOVE 24 INCHES OF SHEATH MATERIAL FROM EACH CABLE. SEE FIGURE 28.
4. THE SPLICE IS ASSEMBLED BY STARTING WITH THE CENTER CONDUCTORS AND WORKING OUTWARD BY CONDUCTOR LAYERS. THE INDIVIDUAL SPLICES ARE STARTED WITH THE ONE DIFFERENT COLORED CONDUCTOR IN EACH LAYER, AND THE ADJACENT CONDUCTORS IN THE SAME LAYER ARE CONNECTED WITHOUT CROSSOVERS. THE SPLICES ARE SPACED SO THAT EACH SPLICE IS A MINIMUM DISTANCE OF APPROXIMATELY 3-1/2 INCHES FROM THE SPLICE IN AN ADJACENT CONDUCTOR AND THE SPLICES BETWEEN LAYERS ARE NOT ADJACENT. THIS IS ACCOMPLISHED BY STAGGERING THE CONDUCTOR SPLICES IN EACH LAYER. EACH INDIVIDUAL CONDUCTOR IS PREPARED BY SELECTING MATCHED COLOR CODED CONDUCTORS FROM EACH CABLE, HOLDING THEM TOGETHER PARALLEL TO THE AXIS OF THE CABLE AND MARKING THEM IN THE POSITION WHERE THE SPLICE IS TO BE MADE SO THAT THERE WILL BE A ONE HALF INCH OVERLAP WHEN THE CONDUCTORS ARE CUT. THE ONE HALF INCH EXTRA LENGTH IS TO ALLOW THE SPLICED CONDUCTOR TO BE BOWED SLIGHTLY TO ALLOW ROOM FOR THE CRIMPING TOOL TO BE USED ON THE FOLLOWING SPLICES. THE CONDUCTOR INSULATION IS THEN REMOVED FOR A DISTANCE SLIGHTLY LONGER THAN ONE-HALF THE CONNECTOR LENGTH. THE BRAID IS THEN REMOVED APPROXIMATELY ONE HALF INCH FROM THE END OF THE INSULATION. THE PROPER CONNECTOR IS THEN CRIMPED ON THE CONDUCTOR. SEE FIGURE 29 AND FIGURE 1E1 10 (F).
5. TWO LAYERS OF PRESSURE SENSITIVE VINYL TAPE ARE THEN APPLIED, WITH 1/2 LAP, OVER THE CONNECTOR TO A MINIMUM OF 1 INCH FROM THE ENDS OF THE CONNECTOR. SEE FIGURE 30.
6. THE ABOVE OPERATIONS ARE REPEATED, CONNECTING AND TAPING ONE LAYER OF CONDUCTORS AT A TIME. SEE FIGURE 31.
7. AFTER ALL OF THE CONDUCTORS HAVE BEEN SPLICED THE CABLE SHOULD BE STRETCHED TO STRAIGHTEN THE CONDUCTORS. THEN APPLY A BINDER TAPE CONSISTING OF TWO LAYERS, 1/2 LAPPED, OF PRESSURE SENSITIVE VINYL TAPE OVER THE GROUPED CONDUCTORS BETWEEN THE CABLE SHEATH ENDS. ROUGHEN SHEATH MATERIAL 3 INCHES ON EACH END OF SPLICE. SEE FIGURE 32.
8. APPLY ONE LAYER, 1/2 LAPPED, OF FILLER TAPE. WHEN TAPING, PULL TAPE TO APPROXIMATELY ONE-HALF OF ITS ORIGINAL THICKNESS. EXTEND TAPE OVER ENDS OF CABLE SHEATH FOR ABOUT 2 INCHES. SEE FIGURE 33.
9. APPLY TWO LAYERS, 1/2 LAPPED, OF PRESSURE SENSITIVE VINYL TAPE. TAPE SHOULD EXTEND APPROXIMATELY ONE INCH BEYOND ENDS OF FILLER TAPE. SEE FIGURE 34.
10. APPLY TWO COATS OF LIQUID COATING MATERIAL. ALLOW FIRST COAT TO DRY THOROUGHLY BEFORE APPLYING SECOND COAT. SEE FIGURE 35.
11. WIND DUCK TAPE BACK OVER SPLICE AND APPLY APPROXIMATELY A 6 INCH LENGTH OF 1/2 LAPPED PRESSURE SENSITIVE VINYL TAPE TO HOLD THE END OF THE DUCK TAPE. APPLY TWO COATS OF LIQUID COATING MATERIAL OVER THE VINYL TAPE AND APPROXIMATELY 2 INCHES ONTO THE DUCK TAPE. SEE FIGURE 36, ON FIGURE 1E8.
12. SEE FIGURE 1E1 NOTES 11 & 12 FOR ALTERNATE METHOD TO STEPS 8, 9, AND 10 ABOVE.

METHOD 1E72

1. METHOD FOR SPLICING MULTI-CONDUCTOR, MERCHANT DEGAUSSING CABLES (TYPE MDGY).
2. THIS SECTION DESCRIBES THE METHOD FOR SPLICING THE FOLLOWING SIZES OF TYPE MDGY DEGAUSSING CABLES

   MDGY-17 (4)
   MDGY-15 (3)
   MDGY-12 (2)

3. ON ONE CABLE CUT STEEL ARMOR TAPES FOUR FEET FROM THE END AND SLIP THE TAPES BACK ON THE CABLE OUT OF THE WAY OF THE SPLICING OPERATIONS. THESE TAPES WILL BE REPLACED OVER THE SPLICE IN THE FINAL STEPS. UNWIND THE DUCK TAPE ON THE FOUR FOOT CABLE END AND SECURE THE ROLLED TAPE BEYOND THE SPLICE AREA. REMOVE TWO FEET OF STEEL ARMOR TAPES AND DUCK TAPE FROM THE OTHER CABLE. SEE FIGURE 37, ON FIGURE 1E8.
4. REMOVE TWO FEET OF CABLE FROM THE FOUR FOOT CABLE END, AND THEN REMOVE 21 INCHES OF SHEATH FROM EACH CABLE. PLACE THE CABLE ENDS IN A POSITION AS CLOSE AS PRACTICAL TO THE POSITION THE CABLE WILL BE IN AFTER INSTALLATION AND SUPPORT THEM RIGIDLY IN THIS POSITION BY TEMPORARY TIES OR CLAMPS. SEE FIGURE 38, SHEET 8.
5. PROCEED AS IN STEP 4 OF METHOD 1E71. SEE FIGURE 39, ON FIGURE 1E8.
6. THREE LAYERS OF PRESSURE SENSITIVE VINYL TAPE ARE THEN APPLIED, WITH 1/2 LAP, OVER THE CONNECTOR TO A MINIMUM OF 1 INCH FROM THE ENDS OF THE CONNECTOR. SEE FIGURE 40, SHEET 8.
7. THE ABOVE OPERATIONS ARE REPEATED, CONNECTING AND TAPING ONE LAYER OF CONDUCTORS AT A TIME. SEE FIGURE 41, ON FIGURE 1E8.
8. PROCEED AS IN STEPS 7 THROUGH 10 OF METHOD 1E71. SEE FIGURES 42, 43, 44 AND 45, SHEET 8.
9. WIND DUCK TAPE BACK OVER SPLICE AND APPLY PRESSURE SENSITIVE VINYL TAPE TO HOLD THE END OF THE TAPE IN PLACE. SEE FIGURE 46, SHEET 8.
10. SLIP THE INNER STEEL ARMOR TAPE OVER THE SPLICE AREA AND SECURE THE ENDS WITH STAINLESS STEEL "BANDIT" CLAMPS. AFTER SECURING ONE END TWIST THE ARMOR TAPE AROUND THE CABLE TO TIGHTEN IT BEFORE SECURING THE OTHER END. SEE FIGURE 47, SHEET 8.
11. SLIP THE OUTER STEEL ARMOR TAPE OVER THE INNER ARMOR TAPE AND SECURE IT WITH "BANDIT" CLAMPS WITHIN THE CLAMPS ON THE INNER TAPE. TWIST THE TAPE AROUND THE CABLE TO TIGHTEN IT BEFORE SECURING THE ENDS. PLACE THREE ADDITIONAL "BANDIT" CLAMPS OVER THE OUTER TAPE AT THE SPLICE AREA. SEE FIGURE 48, ON FIGURE 1E8.

NOTES:

1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 121 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1E7 OF DRAWING 803-5001027.

FIGURE 1E7. Splicing cables-power, control, telephone and electronic.

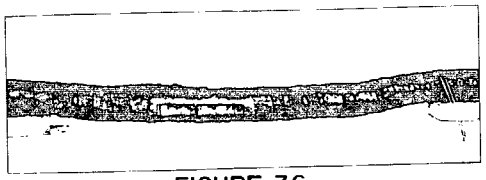

FIGURE 36

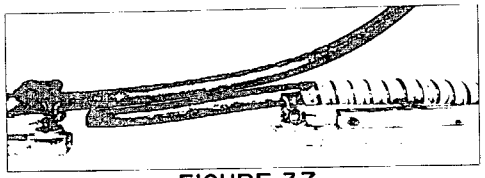

FIGURE 37

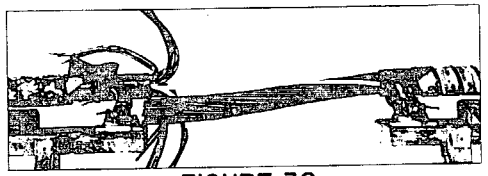

FIGURE 38

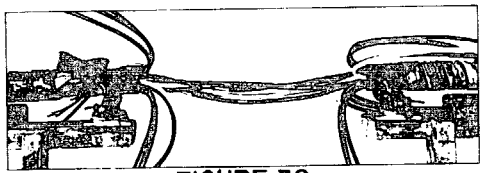

FIGURE 39

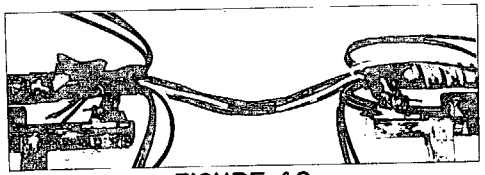

FIGURE 40

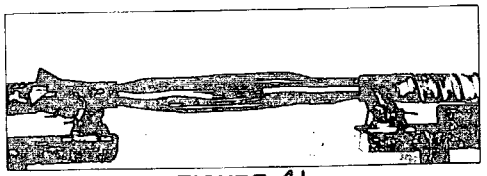

FIGURE 41

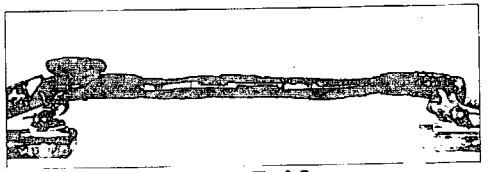

FIGURE 42

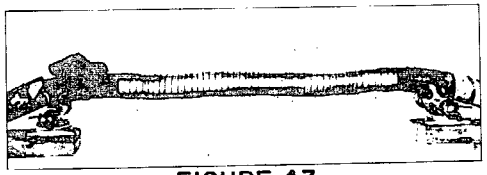

FIGURE 43

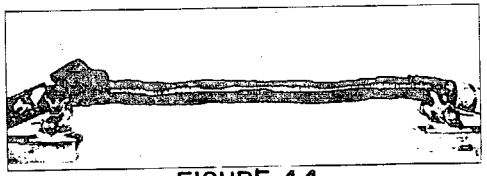

FIGURE 44

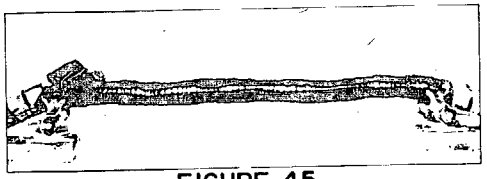

FIGURE 45

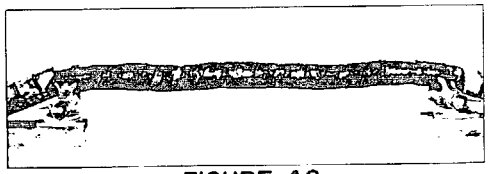

FIGURE 46

FIGURE 47

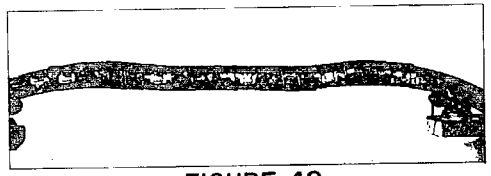

FIGURE 48

NOTES:
1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 122 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1E8 OF DRAWING 803-5001027.

SH 132316998

FIGURE 1E8. Splicing cables-power, control, telephone and electronic.

FIGURE 49

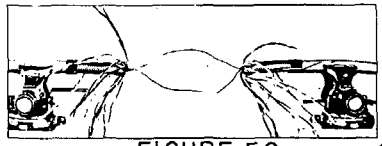

FIGURE 50

FIGURE 51

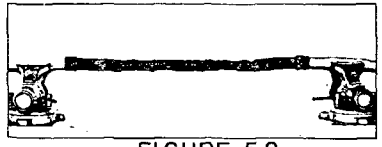

FIGURE 52

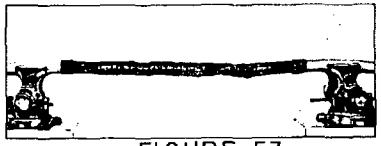

FIGURE 53

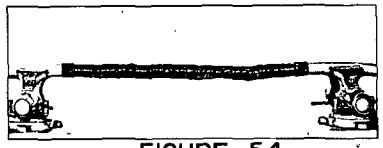

FIGURE 54

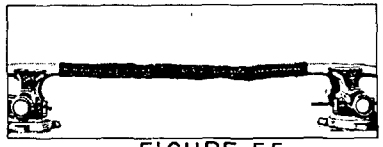

FIGURE 55

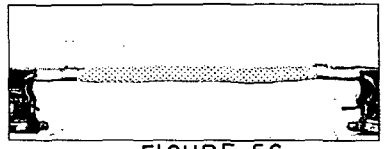

FIGURE 56

SH 132316999

METHOD 1E91

1. METHOD FOR SPLICING TWISTED PAIR TELEPHONE CABLES (TYPE TTHFWA).
2. THIS DESCRIBES THE METHOD FOR SPLICING THE FOLLOWING SIZES OF TYPE TTHFWA TELEPHONE CABLES:

TTHFWA-1-1/2	TTHFWA-20
TTHFWA-3	TTHFWA-30
TTHFWA-5	TTHFWA-40
TTHFWA-10	TTHFWA-50
TTHFWA-15	TTHFWA-60

3. REMOVE A SECTION OF BASKETWEAVE ARMOR, 6 INCHES LONGER THAN SHOWN IN STEP 4, FROM A PIECE OF SCRAP CABLE OF SLIGHTLY LARGER DIAMETER THAN THE CABLES BEING SPLICED AND SLIDE IT OVER THE END OF ONE OF THE CABLES TO BE SPLICED. POSITION THIS ARMOR WELL BACK FROM THE SPLICING AREA SO THAT IT DOES NOT INTERFERE WITH SUBSEQUENT SPLICING OPERATIONS. REFER TO NOTE 1 FIGURE 1E1.
4. REMOVE ARMOR AND SHEATH MATERIAL FROM THE END OF EACH CABLE TO BE SPLICED, AS FOLLOWS:

TTHFWA TYPE CABLE	LENGTH TO BE REMOVED, INCHES	
	ARMOR	SHEATH
1½, 3, 5, 10	7	5
15, 20	10	8
30	12	10
40	14	12
50	16	14
60	18	16

DO NOT UNTWIST THE PAIRED CONDUCTORS UNTIL THEY ARE TO BE SPLICED. PLACE CABLE ENDS IN A POSITION AS CLOSE AS PRACTICAL TO THE POSITION THE CABLE WILL BE IN AFTER INSTALLATION AND SUPPORT THEM RIGIDLY IN THIS POSITION BY TEMPORARY TIES OR CLAMPS. SEE FIGURE 49.

5. THE SPLICE IS ASSEMBLED BY STARTING WITH A CENTER PAIR OF CONDUCTORS AND WORKING OUTWARD BY CONDUCTOR LAYERS. SELECT A MATCHING PAIR OF CONDUCTORS FROM EACH CABLE AND UNTWIST THE CONDUCTORS. TAKE MATCHING CONDUCTORS FROM EACH PAIR AND CUT THEM SO THERE WILL BE AN OVERLAP OF APPROXIMATELY 1 INCH. REMOVE SUFFICIENT INSULATION FROM EACH CONDUCTOR TO ALLOW THE CONDUCTOR TO BE INSERTED TO THE CENTER STOP OF THE CONNECTOR AND THEN CRIMP THE PROPER CONNECTOR ON THE CONDUCTORS. USING THE FIRST SPLICED CONDUCTOR AS A GUIDE FOR LENGTH, OVERLAP THE REMAINING CONDUCTORS IN TURN AND CUT THEM SIMULTANEOUSLY SO THAT THE CONNECTORS WILL BE STAGGERED THROUGHOUT THE LENGTH OF THE SPLICE. AFTER ALL CONDUCTORS HAVE BEEN SPLICED, PULL THE CABLE TO REMOVE THE SLACK IN THE CONDUCTORS. FOR THE PROPER CONNECTORS AND CRIMPING TOOL, SEE FIGURE 1E1 NOTE 10(F) AND FIGURE 1E2 TABLE 1 SEE FIGURES 50 AND 51.
6. APPLY A BINDER TAPE CONSISTING OF ONE LAYER, 1/2 LAPPED, OF PRESSURE SENSITIVE VINYL TAPE OVER THE GROUPED CONDUCTORS BETWEEN THE CABLE SHEATH ENDS. ROUGHEN THE SHEATH MATERIAL AT EACH END OF THE SPLICE. SEE FIGURE 52.
7. APPLY ONE LAYER OF SHEATH FILLER TAPE. WHEN TAPING, PULL TAPE TO APPROXIMATELY ONE-HALF OF ITS ORIGINAL THICKNESS. EXTEND TAPE OVER ENDS OF CABLE SHEATH FOR ABOUT 1-1/2 INCHES. SEE FIGURE 53.
8. APPLY TWO LAYERS, 1/2 LAPPED, OF PRESSURE SENSITIVE VINYL TAPE. TAPE TO WITHIN 1/4 INCH FROM THE ENDS OF THE ARMOR. SEE FIGURE 54.
9. APPLY TWO COATS OF LIQUID COATING MATERIAL. ALLOW FIRST COAT TO DRY THOROUGHLY BEFORE APPLYING SECOND COAT. SEE FIGURE 55.
10. SLIDE ARMOR WIRE SLEEVE OVER SPLICE AREA AND SECURE ONE END WITH STAINLESS STEEL "BANDIT" CLAMPS. THEN PULL SLEEVE TO PROVIDE A SNUG FIT BEFORE APPLYING SECOND CLAMP. TRIM OFF ANY PROTRUDING ARMOR WIRE STRANDS. SEE FIGURE 56.
11. SEE FIGURE 1E1 NOTES 11 & 12 FOR ALTERNATE METHOD TO STEPS 7, 8, AND 9 ABOVE.

NOTES:
1. THIS FIGURE SUPERSEDES SHEET 1E9 OF DRAWING 803-5001027

FIGURE 1E9. Splicing cables-power, control, telephone electronic.

FIGURE 57
PREPARATION OF TYPE TTRSA CABLE, INNER RINGS OVER BRAIDED SHIELD

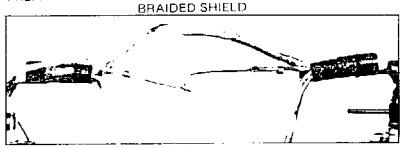

FIGURE 58
BRAID WIRE ON ONE END OF SHIELDED PAIR, OUTER RING ON EACH END OF PAIR. PRE-INSULATED CONNECTORS ON ONE PAIR OF CONDUCTORS.

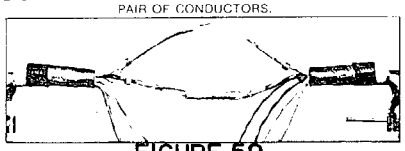

FIGURE 59
BRAID WIRE SECURED AT ONE END OF SPLICE

FIGURE 60
BRAID WIRE STRETCHED AND SECURED AT BOTH ENDS OF SPLICE
SEE VIEW "A"

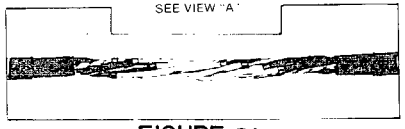

FIGURE 61
ALL CONDUCTOR AND BRAIDED SHIELDS SPLICED, CONDUCTOR SLACK REMOVED

FIGURE 62
VINYL BINDER TAPE OVER CABLED SHIELDED PAIRS, SHEATH ROUGHENED

SH 132317000

FIGURE 63
APPLICATION OF SHEATH FILLER TAPE

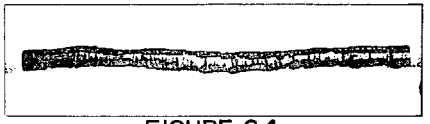

FIGURE 64
APPLICATION OF VINYL SHEATHING TAPE

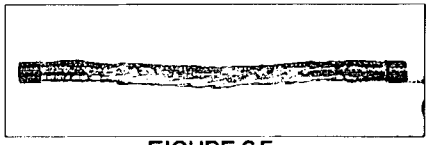

FIGURE 65
SPLICE WITH LIQUID COATING APPLIED

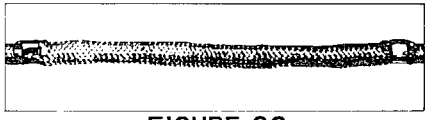

FIGURE 66
ARMOR SLEEVE OVER SPLICE AREA

VIEW "A"

FOR USE WHERE SYSTEMS REQUIRE THAT INSULATION BE APPLIED OVER INDIVIDUAL SHIELDING BRAID.

INSULATION MAY CONSIST OF ONE OF THE FOLLOWING:
A. POLYESTER TAPE, PRESSURE SENSITIVE, ".001 THICK, NSN 5970-00-843-9091
B. PVC TAPE, SHEET 1
C. TUBING, MIL - I - 631.

METHOD 1E101

1. METHOD FOR SPLICING TWISTED SHIELDED PAIR, RADIO, ARMORED CABLES (TYPE TTRSA) AND PAIRS SHIELDED, UNARMORED CABLES (TYPE 2SWU).
2. THIS SECTION DESCRIBES THE METHOD FOR SPLICING THE FOLLOWING SIZES OF TYPE TTRSA CABLES, AND TYPE 2SWU CABLES:

TTRSA-2	TTRSA-10	2SWU-1	2SWU-19
TTRSA-4	TTRSA-12	2SWU-3	2SWU-24
TTRSA-6	TTRSA-16	2SWU-7	2SWU-30
TTRSA-8		2SWU-12	2SWU-37
			2SWU-61

3. REMOVE A SECTION OF BASKETWEAVE ARMOR, 6 INCHES LONGER THAN SHOWN IN STEP 4, FROM A PIECE OF SCRAP CABLE OF SLIGHTLY LARGER DIAMETER THAN THE CABLE BEING SPLICED AND SLIDE IT OVER THE END OF ONE OF THE CABLES TO BE SPLICED. POSITION THIS ARMOR WELL BACK FROM THE SPLICING AREA SO THAT IT DOES NOW INTERFERE WITH SUBSEQUENT SPLICING OPERATIONS. REFER TO NOTE 1. **FIGURE 1E1. (THIS PARAGRAPH FOR TTRSA TYPE CABLE ONLY)**
4. REMOVE ARMOR AND SHEATH MATERIAL FROM THE END OF EACH CABLE TO BE SPLICED, AS FOLLOWS: (2SWU TYPE, SHEATH ONLY)

2SWU TYPE CABLE	TTRSA TYPE CABLE	LENGTH TO BE REMOVED, IN. ARMOR (TTRSA ONLY)	SHEATH
8	2	10	6
3	4	11	8
7	6	12	10
12, 19	8, 10, 12, 16	13	10
24, 30, 37, 61			11
			12

PLACE CABLE ENDS IN A POSITION AS CLOSE AS PRACTICAL TO THE POSITION THE CABLE WILL BE IN AFTER INSTALLATION, WITH THE END OF THE CONDUCTORS OF ONE CABLE REACHING THE CROTCH OF THE OTHER CABLE, AND SUPPORT THEM RIGIDLY IN THIS POSITION BY TEMPORARY TIES OR CLAMPS.

5. THE SPLICE IS ASSEMBLED BY STARTING WITH A MATCHING SHIELDED PAIR OF CONDUCTORS AND MARKING THE SHIELDED PAIR 2-1/2 INCHES IN EACH DIRECTION FROM THE CENTER OF THE SPLICE AREA, SO THERE WILL BE AN OVERLAP OF 5 INCHES WHEN THE EXCESS IS REMOVED. REMOVE 4-1/2 INCHES OF COTTON BRAID FROM EACH PAIR. SLIP AND INNER RING (YIC 194) OVER THE SHIELD UP TO THE COTTON BRAID, REMOVE SHIELD WIRE UP TO 3/4 INCH FROM THE INNER RING, UNBRAID THE REMAINING SHIELD WIRE, FOLD THE WIRE BACK OVER THE INNER RING AND TAPE THE ENDS TO HOLD THEM IN PLACE. SLIP A 6 INCH LENGTH OF BRAID WIRE OVER ONE PAIR OF CONDUCTORS AND SLIP ONE OUTER RING (YOC 200) OVER THE BRAID WIRE AND A SECOND OUTER RING OVER THE CORRESPONDING PAIR ON THE OTHER CABLE. CUT THE BLACK AND WHITE CONDUCTORS 1 INCH AND 3 INCHES, RESPECTIVELY, FROM THE SHIELD WIRE ON ONE PAIR AND 3 INCHES AND 1 INCH, RESPECTIVELY, ON THE MATCHING PAIR. REMOVE 1/4 INCH OF INSULATION FROM THE END OF EACH CONDUCTOR. INSERT THE CONDUCTOR IN THE CONNECTOR TO THE CENTER STOP , AND CRIMP THE CONNECTOR WITH THE RECOMMENDED CRIMPING TOOL. AFTER CONNECTING THE MATCHING CONDUCTORS SLIP THE BRAID OVER THE SPLICE AREA AND ALIGN THE OUTER RING OVER THE INNER RING AT ONE END AND CRIMP THE RING TO SECURE THE SHIELD WIRE. STRETCH THE SHIELD WIRE ACROSS THE SPLICE AND ALIGN THE OTHER OUTER RING OVER THE INNER RING AND SECURE THE SHIELD WIRE BY CRIMPING THE RING. TRIM THE EXCESS SHIELD WIRE OUTSIDE OF THE RINGS. THE ABOVE STEPS ARE ILLUSTRATED IN FIGURES 57, 58, 59 AND 60 USING TWO PAIRS AND SHEET 2, TABLE 1. FOR SPLICING 2SWU TYPE CABLE SEE STEP 13B FOR ADDED INFORMATION.
6. REPEAT THE ABOVE STEPS WITH EACH PAIR OF CONDUCTORS, STAGGERING EACH SPLICE 1/2 INCH. WHEN PREPARING CONDUCTORS FOR SPLICING BE CAREFUL TO KEEP ALL CONDUCTOR LENGTHS EQUAL. AFTER ALL CONDUCTOR PAIRS HAVE BEEN SPLICED, STRAIGHTEN THE CABLE TO REMOVE THE SLACK IN THE CONDUCTORS. SEE FIGURE 61.
7. APPLY A BINDER TAPE CONSISTING OF ONE LAYER, 1/2 LAPPED, OF PRESSURE SENSITIVE VINYL TAPE OVER THE GROUPED CONDUCTORS BETWEEN THE CABLE SHEATH ENDS. ROUGHEN THE SHEATH MATERIAL AT EACH END OF THE SPLICE. SEE FIGURE 62.
8. APPLY ONE LAYER OF SHEATH FILLER TAPE, WITH 1/2 LAP, WHEN TAPING, PULL TAPE TO APPROXIMATELY ONE-HALF OF ITS ORIGINAL THICKNESS AND EXTEND TAPE OVER ENDS OF CABLE SHEATH FOR ABOUT 1-1/2 INCHES. SEE FIGURE 63.
9. APPLY TWO LAYERS, 1/2 LAPPED, OF PRESSURE SENSITIVE VINYL TAPE. TAPE TO WITHIN 1/4 INCH FROM THE ENDS OF THE ARMOR. SEE FIGURE 64.
10. APPLY TWO COATS OF LIQUID COATING MATERIAL. ALLOW FIRST COAT TO DRY THOROUGHLY BEFORE APPLYING SECOND COAT. SEE FIGURE 65.
11. SLIDE ARMOR WIRE OVER SPLICE AREA AND SECURE ONE END WITH STAINLESS STEEL "BANDIT" CLAMPS. THEN PULL ARMOR SLEEVE TO PROVIDE A SNUG FIT BEFORE APPLYING SECOND CLAMP. TRIM OFF ANY PROTRUDING WIRE STRANDS. SEE FIGURE 66.
12. SEE **NOTES 11 & 12 FOR ALTERNATE METHOD TO STEPS 8, 9, AND 10 ABOVE.**
13. CABLE TYPE 2SWU WILL HAVE THE FOLLOWING MODIFICATIONS:
    A. HEAT SHRINKABLE TUBING OR PVC TAPE TO BE PLACED OVER THE SPLICED SHIELDING BRAID. THIS SHALL MEET A DIELECTRIC TEST, SHIELD TO SHIELD, AS SPECIFIED BY MIL SPEC SHEET MIL-C-24145/9A (SHIPS).
    B. PREINSULATED CONNECTORS MAY BE USED FOR SPLICE OF INDIVIDUAL CONDUCTORS. THOMAS AND BETTS PRE-INSULATED 22-18, RAR 23 PLUG TOOL WT 145 OR EQUIVALENT.
    C. ARMOR SHALL BE OMITTED FROM THE SPLICED CABLE.

NOTES:
1. **THIS FIGURE SUPERSEDES SECTION 4, SHEET 124 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1E10 OF DRAWING 803-5001027.**

FIGURE 1E10. Splicing cables-power, control, telephone and electronic.

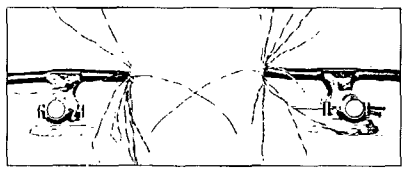

FIGURE 67

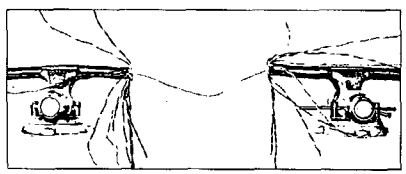

FIGURE 68

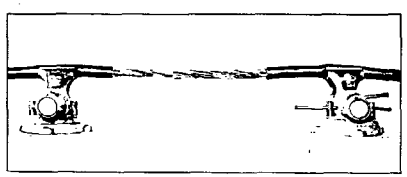

FIGURE 69

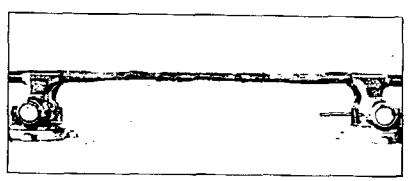

FIGURE 70

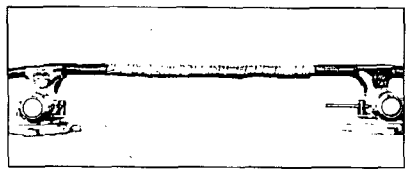

FIGURE 71

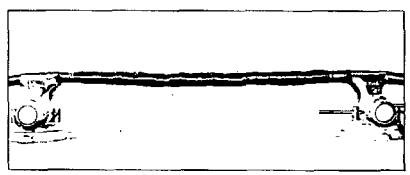

FIGURE 72

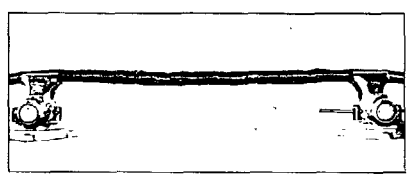

FIGURE 73

METHOD 1E111

1. METHOD FOR SPLICING TWISTED PAIR, SPECIAL PURPOSE CABLES (TYPE TSP)
2. THIS DESCRIBES THE METHOD FOR SPLICING THE FOLLOWING SIZES OF TYPE TSP CABLES:
   TSP-11
   TSP-31
3. REMOVE SHEATH MATERIAL FROM THE END OF EACH CABLE TO BE SPLICED, AS FOLLOWS:
   TSP-11 8 INCHES
   TSP-31 12 INCHES
   DO NOT UNTWIST THE PAIRED CONDUCTORS UNTIL THEY ARE TO BE SPLICED. PLACE CABLE ENDS IN A POSITION AS CLOSE AS PRACTICAL TO THE POSITION THE CABLE WILL BE IN AFTER INSTALLATION, WITH THE ENDS OF THE CONDUCTORS OF ONE CABLE REACHING THE CROTCH OF THE OTHER CABLE, AND SUPPORT THEM IN THIS POSITION BY TEMPORARY TIES OR CLAMPS. SEE FIGURE 67.
4. THE SPLICE IS ASSEMBLED BY STARTING WITH A MATCHING PAIR OF CONDUCTORS FROM THE CENTER OF EACH CABLE, AND WORKING OUTWARD BY CONDUCTOR LAYERS. UNTWIST THE CONDUCTORS OF A MATCHING PAIR OF CONDUCTORS AND CUT THE INDIVIDUAL MATCHING CONDUCTORS SO THEY OVERLAP BY A DISTANCE EQUAL TO THE LENGTH OF THE PREINSULATED CONNECTOR. REMOVE SUFFICIENT INSULATION FROM THE END OF THE CONDUCTORS TO ALLOW THE CONDUCTOR TO BE INSERTED TO THE CENTER STOP OF THE CONNECTOR. THEN CRIMP THE CONNECTOR ON THE CONDUCTORS. CUT THE REMAINING CONDUCTORS SO THAT THE CONNECTORS IN THE SAME PAIR WILL BE STAGGERED BY AT LEAST 1/2 INCH BETWEEN THE ENDS OF THE CONNECTOR INSULATION THROUGHOUT THE LENGTH OF THE SPLICE AND THE SPLICED CONDUCTORS WILL ALL BE THE SAME LENGTH WHEN THE SPLICE IS COMPLETED. AFTER ALL CONDUCTORS HAVE BEEN SPLICED, STRAIGHTEN THE CABLE TO REMOVE THE SLACK IN THE CONDUCTORS. FOR THE PROPER CONNECTOR SEE SHEET 3. SEE FIGURES 68 AND 69.
5. APPLY A BINDER TAPE CONSISTING OF ONE LAYER, 1/2 LAPPED, OF PRESSURE SENSITIVE VINYL TAPE OVER THE GROUPED CONDUCTORS BETWEEN THE CABLE SHEATH ENDS. ROUGHEN THE SHEATH MATERIAL AT EACH END OF THE SPLICE FOR A DISTANCE OF 3 INCHES. SEE FIGURE 70.
6. APPLY ONE LAYER OF SHEATH FILLER TAPE. WHEN TAPING, PULL TAPE TO APPROXIMATELY ONE-HALF OF ITS ORIGINAL THICKNESS, AND APPLY WITH ONE-HALF LAP. EXTEND TAPE OVER ENDS OF CABLE SHEATH FOR ABOUT TWO INCHES. SEE FIGURE 71.
7. APPLY TWO LAYERS, 1/2 LAPPED, OF PRESSURE SENSITIVE VINYL TAPE. TAPE TO WITHIN 1/4 INCH OF THE END OF THE ROUGHENED SECTION OF SHEATH. SEE FIGURE 72.
8. APPLY TWO COATS OF LIQUID COATING MATERIAL. ALLOW FIRST COAT TO DRY THOROUGHLY BEFORE APPLYING SECOND COAT. SEE FIGURE 73.
9. SEE FIGURE 1E1 NOTES 11 & 12 FOR ALTERNATE METHOD TO STEPS 6, 7, AND 8 ABOVE.

NOTES:
1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 125 OF OF DRAWING NAVSEA NO. 9000-S6202-73980, AND SHEET 1E11 OF DRAWING 803-5001027.

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FIGURE 1E11. Splicing cables-power, control, telephone and electronic.

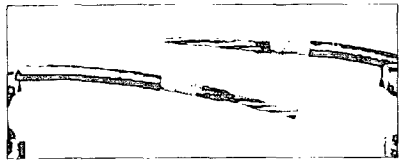


FIGURE 74

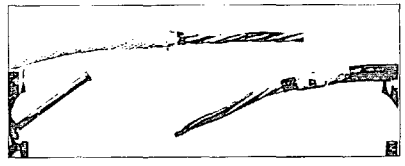


FIGURE 75

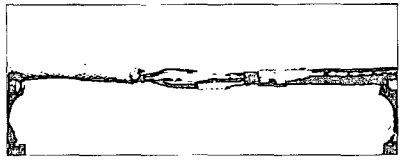


FIGURE 76

FIGURE 77

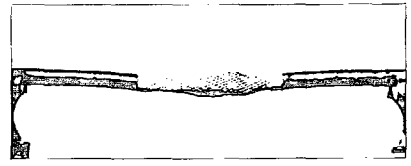


FIGURE 78

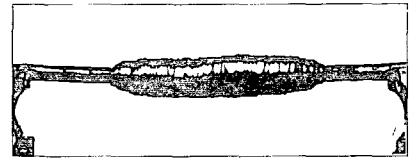


FIGURE 79

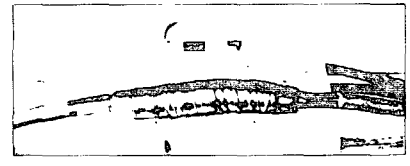


FIGURE 80

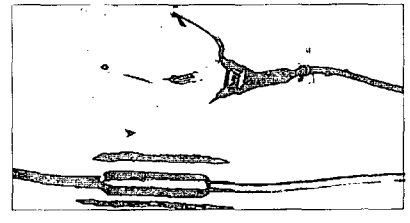


FIGURE 81

METHOD 1E121

1. THE PROCEDURE OUTLINED IS SUITABLE FOR SPLICING THE FOLLOWING TYPES AND SIZES OF NAVY SHIPBOARD CABLE.

DSS-2	FSS-2
DSS-3	FSS-4
DSS-4	TSS-4

NOTE: MATERIALS USED ARE LISTED IN TABLE 3 SHEET 3.

2. REMOVE A 4" LENGTH OF SHEATH MATERIAL FROM THE END OF EACH TYPE DSS, TSS OR FSS CABLE TO BE SPLICED. SLIP AN INNER RING OVER THE SHIELD UP TO THE END OF THE CABLE JACKET AND REMOVE 3 INCHES OF BRAIDED SHIELD FROM THE END OF EACH CABLE. SEE FIGURE 74.
3. UNBRAID THE EXPOSED SHIELD WIRE, FOLD IT BACK OVER THE INNER RING AND TAPE THE ENDS OF THE WIRE DOWN. SLIP A 6" LENGTH OF BRAIDED SHIELD WIRE OVER ONE CABLE END AND POSITION IT BACK OUT OF THE WAY OF SPLICING OPERATIONS. SLIP AN OUTER RING ON EACH CABLE END. REMOVE THE CABLE FILLER MATERIAL. SEE FIGURE 75.
4. CUT CONDUCTORS ON TYPE DSS, FSS AND TSS CABLES TO LENGTH FROM THE END OF THE BRAIDED SHIELD AS FOLLOWS:

CONDUCTORS	CABLE 1	CABLE 2
BLACK AND RED	1-1/4"	2"
WHITE AND GREEN	2"	1-1/4"

REMOVE INSULATION FROM ENDS OF CONDUCTORS AND CRIMP CONNECTORS ON MATCHING PAIRS FROM EACH CABLE. SEE FIGURE 76.

5. APPLY ONE LAYER OF VULCANIZABLE POLYCHLOROPRENE TAPE, CUT TO 1/2" WIDTH, OVER THE GROUPED CONDUCTORS BETWEEN THE ENDS OF THE BRAIDED SHIELD. SEE FIGURE 77.
6. SLIP THE BRAIDED SHIELD WIRE OVER SPLICE AREA, ALIGN THE OUTER RING OVER THE INNER RING AND SECURE THE SHIELD WIRE BY CRIMPING THE RING. STRETCH THE BRAID WIRE ACROSS THE SPLICE AREA, SECURE AT OTHER END AND TRIM EXCESS WIRE. SEE FIGURE 78.
7. CLEAN THE CABLE JACKET, APPROXIMATELY 3" ON EACH END OF THE SPLICE, WITH SANDPAPER AND VINYL SOLVENT. MARK THE CABLE JACKET SO THAT THE SPLICED AREA MAY BE CENTERED IN THE VULCANIZING MOLD AFTER THE JACKET TAPE IS APPLIED. APPLY POLYCHLOROPRENE CEMENT OT THE CLEANED PORTIONS, WAIT TWO MINUTES AND APPLY THE VULCANIZABLE POLYCHLOROPRENE TAPE TO A DIAMETER SLIGHTLY LARGER THAN THAT OF THE CAVITY OF THE MOLD AND A LENGTH APPROXIMATELY EQUAL TO THAT OF THE CAVITY OF THE MOLD. SEE FIGURE 79.
8. HAVE THE MOLD HEATED TO 300°F. WHILE PREPARING THE SPLICE. PLACE THE SPLICED SECTION IN THE MOLD, CLOSE THE MOLD TO WITHIN 1/8" OF COMPLETE CLOSURE AND WAIT 1 MINUTE BEFORE COMPLETELY CLOSING. AFTER ALLOWING THE SPLICE TO VULCANIZE FOR 30 MINUTES REMOVE IT CAREFULLY FROM THE MOLD AND CUT THE EXCESS POLYCHLOROPRENE FROM THE EDGES. SEE FIGURES 80 AND 81.

NOTES:

1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 126 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1E12 OF DRAWING 803-5001027.

SH 132317002

FIGURE 1E12. Cable splicing-power, control, telephone and electronic.

FIGURE 82

FIGURE 83

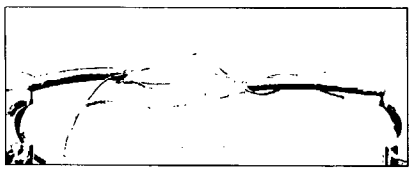


FIGURE 84

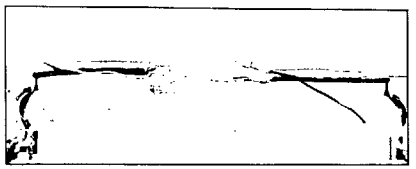


FIGURE 85

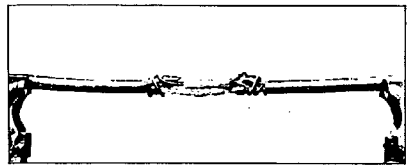


FIGURE 86

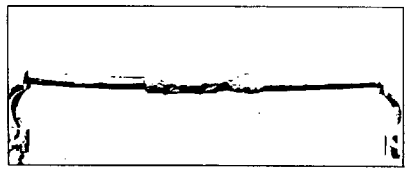


FIGURE 87

METHOD 1E131

1. THE PROCEDURE OUTLINED IS SUITABLE FOR SPLICING THE FOLLOWING TYPES AND SIZES OF NAVY SHIPBOARD CABLE:

   MSS-6

   NOTE: MATERIALS USED ARE LISTED IN TABLE 3 SHEET 3.
2. REMOVE A 4 INCH LENGTH OF SHEATH MATERIAL FROM EACH TYPE MSS-6 CABLE TO BE SPLICED. SLIP AN INNER RING OVER THE SHIELDS ON EACH SHIELDED PAIR. LOCATE THE SHIELDS SO THAT THE OUTER EDGES ARE 5/8 AND 1 INCH FROM THE CUT END OF THE CABLE JACKET ON THE SHIELDED PAIRS OF ONE CABLE AND REVERSE THE DISTANCES ON THE CORRESPONDING PAIRS OF THE SECOND CABLE. SEE FIGURE 82.
3. REMOVE MOST OF THE BRAIDED SHIELDS, LEAVING APPROXIMATELY 1/2 INCH TO BE UNBRAIDED AND FOLDED BACK OVER THE INNER RINGS. SEE FIGURE 83.
4. CUT THE CONDUCTORS ON TYPE MSS-6 CABLES, TO LENGTH, AS FOLLOWS:

	LENGTH FROM END OF SHIELDS	
CONDUCTORS	CABLE 1	CABLE 2
BLACK AND RED	1"	1-3/8"
WHITE AND BLUE	1-3/8"	1"

   SLIP AN OUTER RING OVER EACH END OF THE SHIELDED PAIRS, AND SLIP A 6" LENGTH OF BRAIDED SHIELD WIRE OVER THE LONGER END OF EACH PAIR. ALIGN THE OUTER RING OVER THE INNER RING AND SECURE ONE END OF EACH BRAIDED SHIELD WIRE BY CRIMPING THE RINGS. THEN INSTALL THE PREINSULATED CONNECTORS ON MATCHING CONDUCTORS OF EACH SHIELDED PAIR. SEE FIGURE 84.

   NOTE: DO NOT CUT THE YELLOW AND GREEN CONDUCTORS AT THIS TIME.
5. STRETCH THE BRAIDED SHIELD WIRE OVER THE SPLICED CONDUCTORS AND SECURE IT AT THE OTHER END. TRIM THE EXCESS SHIELD WIRE OUTSIDE THE RINGS. SEE FIGURE 85.
6. APPLY A NARROW STRIP OF VULCANIZABLE POLYCHLOROPRENE TAPE OVER THE RINGS. GIVE THE YELLOW AND GREEN CONDUCTORS APPROXIMATELY ONE HELICAL TURN, OVER THE SHIELDED PAIRS, IN OPPOSITE DIRECTIONS AT EACH END OF THE SPLICE, AND POSITION THE CONDUCTORS SO THAT THE PREINSULATED CONNECTORS WILL LIE PARALLEL TO THE AXIS OF THE CABLE, ON OPPOSITE SIDES OF THE SHIELDED PAIRS. CUT AND CONNECT THE CONDUCTORS NEAR THE CENTER OF THE SPLICE AREA. SEE FIGURE 86.
7. APPLY A LAYER OF PLASTIC SEALER COMPOUND AROUND THE TWO INDIVIDUAL CONDUCTORS AND OVER THE GROUPED CONDUCTORS. SEE FIGURE 87.
8. CLEAN THE CABLE JACKET, APPROXIMATELY 3" ON EACH END OF THE SPLICE, WITH SANDPAPER AND VINYL SOLVENT. MARK THE CABLE JACKET SO THAT THE SPLICED AREA MAY BE CENTERED IN THE VULCANIZING MOLD AFTER THE JACKET TAPE IS APPLIED. APPLY POLYCHLOROPRENE CEMENT TO THE CLEANED PORTIONS, WAIT TWO MINUTES AND APPLY THE VULCANIZABLE POLYCHLOROPRENE TAPE TO A DIAMETER SLIGHTLY LARGER THAN THAT OF THE CAVITY OF THE MOLD AND A LENGTH APPROXIMATELY EQUAL TO THAT OF THE CAVITY OF THE MOLD. SEE FIGURE 79.
9. HAVE THE MOLD HEATED TO 300°F. WHILE PREPARING THE SPLICE. PLACE THE SPLICED SECTION OF THE CABLE IN THE VULCANIZING MOLD, CLOSE THE MOLD TO WITHIN 1/8" OF COMPLETE CLOSURE AND WAIT 1 MINUTE BEFORE COMPLETELY CLOSING. AFTER ALLOWING THE SPLICE TO VULCANIZE FOR 30 MINUTES REMOVE IT CAREFULLY FROM THE MOLD AND CUT THE EXCESS POLYCHLOROPRENE FROM THE EDGES. SEE FIGURES 80 AND 81.

NOTES:
1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 127 OF DRAWING NAVSEC NO. 9000-s6202-73980, AND SHEET 1E13 OF DRAWING 803-5001027

SH 132317003

FIGURE 1E13. Cable splicing-power, control, telephone and electronic.

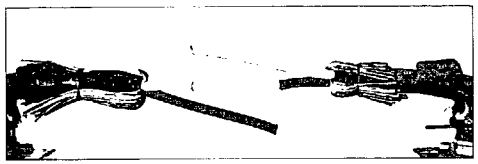


FIGURE 88

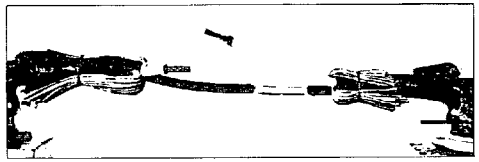


FIGURE 89

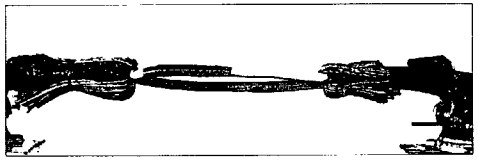


FIGURE 90

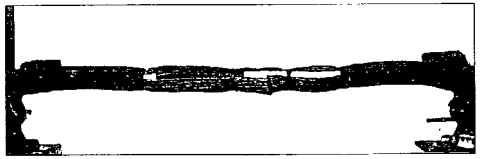


FIGURE 91

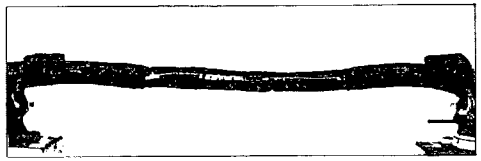


FIGURE 92

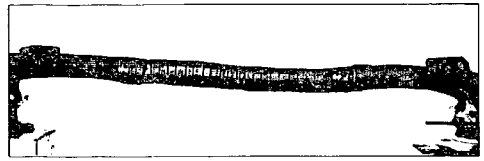


FIGURE 93

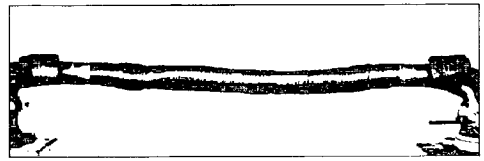


FIGURE 94

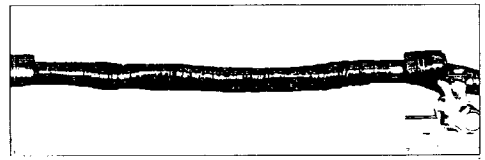


FIGURE 95

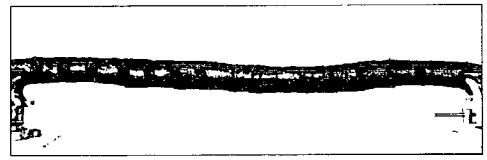


FIGURE 96

SH 132317004

METHOD 1E141

1. METHOD FOR SPLICING DOUBLE CONDUCTOR DEGAUSSING CABLES (TYPE DDGT).
2. THIS SECTION DESCRIBES THE METHOD FOR SPLICING THE FOLLOWING SIZES OF TYPE DDGT DEGAUSSING CABLES

   DDGT-17 DDGT-105
   DDGT-53 DDGT-212
   DDGT-400

3. PLACE CABLE ENDS IN A POSITION AS CLOSE AS PRACTICAL TO THE POSITION THE CABLE WILL BE IN AFTER INSTALLATION AND SUPPORT THEM RIGIDLY IN THIS POSITION BY TEMPORARY TIES OR CLAMPS. UNWIND THE OUTER DUCK TAPE FROM THE END OF EACH CABLE AND SECURE THE ROLLED TAPE BEYOND THE SPLICE AREA. REMOVE SHEATH MATERIAL AND ONE CONDUCTOR FROM EACH CABLE AS FOLLOWS:

CABLE TYPE	SHEATH MATERIAL TO BE REMOVED, IN.	LENGTH OF CONDUCTOR TO BE REMOVED, IN.*
DDGT-17	7	4
DDGT-53	8	5
DDGT-105	8	5
DDGT-212	10	5
DDGT-400	13	6 1/2

*OPPOSITE CONDUCTORS REMOVED FROM CABLES TO BE SPLICED TO ALLOW FOR STAGGERING OF CONNECTIONS. ROUGHEN THE SHEATH MATERIAL 3 INCHES ON THE DDGT-17 CABLE AND 4 INCHES ON THE REMAINING CABLES. TIE THE FILLERS BACK ON THE CABLE. SEE FIGURE 88.

4. REMOVE INSULATION FROM EACH CONDUCTOR APPROXIMATELY 1/8 INCH LONGER THAN HALF THE CONNECTOR LENGTH. REMOVE THE BRAID SLIGHTLY FURTHER THAN THE INSULATION. THE PROPER CONNECTOR IS THEN CRIMPED ON THE CONDUCTOR. SEE FIGURE 89.
5. THREE LAYERS OF PRESSURE SENSITIVE VINYL TAPE ARE THEN APPLIED, WITH 1/2 LAP, OVER THE CONNECTOR TO A MINIMUM OF 1 INCH FROM THE ENDS OF THE CONNECTOR. SEE FIGURE 90.
6. AFTER BOTH CONDUCTORS HAVE BEEN SPLICED, THE CABLE SHOULD BE STRETCHED TO STRAIGHTEN THE CONDUCTORS. LAY THE ORIGINAL FILLERS BACK IN PLACE. SEE FIGURE 91.
7. APPLY A BINDER TAPE CONSISTING OF TWO LAYERS, WITH 1/2 LAP, OF PRESSURE SENSITIVE VINYL TAPE OVER THE GROUPED CONDUCTORS BETWEEN THE CABLE SHEATH ENDS. SEE FIGURE 92.
8. APPLY ONE LAYER, 1/2 LAPPED, OF FILLER TAPE. WHEN TAPING, PULL TAPE TO APPROXIMATELY ONE-HALF OF ITS ORIGINAL THICKNESS. EXTEND TAPE OVER ENDS OF CABLE SHEATH FOR ABOUT 2 INCHES. SEE FIGURE 93.
9. APPLY 2 LAYERS, 1/2 LAPPED, OF PRESSURE SENSITIVE VINYL TAPE. TAPE SHOULD EXTEND APPROXIMATELY ONE INCH BEYOND ENDS OF FILLER TAPE. SEE FIGURE 94.
10. APPLY TWO COATS OF LIQUID COATING MATERIAL. ALLOW FIRST COAT TO DRY THOROUGHLY BEFORE APPLYING SECOND COAT. SEE FIGURE 95.
11. WIND THE DUCK TAPE BACK OVER THE SPLICE AND APPLY PRESSURE SENSITIVE VINYL TAPE TO HOLD THE END OF THE TAPE. APPLY TWO COATS OF LIQUID COATING MATERIAL OVER THE VINYL TAPE. SEE FIGURE 96.

NOTES:
1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 128 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1E14 OF DRAWING 803-5001027.

FIGURE 1E14. Cable splicing-power, control, telephone and electronic.

METHOD 1E151

1. METHOD FOR SPLICING CABLES, SPECIAL PURPOSE, ELECTRICAL (TYPES DPS, TPS, FPS AND 7PS-6).
2. THIS SECTION DESCRIBES THE METHOD FOR SPLICING THE FOLLOWING TYPES AND SIZES OF ELECTRIC CABLES FOR OPERATION IN HIGH TEMPERATURE AMBIENT CONDITIONS ABOARD NAVAL VESSELS:

DPS-3	TPS-3	FPS-14
DPS-4	TPS-4	7PS-6
DPS-6	TPS-6	
DPS-9	TPS-9	
	TPS-14	

3. REMOVE A SECTION OF BASKETWEAVE ARMOR APPROXIMATELY 6 INCHES LONGER THAN THE LENGTH OF ARMOR TO BE REMOVED FROM THE CABLES BEING SPLICED, FROM A PIECE OF SCRAP CABLE OF SLIGHTLY LARGER DIAMETER, AND SLIDE IT OVER THE END OF ONE OF THE CABLES. POSITION THIS ARMOR WELL BACK FROM THE SPLICING AREA SO THAT IT DOES NOT INTERFERE WITH SUBSEQUENT SPLICING OPERATIONS.
4. REMOVE ARMOR AND SHEATH MATERIAL FROM THE END OF EACH CABLE TO BE SPLICED AS FOLLOWS:

	LENGTH TO BE REMOVED, IN.	
TYPE CABLE	ARMOR	SHEATH
DPS-3, 4, 6 AND 9	10	7
7PS-6, TPS-3, 4, 6, 9 AND 14	13	10
FPS-14	16	13

SELECT CONNECTOR FOR ABOVE CABLES FROM THE FOLLOWING:

TYPE CABLE	CCBC CONNECTOR
PS-3 AND 4	2-1/2-4
PS-6 AND 9	6-9
PS-14	14

NOTE: USE NAVY UNIVERSAL CRIMPING TOOL UP TO SIZE 9, AND USE MANUFACTURER'S RECOMMENDED TOOL ON SIZE 14. PLACE CABLE ENDS IN A POSITION AS CLOSE AS PRACTICAL TO THE POSITION THE CABLE WILL BE IN AFTER INSTALLATION, WITH THE ENDS OF THE CONDUCTORS REACHING THE CROTCH OF THE OTHER CABLE, AND SUPPORT THEM RIGIDLY IN THIS POSITION BY TEMPORARY TIES OR CLAMPS. SEE FIG. 97, **ON FIGURE 1E16.**

5. THE SPLICE IN THE TYPE PS CABLE IS ASSEMBLED BY CUTTING MATCHING CONDUCTORS SO THAT THE CONDUCTOR SPLICES WILL BE APPROXIMATELY 2 INCHES FROM THE CROTCH AND 3 INCHES FROM EACH OTHER. NO CONDUCTOR SPLICES SHALL BE ADJACENT, EXCEPT THAT IN THE 7PS-6 CABLE ALTERNATE CONDUCTORS IN THE OUTER LAYER MAY BE SPLICED AT THE SAME POINT. REMOVE INSULATION FROM THE END OF THE CONDUCTORS EQUAL TO APPROXIMATELY 1/8 INCH MORE THAN HALF THE CONNECTOR LENGTH. INSERT THE CONDUCTOR TO THE STOP IN THE CONNECTOR AND CRIMP. APPLY THREE LAYERS, 1/2 LAPPED OF *SELF-BONDING SILICONE RUBBER BIAS WEAVE GLASS TAPE OVER THE CONNECTOR, APPROXIMATELY 1 INCH FROM EACH END OF THE CONNECTOR. THEN APPLY ONE LAYER OF TAPE, 1/2 LAPPED, OVER THE INSULATED CONDUCTOR FROM CROTCH TO CROTCH. SEE FIGURE 98, SHEET 16.
6. AFTER SPLICING ALL CONDUCTORS STRETCH THE CABLE AND LAY THE ORIGINAL FILLERS BACK IN PLACE. SEE FIGURE 99, **ON FIGURE 1E16.**
7. APPLY ONE LAYER, 1/2 LAPPED, OF SELF-BONDING SILICONE RUBBER BIAS WEAVE TAPE OVER THE GROUPED CONDUCTORS BETWEEN THE CABLE SHEATH ENDS. SEE FIGURE 100, **ON FIGURE 1E16.**
8. APPLY A COATING OF A **ROOM TEMPERATURE VULCANIZABLE SILICONE RUBBER COMPOUND OVER THE BINDER TAPE AND APPROXIMATELY 1 INCH ON THE ENDS OF THE CABLE SHEATH. APPLY TWO LAYERS, 1/2 LAPPED OF ***UNSUPPORTED PRESSURE SENSITIVE SILICONE RUBBER TAPE OVER THE VULCANIZABLE SILICONE RUBBER COMPOUND AND APPROXIMATELY 2 INCHES ON THE ENDS OF THE CABLE SHEATH. SEE FIGURE 101, **ON FIGURE 1E16**
9. APPLY TWO LAYERS, 1/2 LAPPED, OF SELF-BONDING SILICONE RUBBER BIAS WEAVE GLASS TAPE BETWEEN THE ARMOR ENDS. SEE FIGURE 102, **ON FIGURE 1E16.**
10. SLIDE ARMOR SLEEVE OVER SPLICE AREA AND SECURE ENDS WITH STAINLESS STEEL "BANDIT" CLAMPS. AFTER SECURING ONE END PULL SLEEVE TO PROVIDE A SNUG FIT BEFORE PUTTING SECOND CLAMP IN PLACE. TRIM OFF ANY PROTRUDING ARMOR WIRE STRANDS. SEE FIGURE 103, **ON FIGURE 1E16.**

SH 132317005

METHOD 1E152

1. METHOD FOR SPLICING CABLES, SPECIAL PURPOSE, ELECTRICAL (TYPES TCTX, TCJX AND TCKX).
2. THIS SECTION DESCRIBES THE METHOD FOR SPLICING THE FOLLOWING TYPES AND SIZES OF ELECTRIC CABLES FOR OPERATION IN HIGH TEMPERATURE AMBIENT CONDITIONS ABOARD NAVAL VESSELS:

TCTX-3	TCJX-3	TCKX-1
TCTX-7	TCJX-7	TCKX-3
TCTX-12	TCJX-12	TCKX-7
		TCKX-12

3. REMOVE A SECTION OF BASKETWEAVE ARMOR APPROXIMATELY 6 INCHES LONGER THAN THE LENGTH OF ARMOR TO BE REMOVED FROM THE CABLES BEING SPLICED, FROM A PIECE OF SCRAP CABLE OF SLIGHTLY LARGER DIAMETER, AND SLIDE IT OVER THE END OF ONE OF THE CABLES. POSITION THIS ARMOR WELL BACK FROM THE SPLICING AREA SO THAT IT DOES NOT INTERFERE WITH SUBSEQUENT SPLICING OPERATIONS.
4. REMOVE ARMOR AND SHEATH MATERIAL FROM THE END OF EACH CABLE TO BE SPLICED AS FOLLOWS:

	LENGTH TO BE REMOVED, IN.	
TYPE CABLE	ARMOR	SHEATH
TC-X (ALL)	7	5

DO NOT UNTWIST PAIRED CONDUCTORS UNTIL THEY ARE TO BE SPLICED. SELECT CONNECTOR FOR ABOVE CABLES FROM THE FOLLOWING:

TYPE CABLE	CCBC CONNECTOR
TCTX	1/2
TCJX, TCKX	2-1/2-4

NOTE: USE NAVY UNIVERSAL CRIMPING TOOL. PLACE CABLE ENDS IN A POSITION AS CLOSE AS PRACTICAL TO THE POSITION THE CABLE WILL BE IN AFTER INSTALLATION, WITH THE ENDS OF THE CONDUCTORS REACHING THE CROTCH OF THE OTHER CABLE, AND SUPPORT THEM RIGIDLY IN THIS POSITION BY TEMPORARY TIES OR CLAMPS. SEE FIG. 108, **ON FIGURE 1E16.**

5. THE SPLICE IN THE TYPE TC-X CABLES IS ASSEMBLED BY STARTING WITH A CENTER PAIR OF CONDUCTORS. UNTWIST THE CONDUCTORS OF A MATCHING PAIR OF CONDUCTORS AND CUT THE MATCHING CONDUCTORS SO THERE WILL BE A ONE INCH OVERLAP. STAGGER THE SPLICES BETWEEN CONDUCTORS OF THE SAME PAIR APPROXIMATELY ONE INCH. REMOVE SUFFICIENT INSULATION FROM THE ENDS OF THE CONDUCTORS TO ALLOW THE CONDUCTOR TO BE INSERTED TO THE CENTER STOP OF THE CONNECTOR. SLIP A 2-INCH LENGTH OF SILICONE RUBBER INSULATED GLASS TUBING OVER THE LONGER INSULATED CONDUCTOR AND THEN SPLICE THE CONDUCTOR WITH THE RECOMMENDED CONNECTOR AND CRIMPING TOOL. WHEN A PAIR OF CONDUCTORS HAS BEEN SPLICED, CENTER THE INSULATION TUBING OVER THE CONNECTORS AND APPLY UNSUPPORTED SILICONE RUBBER TAPE OVER THE TUBING ON ONE CONDUCTOR AND THE END OF THE TUBING AND THE ORIGINAL INSULATION ON THE OTHER CONDUCTOR TO HOLD THE INSULATION TUBING IN PLACE. SEE FIGURES 108 AND 109, **ON FIGURE 1E16.**
6. REPEAT THE ABOVE PROCEDURE ON EACH PAIR OF CONDUCTORS, STAGGERING THE CONDUCTOR SPLICES AS MUCH AS POSSIBLE BETWEEN PAIRS. AFTER ALL CONDUCTORS HAVE BEEN SPLICED, PULL THE CABLE TO REMOVE THE SLACK IN THE CONDUCTORS. SEE FIGURE 110, **ON FIGURE 1E16.**
7. FOLLOW STEPS 7, 8, 9 AND 10 OF METHOD 1E151 TO COMPLETE THE SPLICE.

METHOD 1E153

1. METHOD FOR SPLICING CABLES, SPECIAL PURPOSE, ELECTRICAL (TYPE PI).
2. THIS SECTION DESCRIBES THE METHOD FOR SPLICING THE FOLLOWING TYPES AND SIZES OF ELECTRIC CABLES FOR OPERATION IN HIGH TEMPERATURE AMBIENT CONDITIONS ABOARD NAVAL VESSELS:

PI-3
PI-7
PI-12

3. REMOVE A SECTION OF BASKETWEAVE ARMOR APPROXIMATELY 6 INCHES LONGER THAN THE LENGTH OF ARMOR TO BE REMOVED FROM THE CABLES BEING SPLICED, FROM A PIECE OF SCRAP CABLE OF SLIGHTLY LARGER DIAMETER, AND SLIDE IT OVER THE END OF ONE OF THE CABLES. POSITION THIS ARMOR WELL BACK FROM THE SPLICING AREA SO THAT IT DOES NOT INTERFERE WITH SUBSEQUENT SPLICING OPERATIONS.
4. REMOVE ARMOR AND SHEATH MATERIAL FROM THE END OF EACH CABLE TO BE SPLICED AS FOLLOWS:

	LENGTH TO BE REMOVED, IN.	
TYPE CABLE	ARMOR	SHEATH
PI-3	11	9
PI-7, PI-12	13	11

DO NOT UNTWIST PAIRED CONDUCTORS UNTIL THEY ARE TO BE SPLICED. SELECT CONNECTOR FOR ABOVE CABLES FROM THE FOLLOWING:

TYPE CABLE	CCBC CONNECTOR
PI	1-2

NOTE: USE NAVY UNIVERSAL CRIMPING TOOL. INNER AND OUTER RINGS FOR USE IN SPLICING SHIELDING BRAID ON TYPE PI CABLE SHALL BE BURNDY ENGINEERING CO. YIC-194 INNER RING AND YOC-200 OUTER RING, CRIMPED WITH DIE SET R20VT IN TOOL YIOQ-1. THE BRAID WIRE USED TO REPLACE THE SHIELD OVER THE SPLICE IN TYPE PI CABLE SHALL BE ALPHA WIRE CORPORATION NO. 1231, OR EQUAL. PLACE CABLE ENDS IN A POSITION AS CLOSE AS PRACTICAL TO THE POSITION THE CABLE WILL BE IN AFTER INSTALLATION, WITH THE ENDS OF THE CONDUCTORS REACHING THE CROTCH OF THE OTHER CABLE, AND SUPPORT THEM RIGIDLY IN THIS POSITION BY TEMPORARY TIES OR CLAMPS. SEE FIG. 104, **ON FIGURE 1E16.**

5. THE SPLICE IN THE TYPE PI CABLE IS ASSEMBLED BY STARTING WITH A MATCHING SHIELDED PAIR OF CONDUCTORS AND MARKING THE SHIELDED PAIR 2-1/2 INCHES IN EACH DIRECTION FROM THE CENTER OF THE SPLICE AREA, SO THERE WILL BE AN OVERLAP OF 5 INCHES WHEN THE EXCESS IS REMOVED. REMOVE 4-1/2 INCHES OF GLASS BRAID FROM EACH PAIR. SLIP AN INNER RING (YIC 194) OVER THE SHIELD UP TO THE END OF THE GLASS BRAID, REMOVE SHIELD WIRE UP TO 3/4 INCH FROM THE INNER RING, UNBRAID THE REMAINING SHIELD WIRE, FOLD THE WIRE BACK OVER THE INNER RING AND TAPE THE ENDS TO HOLD THEM IN PLACE. SLIP A 6-INCH LENGTH OF BRAID WIRE OVER ONE PAIR OF CONDUCTORS AND SLIP ONE OUTER RING (YOC 200) OVER THE BRAID WIRE AND A SECOND OUTER RING OVER THE CORRESPONDING PAIR ON THE OTHER CABLE. CUT THE BLACK AND WHITE CONDUCTORS 1 INCH AND 3 INCHES, RESPECTIVELY, FROM THE SHIELD WIRE ON ONE PAIR AND 3 INCHES AND 1 INCH RESPECTIVELY, ON THE MATCHING PAIR. REMOVE 1/4-INCH OF INSULATION FROM THE END OF EACH CONDUCTOR. INSERT THE LONGER CONDUCTOR IN THE CONNECTOR TO THE CENTER STOP, AND CRIMP THE CONNECTOR WITH THE RECOMMENDED CRIMPING TOOL. SLIP A 2-INCH LENGTH OF SILICONE RUBBER INSULATED GLASS TUBING OVER THE LONGER INSULATED CONDUCTOR BEFORE COMPLETING THE CONDUCTOR SPLICE. AFTER SPLICING BOTH CONDUCTORS SLIP THE INSULATING TUBING OVER EACH CONNECTOR AND APPLY UNSUPPORTED SILICONE RUBBER TAPE OVER THE CENTER OF THE SPLICE AREA TO HOLD THE INSULATING TUBING IN PLACE WHILE SLIPPING THE SHIELDING BRAID OVER THE SPLICE. ALIGN THE OUTER RING OVER THE INNER RING AND ONE END OF THE SHIELDING BRAID AND CRIMP THE RING TO SECURE THE SHIELD. STRETCH THE SHIELD OVER THE SPLICE AND ALIGN THE OTHER OUTER RING OVER THE INNER RING AND SECURE THE SHIELD BY CRIMPING THE RING. TRIM THE EXCESS SHIELD WIRE OUTSIDE OF BOTH OUTER RINGS. THE ABOVE STEPS ARE ILLUSTRATED IN FIG. 104, 105 AND 106 USING TWO PAIRS TO SHOW THE STEPS, **ON FIGURE 1E16.**

NOTES:

1. **THIS FIGURE SUPERSEDES SECTION 4, SHEET 129 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1E15 OF DRAWING 803-5001027.**

6. REPEAT THE ABOVE STEPS WITH EACH PAIR OF CONDUCTORS, STAGGERING EACH SPLICE 1/2 INCH. WHEN PREPARING CONDUCTORS FOR SPLICING BE CAREFUL TO KEEP ALL CONDUCTOR LENGTHS EQUAL. AFTER ALL CONDUCTOR PAIRS HAVE BEEN SPLICED, STRAIGHTEN THE CABLE TO REMOVE THE SLACK IN THE CONDUCTORS. SEE FIGURE 107, **ON FIGURE 1E16.**
7. FOLLOW STEPS 7, 8, 9 AND 10 OF METHOD 1E151 TO COMPLETE THE SPLICE.

* SPEC. MIL-1-22444 (SHIPS).
** RTV SILASTIC, DOW CORNING 731 OR RTV 102 SILICONE RUBBER, G.E. CO. OR EQUAL.
*** UNSUPPORTED SILICONE RUBBER TAPE WITH SILICONE PRESSURE SENSITIVE ADHESIVE, MINNESOTA MINING & MFG CO. NO. 70 OR EQUAL

FIGURE 1E15. Splicing high temperature cables.

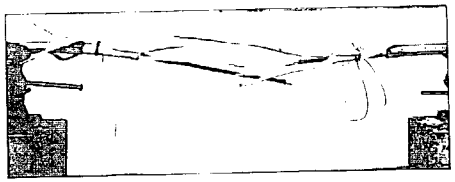


FIGURE 97

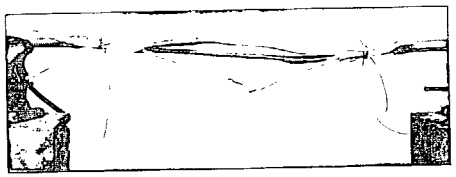


FIGURE 98

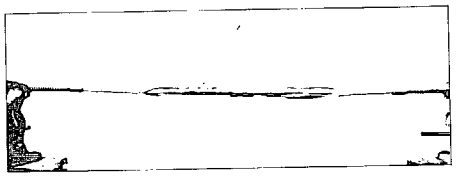


FIGURE 99

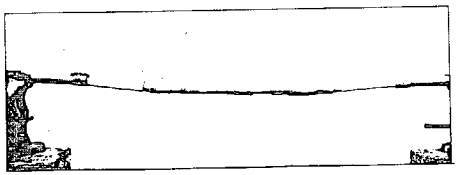


FIGURE 100

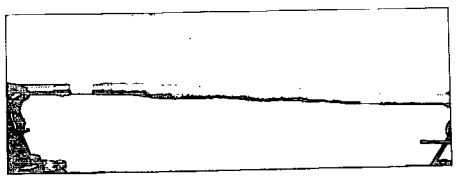


FIGURE 101

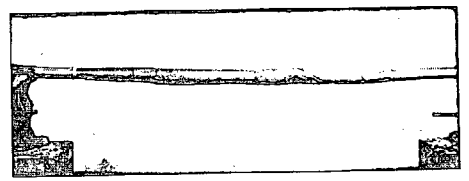


FIGURE 102

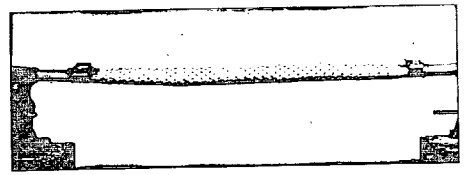


FIGURE 103

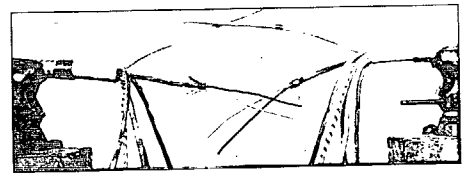


FIGURE 104

FIGURE 105

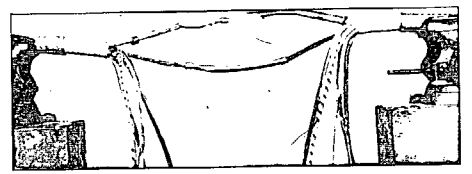


FIGURE 106

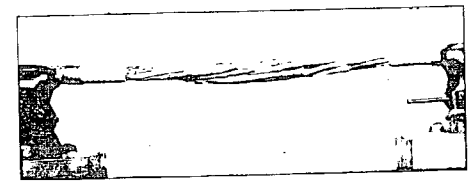


FIGURE 107

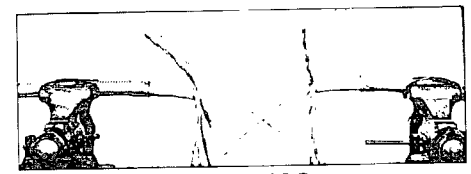


FIGURE 108

FIGURE 109

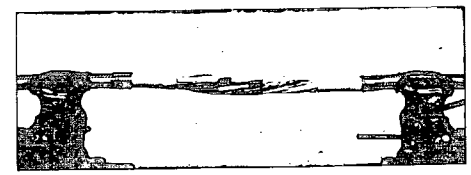


FIGURE 110

NOTES:

1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 130 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1E16 OF DRAWING 803-5001027.

SH 132317006

FIGURE 1E16. Splicing high temperature cables.

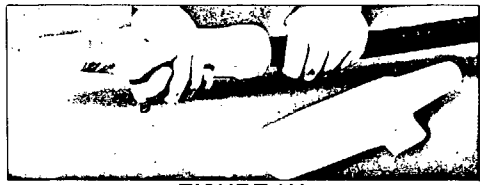


FIGURE 111

FIGURE 112

FIGURE 113

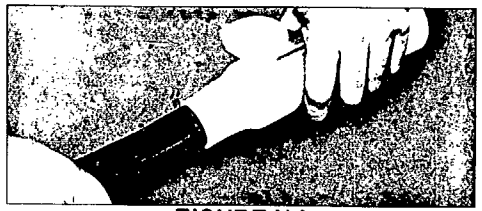


FIGURE 114

FIGURE 115

FIGURE 116

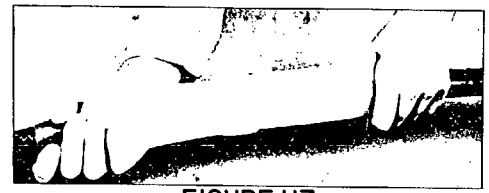


FIGURE 117

FIGURE 118

FIGURE 119

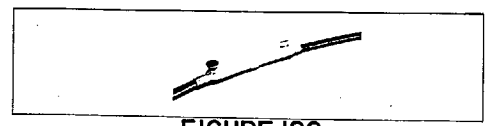


FIGURE 120

SH 132317007

FIGURE 1E17. Splicing cables-power, control, telephone and electronic.

METHOD 1E171

1. THE PROCEDURE OUTLINED IS SUITABLE FOR SPLICING CABLES HAVING POLYETHYLENE CABLE JACKET OR INSULATION BY USING CASTING MOULDS WITH EPOXY OR POLYURETHANE AS A CASTING RESIN IN CONJUNCTION WITH THE PROPER CABLE PRIMER WHICH ACTS AS A SEALER BETWEEN THE CABLE JACKET AND CASTING RESIN. SEE TABLE 3 FIGURE 1E3 AND NOTES 10E, 10E.1, AND 11 TO 13, FIGURE 1E2 FOR MATERIAL AND SPECIFICATIONS.
2. TO DETERMINE PROPER PLACES TO CUT TAPERED END OF CASTING MOULDS, INSERT CABLE END INTO CASE. WHERE CABLE FITS SNUGLY CUT CASE. SEE FIGURES 111 AND 112.
3. ROUGHEN OUTER JACKET OF CABLE WITH EMERY CLOTH. BE SURE TO ROUGHEN COMPLETE AREA THAT WILL BE COVERED WITH MOULD. PRIME ROUGHENED AREA WITH CABLE PRIMER FOR SUPERIOR ADHESION AND BEST MOISTURE PROTECTION. BRUSH ON LIBERAL QUANTITY AND LET DRY. SEE FIGURE 113.
4. SLIP THE HALVES OF SPLICE MOULDS ON RESPECTIVE CABLE ENDS AS SHOWN. SEE FIGURE 114.
5. CLIP SPOKES OF CENTERING WAFER TO EQUAL LENGTHS TO FIT CABLE DIAMETER. SEE FIGURE 115.
6. SLIP CENTERING WAFER ONTO CABLE AS SHOWN. SPLICE CONDUCTOR ACCORDING TO NORMAL PRACTICE. SEE FIGURE 116.
7. SLIDE TWO HALVES OF SPLICE CASE TOGETHER CENTERING SPLICE CASE. NO CLAMPS OR TAPE ARE NECESSARY. BE SURE CASE IS IN LEVEL POSITION BEFORE POURING ENCAPSULATING RESIN. SEE FIGURE 117.
8. MIX EPOXY OR URETHANE CASTING COMPONENTS. MIX THOROUGHLY UNTIL MATERIAL IS UNIFORM IN COLOR WITHOUT STREAKS. IN COLD WEATHER CASTING COMPOUNDS SHOULD BE HEATED TO 50 DEGREES F. OR WARMER FOR EASIER MIXING AND POURING. (BE SURE TO REMOVE CONTAINER COVER BEFORE HEATING.) SEE FIGURE 118.
9. POUR CASTING COMPOUND INTO FUNNEL OF SPLICE CASE. HOLD CAN WELL ABOVE FUNNEL SO RESIN FLOWS IN A THIN FILM. THIS ALLOWS AIR TO VENT FREELY AND ELIMINATES THE FORMATION OF AIR POCKETS. SEE FIGURE 119.
10. DO NOT DISTURB UNTIL ENCAPSULATING COMPOUND HAS HARDENED. (45 MINUTES TO 1 HOUR OR UNTIL HARD.) THIS WILL VARY WITH THE AIR TEMPERATURE. SEE FIGURE 120.

NOTES:
1. THIS FIGURE SUPERSEDES SECTION 4, SHEET 131 OF DRAWING NAVSEC NO. 9000-S6202-73980, AND SHEET 1E17 OF DRAWING 803-5001027.

METHOD 1E181

1. METHOD FOR SPLICING PAIRS, SHIELDED, WATERTIGHT, ARMORED CABLE (TYPE 2SWA) FOR ILLUSTRATIONS THAT ARE FOR SIMILAR TYPE CABLE SEE METHOD
2. THIS SECTION DESCRIBES THE METHOD FOR SPLICING THE FOLLOWING SIZES OF TYPE 2SWA CABLES.

2SWA - 3	2SWA - 24
2SWA - 7	2SWA - 30
2SWA - 10	2SWA - 37
2SWA - 14	2SWA - 44
2SWA - 19	2SWA - 61

3. REMOVE A SECTION OF BASKETWEAVE ARMOR, 6 INCHES LONGER THAN INDICATED IN STEP 4, FROM A PIECE OF SCRAP CABLE OF SLIGHTLY LARGER DIAMETER THAN THE CABLE BEING SPLICED AND SLIDE IT OVER *THE END OF ONE* OF THE CABLES TO BE SPLICED. POSITION THIS ARMOR WELL BACK FROM THE SPLICING AREA SO THAT IT DOES NOT INTERFERE WITH SUBSEQUENT SPLICING OPERATIONS. REFER TO FIGURE 1E1 NOTE 1.
4. REMOVE ARMOR AND SHEATH MATERIAL FROM THE END OF EACH CABLE TO BE SPLICED. AS FOLLOWS:

2SWA TYPE CABLE	APPROXIMATE LENGTH TO BE REMOVED, INCHES ARMOR	SHEATH
3	10	8
7, 10	11	9
14	12	10
19, 24	13	11
30, 37	14	12
44, 61	15	13

PLACE CABLE ENDS IN A POSITION AS CLOSE AS PRACTICAL TO THE POSITION THE CABLE WILL BE IN AFTER INSTALLATION, WITH THE END OF THE CONDUCTORS OF ONE CABLE REACHING THE CROTCH OF THE OTHER CABLE, AND SUPPORT THEM RIGIDLY IN THIS POSITION BY TEMPORARY TIES OR CLAMPS.

5. THE SPLICE IS ASSEMBLED BY STARTING WITH A MATCHING SHIELDED PAIR OF CONDUCTORS AND MARKING THE SHIELDED PAIR 2 1/2 INCHES IN EACH DIRECTION FROM THE CENTER OF THE SPLICE AREA, SO THERE WILL BE AN OVERLAP OF 5 INCHES WHEN THE EXCESS IS REMOVED. REMOVE 4 1/2 INCHES OF COTTON BRAID FROM EACH PAIR SLIP AN INNER RING (YIC 194) OVER THE SHIELD UP TO THE COTTON BRAID. *REMOVE SHIELD WIRE UP TO 3/4 INCH* FROM THE INNER RING, UNBRAID THE REMAINING SHIELD WIRE, FOLD THE WIRE BACK OVER THE INNER RING AND TAPE ENDS TO HOLD THEM IN PLACE. SLIP A 6 INCH LENGTH OF BRAID WIRE OVER ONE PAIR OF CONDUCTORS AND SLIP ONE OUTER RING (YOC 200) OVER THE BRAID WIRE AND A SECOND OUTER RING OVER THE CORRESPONDING PAIR ON *THE OTHER CABLE. CUT THE BLACK AND WHITE* CONDUCTORS 1 INCH AND 3 INCHES, RESPECTIVELY, FROM THE SHIELD WIRE ON ONE PAIR AND 3 INCHES AND 1 INCH, RESPECTIVELY, ON THE MATCHING PAIR. REMOVE 1/4 INCH OF INSULATION FROM THE END OF EACH CONDUCTOR. INSERT THE CONDUCTOR IN THE CONNECTOR TO THE CENTER STOP, AND CRIMP THE CONNECTOR WITH THE RECOMMENDED CRIMPING TOOL. HEAT SHRINKABLE TUBING OR PVC TAPE IS TO BE PLACED OVER THE SPLICES IN SHIELDING BRAID TO MEET THE DIELECTRIC TEST OF 200 VOLTS (RMS) SHIELD TO SHIELD. IF HEAT SHRINKABLE TUBING IS USED IT MUST BE SLIPPED OVER THE CABLE ENDS BEFORE CONNECTING THE MATCHING CONDUCTORS. PRE-INSULATED CONNECTORS MAY BE USED FOR SPLICING OF INDIVIDUAL CONDUCTORS. THOMAS AND BETTS PRE-INSULATED CONNECTOR NUMBER 22-18RAA23 PLUS TOOL WT 145, OR EQUIVALENT, IS PREFERRED. AFTER CONNECTING THE MATCHING CONDUCTORS SLIP THE BRAID OVER THE SPLICE AREA AND ALIGN THE OUTER RING OVER THE INNER RING AT ONE END AND CRIMP THE RING TO SECURE THE SHIELD WIRE. STRETCH THE SHIELD WIRE ACROSS THE SPLICE AND ALIGN THE OTHER RING OVER THE INNER RING AND SECURE THE SHIELD WIRE BY CRIMPING THE RING. TRIM THE EXCESS SHIELD WIRE OUTSIDE OF THE RINGS. SLIP THE HEAT SHRINKABLE TUBING IN PLACE OR WRAP WITH PVC TAPE. FOR ADDITIONAL SPLICING NOTES AND SPLICING MATERIAL SEE FIGURES 1E1, 1E2 & 1E3.
6. REPEAT THE ABOVE STEPS WITH EACH PAIR OF CONDUCTORS, STAGGERING EACH SPLICE 1/2 INCH. WHEN PREPARING CONDUCTORS FOR SPLICING BE CAREFUL TO KEEP ALL CONDUCTOR LENGTHS EQUAL. AFTER ALL CONDUCTOR PAIRS HAVE BEEN SPLICED, STRAIGHTEN THE CABLE TO REMOVE THE SLACK IN THE CONDUCTORS. SEE METHOD 1E101, FIGURE 61.
7. APPLY A BINDER TAPE CONSISTING OF ONE LAYER, 1/2 LAPPED, OF PRESSURE SENSITIVE VINYL TAPE OVER THE GROUPED CONDUCTORS BETWEEN THE CABLE SHEATH ENDS. ROUGHEN THE SHEATH MATERIAL AT EACH END OF THE SPLICE. SEE FIGURE 62. ON FIGURE 1E10.
8. APPLY ONE LAYER OF SHEATH FILLER TAPE, WITH 1/2 LAP. WHEN TAPING, PULL TAPE TO APPROXIMATELY ONE-HALF OF ITS ORIGINAL THICKNESS AND EXTEND TAPE OVER ENDS OF CABLE SHEATH FOR ABOUT 1 1/2 INCHES. SEE FIGURE 63 ON FIGURE 1E10.
9. APPLY TWO LAYERS, 1/2 LAPPED, OF PRESSURE SENSITIVE VINYL TAPE. TAPE TO WITHIN 1/4 INCH FROM THE ENDS OF THE ARMOR. SEE FIGURE 64 ON FIGURE 1E10.
10. APPLY *TWO COATS OF* LIQUID COATING MATERIAL. ALLOW FIRST COAT TO DRY THOROUGHLY BEFORE APPLYING SECOND COAT. SEE FIGURE 65 ON FIGURE 1E10.
11. SLIDE ARMOR WIRE OVER SPLICE AREA AND SECURE ONE END WITH STAINLESS STEEL "BANDIT" CLAMPS. THEN PULL ARMOR SLEEVE TO PROVIDE A SNUG FIT BEFORE APPLYING SECOND CLAMP. TRIM OFF ANY PROTRUDING WIRE *STRANDS. SEE FIGURE* 66 ON FIGURE 1E10.
12. FOR ALTERNATE METHOD TO STEPS 8, 9 AND 10 ABOVE SEE FIGURE 1E1 1. NOTES 11 AND 12

NOTES:

1. THIS FIGURE SUPERSEDES SHEET 1E18 OF DRAWING 803-5001027 AND SECTION 4, SHEET 133 OF DRAWING NAVSEC NO. 9000-S6202-73980.

SH 132317008

FIGURE 1E18. Splicing cables-power, control, telephone and electronic.

1. CABLE ARMOR WILL BE OMITTED OVER SPLICES OF ARMORED TO UNARMORED CABLE, AND OVER SPLICES OF UNARMORED CABLES. ARMOR OVER SPLICES OF ARMORED CABLES SHALL BE OMITTED EXCEPT IN THOSE AREAS WHERE ARMORED CABLE IS MANDATORY. HOWEVER, A JUMPER CAN BE INSTALLED AT THE SPLICE TO MAINTAIN ELECTRICAL CONTINUITY.

2. THE SPLICING OF MDGY CABLES SHALL BE UTILIZED FOR SHIPS IN REPAIR ONLY.

3. CARE SHOULD BE EXERCISED WHEN PREPARING CABLE ENDS SO THAT UNDERLYING INSULATION IS NOT CUT WHEN REMOVING THE ARMOR AND SHEATH. SIMILAR CARE IS NECESSARY WHEN REMOVING INSULATION TO PROTECT THE COPPER CONDUCTOR STRANDS FROM CUTS AND NICKS.

4. THE EXCESS STRAND SEALING COMPOUND SHOULD BE WIRE BRUSHED AND CLEANED OFF THE OUTER SURFACE OF THE OUTER LAYER OF COPPER STRANDS OF EACH CONDUCTOR BEFORE THE CONDUCTOR IS INSERTED IN THE CONNECTOR. CONNECTORS SHOULD BE INSTALLED SO THAT THE CONDUCTOR END IS FULLY INSERTED TO THE "STOP" AT THE CENTER OF THE CONNECTOR AND THE INDENT SHOULD BE SPACED HALF WAY BETWEEN THE END OF THE CONNECTOR AND THE "STOP".

5. TEMPORARY BINDING SHOULD BE APPLIED OVER THE END OF TAPES ON CONDUCTORS TO PREVENT UNWINDING OF THE INSULATION.

6. SPLICING MATERIAL SHOULD BE KEPT AS CLEAN AS POSSIBLE DURING APPLICATION SO THAT FOREIGN MATTER OR CONTAMINANTS ARE NOT WITHIN THE SPLICE.

7. MATERIAL: THE HEAT SHRINK TUBING SHALL BE PER MIL-I-23053/15.

8. INSTALLATION PROCEDURE:
   - A. SLIDE EXPANDED HEAT-SHRINKABLE PART OVER ITEM TO BE COVERED.
   - B. SHRINK TUBING BY APPLYING HEAT, USING A TORCH, HOT AIR BLOWER (HEAT GUN) OR OTHER HEAT SOURCE. TUBING STARTS TO SHRINK AT 250-275°F. (HIGHER TEMPERATURE RATINGS OF HEAT GUN AND/OR TORCH ARE SOMETIMES REQUIRED TO OFFSET HEAT-SINK EFFECT OF CONDUCTOR, CONNECTOR, SHIELDING, ETC.) HEAT GUN, IS RECOMMENDED, HOWEVER, A BERNZOMATIC TORCH WITH FLAME SPREADER MAY ALSO BE USED. (OTHER MODELS AND TYPE TORCHES CAN BE USED.)
   - C. AS HEAT IS APPLIED, MOVE HEAT SOURCE BACK AND FORTH AND AROUND THE PART TO BE SHRUNK. FOR SPLICE COVER, SHRINK FROM CENTER TO AVOID TRAPPING AIR INSIDE THE COVER. THIS WILL ENSURE EVEN SHRINKAGE.
   - D. WHEN PART HAS RECOVERED ENOUGH TO ASSUME THE CONFIGURATION OF THE ITEM COVERED, AND WHEN THE SEALANT IS SEEN TO FLOW, DISCONTINUE HEATING. ADDITIONAL HEATING WILL NOT MAKE THE PART SHRINK TIGHTER.
   - E. SINCE THE WALL THICKNESS OF THICK-WALL, HEAT-SHRINK TUBING IS APPROXIMATELY THE THICKNESS OF THE EXISTING SHEATH, IT IS NOT NECESSARY TO REPLACE THE SHEATHING THAT HAS BEEN REMOVED FOR SPLICING.
   - F. BOTH THE THERMALLY STABLIZED MODIFIED POLYOLEFIN TUBING AND THE SEALANT USED FOR THIS SPLICING METHOD HAVE AN INFINITE SHELF LIFE.
   - G. HEAT SHRINK TUBING AND THE SEALANT ARE VIRTUALLY INERT, THERE ARE NO ADVERSE EFFECTS FROM ACIDS, SALTS, BASES, OR ALKALIS. THEY ARE AFFECTED BY CONSTANT IMMERSION AT ELEVATED TEMPERATURES, BY SOME FUELS AND OILS.
   - H. USE TABLES 1, 2, 3, AND 4 SHEET 1E20 AS A GUIDE TO DIAMETERS AND LENGTHS OF TUBING REQUIRED FOR SPLICING COMMON SIZES OF CABLE.

9. WHERE A WATERTIGHT SPLICE IS REQUIRED IT WILL BE NECESSARY TO USE A MELTABLE SEALANT WHICH IS COMPATIBLE WITH THE THICK WALL HEAT SHRINK TUBING AND MEETS THE REQUIREMENTS OF METHOD 1A61. FOR APPROVED MANUFACTURERS LIST CONTACT CMDR DEPT OF NAVY, WASH DC 20362, NAVSEA CODE 56Z34.

10. CONNECTORS. CONNECTORS SUITABLE FOR EACH CONDUCTOR SIZE ON TABLE 1, SHEET 1E20 THE CONDUCTOR MUST BE LONG ENOUGH TO REACH THE FULL DEPTH OF THE CONNECTOR AND THE CONDUCTOR INSULATION MUST BE FLUSH WITH THE BUTT OF THE CONNECTOR. TWO PIECE COMPRESSION RINGS AS APPROVED BY MIL-I-983E (3.8.11.2.2.) AND MIL-E-16400F (3.9. 12,4) ARE USED FOR CONNECTING THE GROUNDING SHIELDS OF TYPE TTRSA CABLE. EXAMPLES SHOWN ON SHEET 1E10 ARE BURNDY "HY RING" SERIES AND REQUIRE A BURNDY TYPE MR 8 PV-3 HAND COMPRESSION TOOL OR EQUIVALENT.

11. DELETED.

12. THE SAME BASIC SPLICING PROCEDURE AND MATERIALS MAY BE USED AS AN ALTERNATE METHOD FOR APPLICATIONS OUTLINED IN SECTION 1, GROUP E.

CAUTION

CABLE SPLICES USING HEAT SHRINK TUBING SHALL NOT BE INSTALLED IN AREAS SUBJECT TO OIL IMMERSION OR SPLASHES (i.e. MACHINERY SPACES, ENGINE ROOMS, GENERATOR ROOMS, PUMP ROOMS) DUE TO ITS PROPENSITY TO ABSORB OIL.

NOTES:
1. THE CABLE SPLICING METHODS DETAILED ON THIS SHEET AND ON FIGURE 1E20 ARE TO BE USED AS AN ALTERNATE TO THOSE DETAILED ON FIGURES 1E1 THROUGH 1E18.
2. THIS FIGURE SUPERSEDES SHEET 1E19 OF DRAWING 803-5001027.

SH 132317009

FIGURE 1E19. Splicing cable-power, control, telephone and electronic with heat shrink tubing.

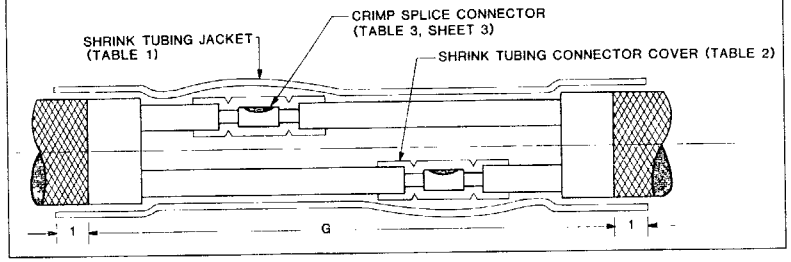
TABLE 1 – SHRINK TUBING JACKET FOR COMPLETED CABLE SPLICE (NOTE 3)	
RANGE OF CABLE DIAMETER	JACKET SIZE LENGTH x I.D.
0.22 TO 0.50	G ± 2" (TABLE 3) x 0.75"
0.40 TO 0.87	G ± 2" (TABLE 3) x 1.10"
0.87 TO 1.75	G ± 2" (TABLE 3) x 2.00"
1.50 TO 2.75	G ± 2" (TABLE 3) x 3.00"
2.00 TO 3.85	G ± 2" (TABLE 3) x 4.00"

TABLE 2 – SHRINK TUBING DIMENSIONS		
EXPANDED	FULLY RECOVERED	
I.D.	I.D.	WALL THICKNESS
0.40"	0.15"	0.060"
0.75"	0.22"	0.095
1.10"	0.375"	0.120"
1.50"	0.50"	0.140"
2.00"	0.75"	0.155"
3.00"	1.25"	0.155"
4.00"	1.75"	0.155"

NOTES:

1. HEAT SHRINK TUBING SHALL CONFORM TO THE DIMENSIONAL REQUIREMENTS OF TABLE 2 AND TO MIL-I-23053/15. SEE NOTE 13 ON FIGURE 1E19.
2. APPLICATION OF HEAT SHRINK TUBING FOR CABLE SPLICING SHALL BE IN ACCORDANCE WITH FIGURE 1E19.
3. SHRINK TUBING FOR CABLE SHALL BE PER MIL-I-23053/15 EXCEPT THE SEALANT/ADHESIVE SHALL BE OF THE TYPE THAT MEETS THE REQUIREMENTS DEFINED IN METHOD 1A61 ON FIGURE 1A6.
4. THIS FIGURE SUPERSEDES SHEET 1E20 OF DRAWING 803-5001027.

TABLE 3 – SPLICE DIMENSIONS AND SHRINK TUBING INSTALLATION FOR POWER CABLES AND SINGLE CONDUCTOR DEGAUSSING CABLES.



SH 132317010

FIGURE 1E20. Splicing cable-power, control, telephone and electronic with heat shrink tubing.

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
DOD-STD-2003-1(NAVY)	ELECTRIC PLANT INSTALLATION STANDARD METHODS FOR SURFACE SHIPS AND SUBMARINES (CABLE) SECTION 1 OF 5

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)*:

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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PREVIOUS EDITION IS OBSOLETE.