CABLE PRESSURE SYSTEMS
VALVES, TUBINGS, AND FITTINGS
DESCRIPTION, INSTALLATION, AND ARRANGEMENTS

CONTENTS PAGE

1. GENERAL

1.01 This section covers the description, installation, and arrangement of valves, tubings, and fittings that may be used in a cable pressure system. Also covered in this section are soldering molds which are used for soldering valves to lead cable or sleeves.

1.02 This section is reissued to update information and to include information formerly contained in Sections 637-235-200, -205, -206, and -212. Since this is a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 The valves requiring lead pipe connections and the lead pipe itself are included in this section primarily to cover existing operations. Equipment and arrangements using plastic tubing are recommended with the exception of buried applications.

2. PRESSURE TESTING VALVES

2.01 Valves are installed in cables maintained under air pressure for convenience in admitting air and to provide pressure reading points.

2.02 Methods of installing flanges and screw plugs on lead- or plastic-sheathed cable are described in Section 637-235-201.

2.03 Each of the pressure testing valves described in this section consists of a valve stem equipped with valve core and cap.

A. C Pressure Testing Valve

2.04 The C pressure testing valve (Fig. 1) is designed for installation directly in the lead sheath or sleeve of a cable. It provides a permanent air admission and pressure reading point on cables maintained under continuous pressure.

> ***Caution:*** ***Valves should not be installed directly in the sheath of lepeth cables since they will reduce the dielectric strength of the cable to the point where it will be susceptible to lightning damage. Preparation of lepeth sheath cable for the installation of a valve is covered in Part 10.***

Fig. 1—C Pressure Testing Valve (AT-6914)

2.05 To install the C pressure testing valve on a ***lead-sheath*** cable, proceed as follows:

(1) Clean the area where the valve is to be placed.

(2) Prepare the sheath for valve installation by either the raised sheath (high dielectric strength) or muslin spacing (high or normal dielectric strength) methods as outlined in Part 9.

(3) Using a cable drill, bore a 1/4-inch hole in the sheath.

(4) Remove the cap and core from the valve and screw the threaded end of the valve into the drilled hole. Use the valve repair tool to seat the valve firmly into place (Fig. 2).

> ***Note:*** Always remove the valve core from the valve before soldering. The heat is likely to damage the gasket on the valve core.

(5) Place the cable soldering form around the base of the valve stem and solder stem to lead sheath.

(6) Remove the soldering form. ***Do not replace the valve core and cap until the valve stem has cooled.***

(7) After the valve core has been replaced, test for leaks using a small quantity of testing solution applied to the top of the valve stem.

> ***Note:*** Apply the testing solution sparingly as it may deteriorate the valve core seating material.

(8) Depress the valve core momentarily to blow out any solution before replacing the cap.

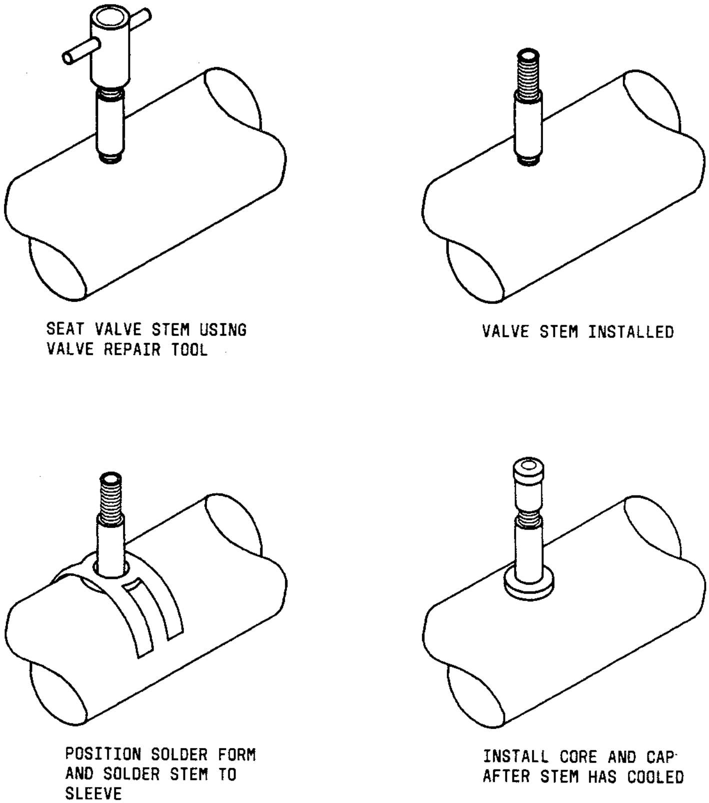


Fig. 2—Installation of C Pressure Testing Valve

2.06 To install the C pressure testing valve on a ***lead sleeve,*** proceed as follows:

(1) Clean the area where the valve is to be placed.

(2) Using a cable drill, bore a 1/4-inch hole in the sleeve approximately 2-1/2 inches from one end of the wiped joints (Fig. 3).

Note: In aerial cable, the hole should be drilled at the end of the sleeve nearest the pole and at an angle so that it does not protrude above the strand.

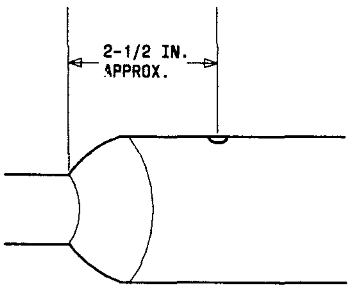


Fig. 3—Location of Drilled Hole on Lead Sleeve

(3) Follow the instructions outlined in paragraph 2.05 (4) through (8), except apply to a lead sleeve rather than a lead sheath.

2.07 When a valve is to be installed on the side of a cable (using D soldering mold described in Part 8), the sheath should be prepared by the muslin spacing method described in Part 9.

B. F Pressure Testing Valve

2.08 The F pressure testing valve (Fig. 4) is used for installation in the C or F pressure flange (Section 637-235-201) to provide temporary or permanent air admission and pressure reading points on cables under pressure.

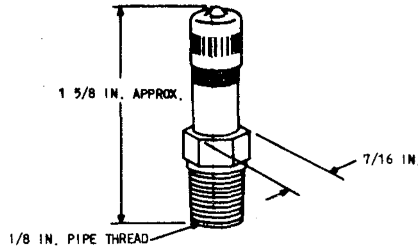


Fig. 4—F Pressure Testing Valve (AT-6914)

2.09 This valve, used in conjunction with the 103-B coupling and B plastic tubing fitting, may be used where valve extensions using plastic tubing are required.

2.10 Apply Teflon pipe sealing tape to the 1/8-inch threaded end of the F valve before installation.

C. H Pressure Testing Valve

2.11 The H pressure testing valve (Fig. 5) is designed for use on 37-type terminals. This valve is not suitable for installation in cable sheath, lead pipe, pressure testing flanges, or contractor housings.

2.12 Apply Teflon pipe sealing tape to the lower threads of the valve before installation in terminal housing.

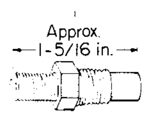


Fig.5—H Pressure Testing Valve (AT-6914)

D. P Pressure Testing Valve

2.13 The P pressure testing valve (Fig 6) is designed for insertion into the end of lead pipe where extensions using lead pipe are required.

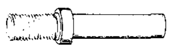


Fig. 6—P Pressure Testing Valve (AT-6914)

2.14 Install the valve in the end of a lead pipe as illustrated in Fig. 7.

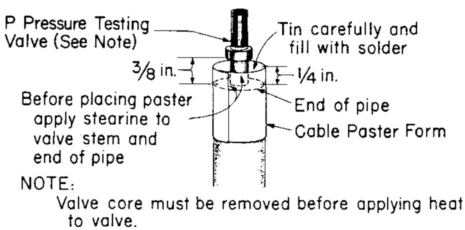


Fig. 7—Installation of P Pressure Testing Valve

E. TR15R Tire Valve and Oval Base Repair Valve

2.15 These valves are used in preparing temporary splice closures made of CR tape or equivalent material to permit pressure testing.

2.16 The ***TR15R valve*** (Fig. 8) is a rubber-covered valve with a disc-shaped rubber base.

2.17 The ***oval base repair valve*** (Fig. 8) is a metal valve with an oval metal base and a screw and washer sealing arrangement.

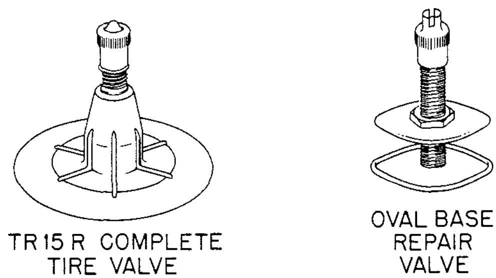


Fig. 8—TR15R Tire Valve and Oval Base Repair Valve

F. Valve Caps and Cores

2.18 The caps on pressure testing valves are airtight and are provided to protect the valve core. All valves should be equipped with caps.

2.19 The ***R valve cap*** is equipped with a rubber gasket and is designed with a round dome for installation and removal by means of the fingers.

2.20 The ***M valve cap*** is equipped with a soft metal gasket and is designed with a hexagonal top for installation and removal by means of a wrench, thereby discouraging tampering and theft.

2.21 Valve caps and core are illustrated in Fig. 9.

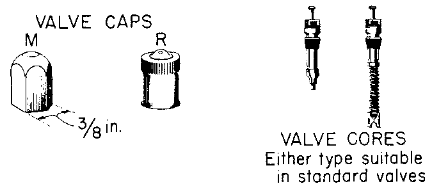


Fig. 9—Valve Caps and Cores (AT-6914)

3. ARRANGEMENT OF PRESSURE TESTING VALVES

A. Aerial

3.01 The arrangement of valves placed in lead- or plastic-sheathed aerial cable is illustrated in Fig. 10. ***It is recommended that the valve be offset slightly from the vertical to minimize possible interference with the strand.***

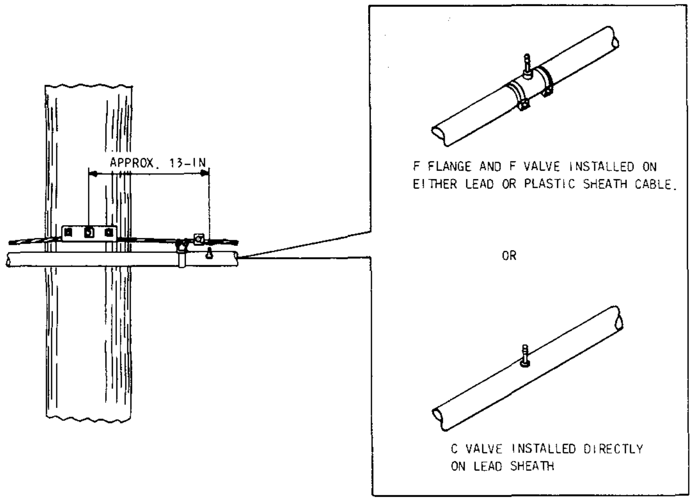


Fig. 10—Arrangement of Valve on Aerial Cable

3.02 Where the valve is to be placed in a splice case or sleeve that is adjacent to and ***within reach*** from the pole, install an F valve in the existing flange on the splice case or install a C valve directly to the sleeve (Fig. 11).

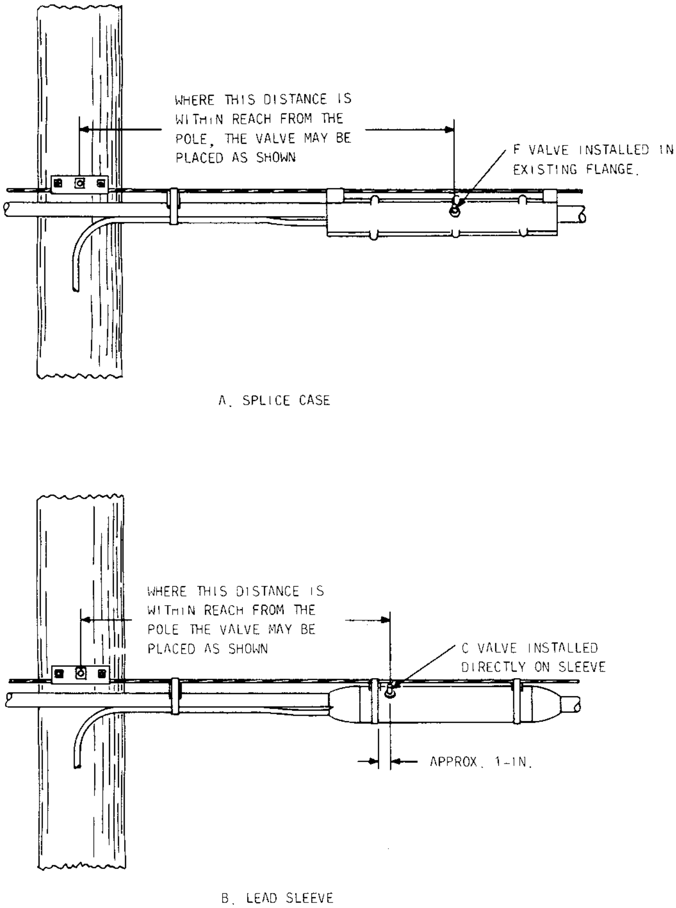


Fig. 11—Arrangement of Valves Within Reach from Pole

3.03 If a splice case or lead sleeve is near the pole but beyond reaching distance, a pressure testing valve may be extended from the case or sleeve using plastic tubing as shown in Fig. 12.

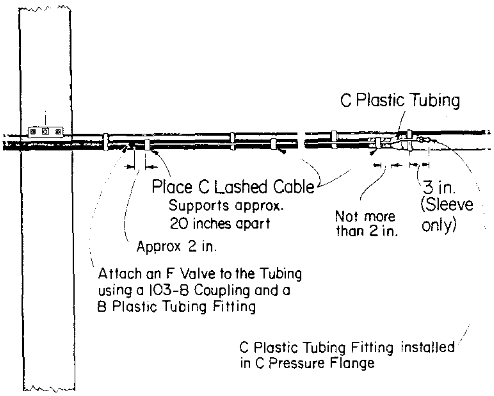


Fig. 12—Arrangement of Valve Extended from Splice Case or Lead Sleeve Using Plastic Tubing

3.04 The arrangements shown in Fig. 10 through 12 for lashed cable construction can be used on cables supported by rings.

B. Underground

3.05 On underground cable, valves should preferably be located on splice cases or lead sleeves rather than on the cable sheath. However, for convenience, C plastic tubing is extended from the splice case or sleeve to the manhole collar and attached to a B high-valve block (Fig. 13). This provides a convenient means for making pressure measurements.

3.06 The plastic tubing is dressed along the cable to the first cable rack or other convenient point, then vertically upward to the high-valve block. The tubing should be lashed to the cable with C lashed cable supports and clamped to the manhole wall and roof, as required.

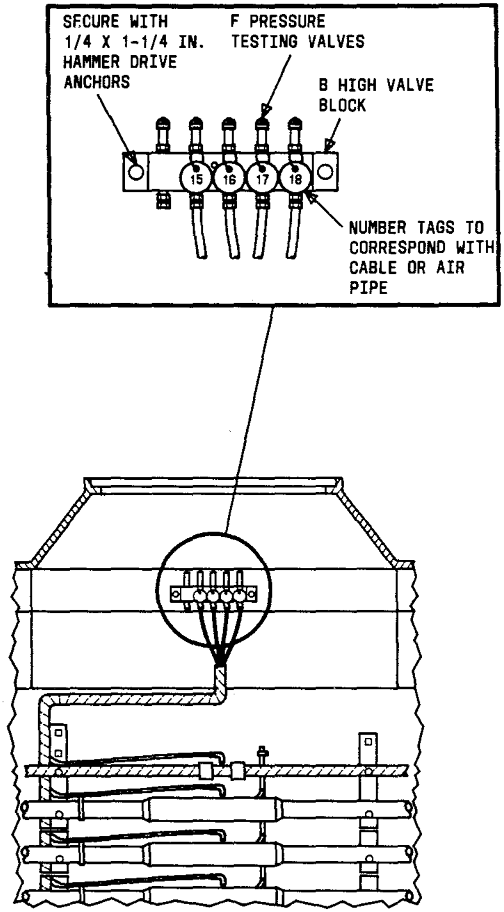


Fig. 13—Arrangement of Valves in Manhole Using Plastic Tubing

C. Buried

3.07 Permanent valves installed on buried cable can be brought aboveground and arranged on markers as shown in Fig. 14 through 18.

3.08 Valves installed on markers must be protected by suitable valve housings. The C and M valve housings are used for this purpose.

3.09 The ***C valve housing*** (Fig. 14) is used for protecting a single valve on the marker. The housing mounts on a 1-1/4 inch steel pipe.

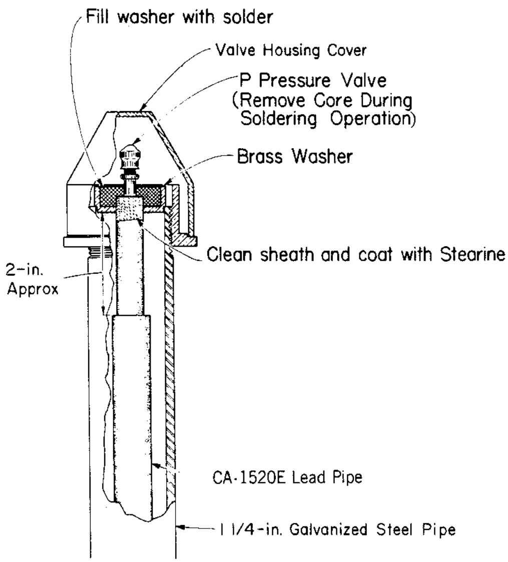


Fig. 14—C Valve Housing

3.10 The arrangement of a C valve housing mounted on a marker adjacent to a single cable route where only one valve is brought above ground is illustrated in Fig. 15.

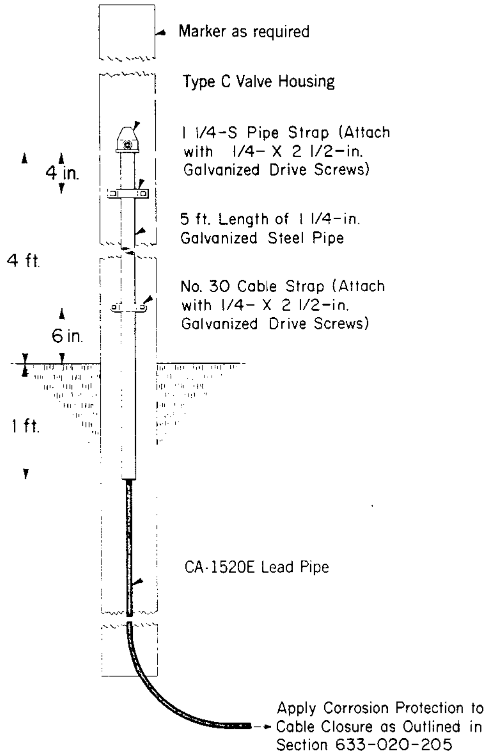


Fig. 15—Marker Arrangement Using C Valve Housing

3.11 When an additional valve is to be located on a marker where the existing valve is protected by a C valve housing, the second valve should be mounted in a C valve housing as close to the first as practical and at the same level.

3.12 The ***M valve housing*** (Fig. 16) will accommodate three valves. This housing mounts on a two-inch steel pipe.

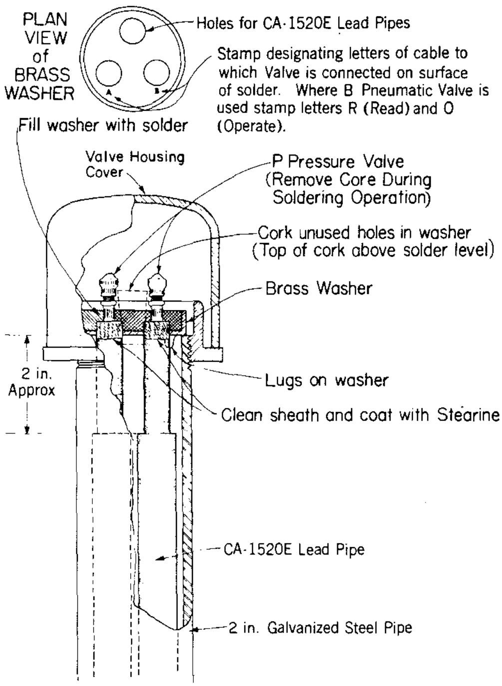


Fig. 16—M Valve Housing

3.13 The arrangement of an M valve housing mounted on a marker is illustrated in Fig. 17. This arrangement is required where either two or three valves are terminated at one location. This arrangement is also required where a B pneumatic valve is installed.

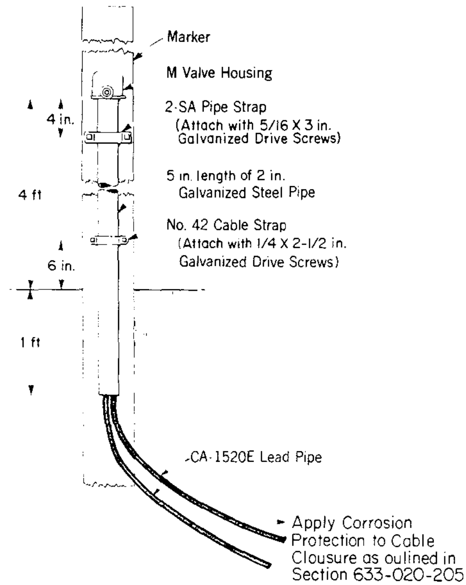


Fig. 17—Marker Arrangement Using M Valve Housing

3.14 ***37-type terminal:*** Where this terminal is used, the two valves required for contactor check and adjustment are included in the terminal and no auxiliary valve pipe is required.

3.15 If a second cable is placed along a cable route where a 37-type terminal is mounted on an existing marker, the appropriate valve housing for the valve on the new cable should be attached to the marker with the top of the housing on a level with the bottom of the porcelain insulator on the 37-type terminal, as shown in Fig. 18.

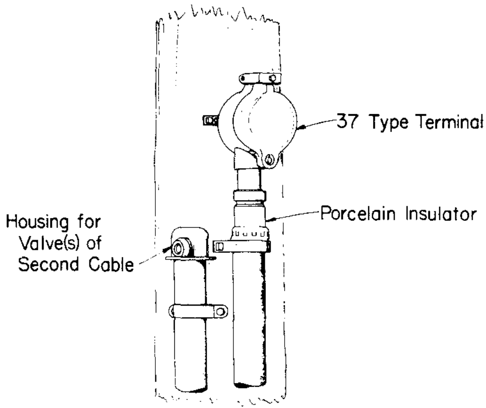


Fig. 18—Marker Arrangement Using 37-Type Terminal

4. BYPASS VALVES

A. General

4.01 When it is desired to join two cables pneumatically or to bridge an airflow restriction in a cable such as a pressure plug, it is recommended that a bypass be installed. If means of opening and closing this bypass for subsequent maintenance work is necessary, a bypass valve having this feature should be installed.

B. Bypass Valve (AT-7618X)

4.02 The bypass valve (Fig. 19) is used primarily on aerial cables or cables in vaults. It may be used also on underground cables where it is not desirable to have air shutoff facilities or valve reading points located in the manhole collar.

4.03 The bypass valve has a diaphragm assembly and associated parts that are permanently sealed within the housing. A control screw in the top of the housing is used to open or close the valve. Turn the screw clockwise to close and counterclockwise to open the valve. Two 1/4-inch pipe tubes for making connections to lead pipe are built into the housing.

4.04 A mounting plate, which is part of the valve, is attached to manhole walls with 1/4- by 1-1/4 inch hammer drive anchors and to poles with 1-1/2 inch strap nails. When the valve is to be mounted on a cable sheath or sleeve, cut off the mounting plate at the housing base with a hacksaw.

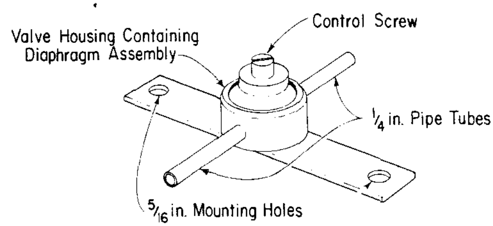


Fig. 19—Bypass Valve (AT-7618X)

C. Dual Stem Bypass Valve (AT-7682X)

4.05 The dual stem bypass valve (Fig. 20) is used primarily with buried cable. It may be used also on underground cables where lead pipe is used to extend valve reading points to the manhole collar.

4.06 The dual stem bypass valve has a diaphragm assembly and associated parts that are permanently sealed within the housing. A control screw in the face of the housing is used to open or close the valve. Turn the screw clockwise to close and counterclockwise to open the valve.

4.07 Two parallel 1/4-inch pipe tubes for making connections to lead pipe are built into the housing and also connect with two F pressure testing valves in the top of the housing.

4.08 When the control screw is closed, pressure readings can be made at the F pressure valves to obtain the pressure existing at each side of the plug or in the two cables, depending on the type installation.

4.09 The mounting bracket furnished with the valve is for use when mounting the valve in a wire terminal at buried cable installations. When the valve is to be installed in a manhole, the mounting bracket nut and mounting bracket should be removed.

4.10 Due to the valve design, there is no danger of damage from heat during the soldering operation. However, the ***valve cores should be removed from the valve stems prior to soldering.***

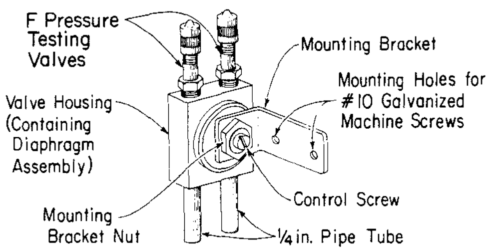


Fig. 20—Dual Stem Bypass Valve (AT-7682X)

D. F Bypass Valve

4.11 The F bypass valve (Fig. 21) can be used with 3/8-inch plastic tubing for constructing a bypass such as across a pressure plug at the underground-aerial cable junction on a riser pole. It may be used also on underground cable where plastic tubing is used to extend valve reading points to the manhole collar.

4.12 This valve has a diaphragm assembly and associated parts that are permanently sealed within the housing. A shutoff control in the face of the housing is used to open or close the valve. Turn the control clockwise to close and counterclockwise to open the valve.

4.13 Two B plastic tubing fittings are installed in the housing for making connections to 3/8-inch plastic tubing and are also connected with two F pressure testing valves in the top of the housing.

4.14 When the shutoff control is closed, pressure readings can be made at the F pressure valves to obtain the pressure existing at each side of the plug or in the two cables, depending on the type installation.

4.15 Two 7/32-inch holes are provided for mounting the valve on a pole or wall with No. 10 galvanized wood screws.

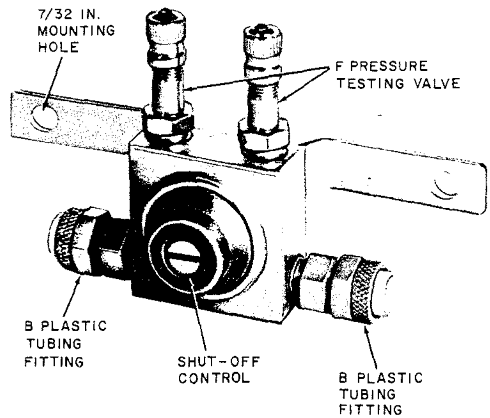


Fig. 21—F Bypass Valve (AT-8664)

5. ARRANGEMENT OF BYPASS VALVES

5.01 Bypass arrangements are provided to establish a continuous air section by bridging a pressure plug in a cable.

5.02 Bypass valves are often installed so that portions of the air pressure system may be isolated for leak-locating purposes. However, when a bypass is installed around a restriction such as an abandoned plug, the bypass valve is usually omitted.

A. Connection to Cable

5.03 Figures 22 and 23 illustrate the methods of connecting either plastic tubing or lead pipe to polyethylene or lead sheath cable, lead sleeves, or splice cases.

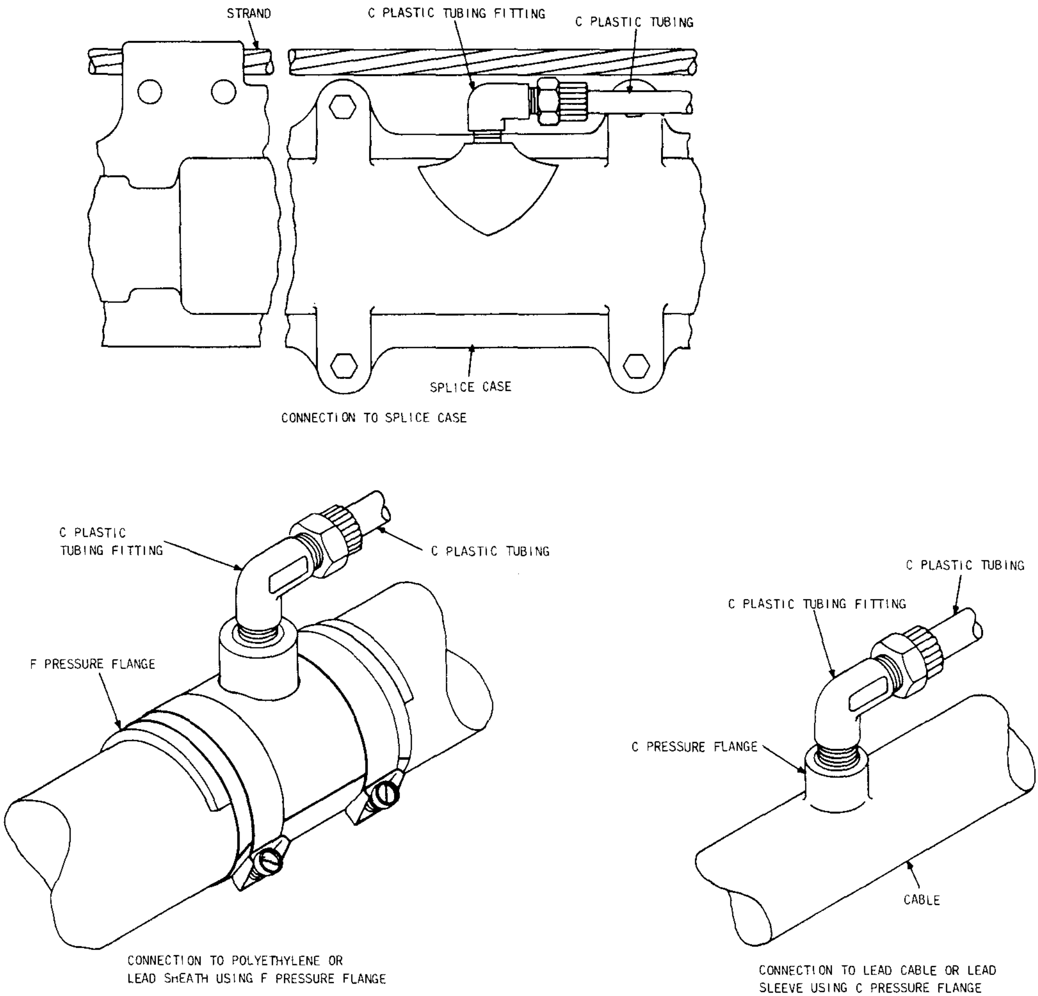


Fig. 22—Connections Using Plastic Tubing

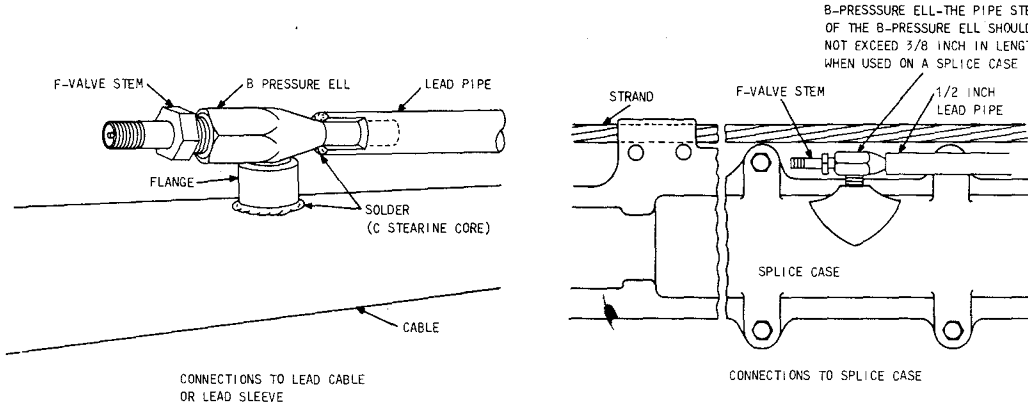


Fig. 23—Connections Using Lead Pipe

B. Aerial Cable

5.04 The arrangement of an air bypass around a pressure plug on aerial cable using plastic tubing is shown in Fig. 24. This arrangement would also be used at junctions between aerial, underground, or buried cable where a plug has been placed to separate the air sections.

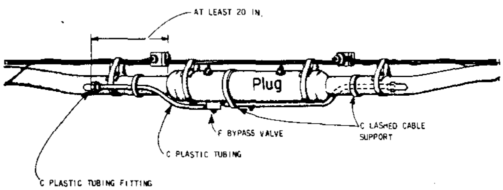


Fig. 24—Aerial Arrangement

C. Underground Cable in Conduit

5.05 The arrangement of an air bypass (using plastic tubing) around a plug installed on underground cable is shown in Fig. 25. Also shown in Fig. 25 is the arrangement for an underground cable that connects to a submarine cable, or for an underground cable that connects to an aerial cable when conditions make it desirable to locate the pressure plug underground instead of aerially.

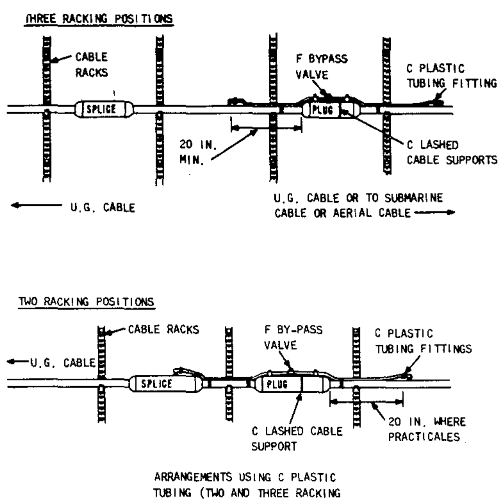


Fig. 25—Underground Arrangement

5.06 In locations where a manhole is likely to be filled with water or where frequent air measurements may be necessary, the F bypass valve may be mounted on the manhole chimney as shown in Fig. 26.

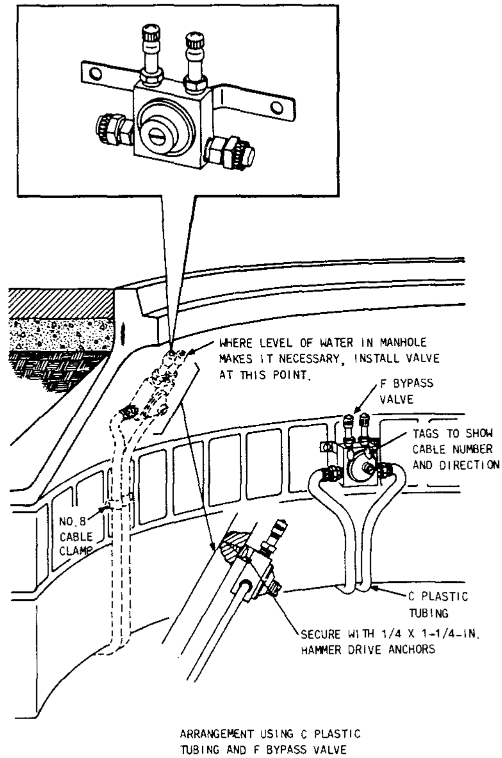
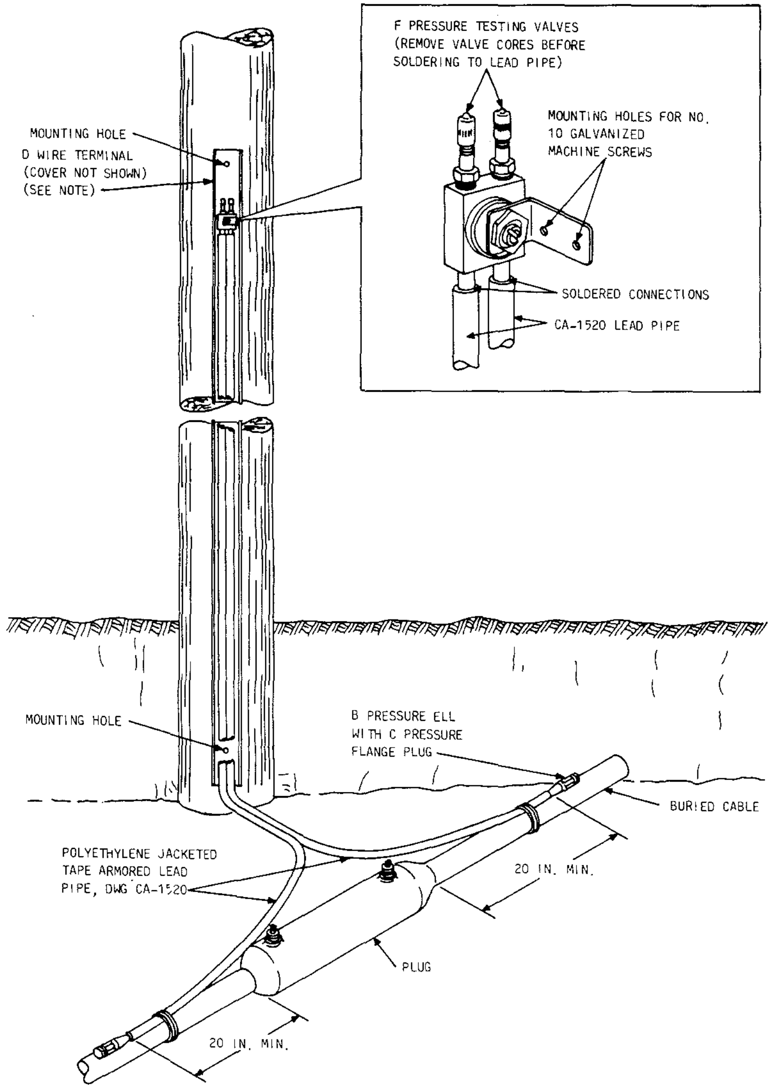


Fig. 26—Extending Valves to Manhole Chimney

D. Buried Cable

5.07 On buried cable and at submarine cable crossings, a bypass valve across a pressure plug can be mounted on a marker in a housing. The bypass housing consists of a D buried wire terminal with connecting block replaced by a dual stem bypass valve (AT-7682X) as shown in Fig. 27.



NOTE:
REMOVE CONNECTING BLOCK (PART OF TERMINAL) AND REPLACE WITH BYPASS VALVE.

Fig. 27—Buried Arrangement

E. Cross-Connecting Terminals

5.08 At cross-connecting terminals where the aerial and underground cables enter separate sheaths, a bypass should be placed using plastic tubing as shown in Fig. 28.

> ***Note:*** Place the plastic tubing and bypass so as to minimize the likelihood of damage from employees climbing or working on the pole.

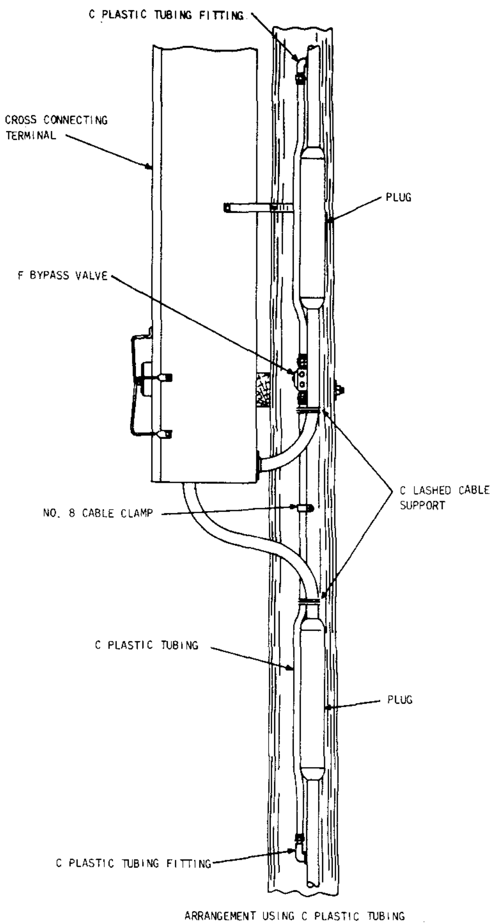


Fig. 28—Cross-Connect Terminal Arrangement

6. B PNEUMATIC VALVE

6.01 The B pneumatic valve (Fig. 29) is designed for use on hardened buried cable systems at a buried sleeve or splice case and permits aboveground cable pressure measurements without jeopardy to the buried cable system.

6.02 Two CA-1520E lead pipes are connected to the B pneumatic valve. The pipes are brought aboveground to the M valve housing. Cable pressure is blocked at the B pneumatic valve until external pressure is applied to the ***Operate*** tube at the M housing to move the valve piston to its open position. This permits cable pressure measurements in the ***Read*** pipe at the M housing.

6.03 Gas pressure in the cable can be measured at the ***Read*** valve only when the pneumatic valve has been operated by injecting air or nitrogen into the ***Operate*** valve at approximately 25 psi. A bicycle tire pump can be conveniently used for this operation. ***Care should be taken to ensure that the pressure in the Operate tube is reduced to zero before leaving the valve location.*** In the event that damage occurs to either the ***Read*** or the ***Operate*** extensions, the valving arrangement ensures that no gas will be lost from the cable as a result of such damage.

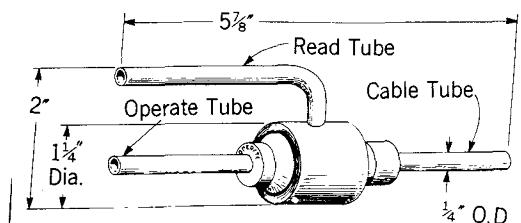


Fig. 29—B Pneumatic Valve

7. TUBING AND FITTINGS

A. Type of Tubing

7.01 The tubing used may be copper, plastic, or lead pipe depending on specific requirements.

7.02 ***Copper tubing*** is commercially available in either refrigeration or water types, although refrigeration tubing is most commonly used in air systems. Copper tubing is recommended for use between the pressure source and the meter panel and within the meter-panel itself. It is also used in some installations between the meter-panel and the individual cables.

7.03 ***C plastic tubing*** is used for making air connections to cables at meter-panels, at manifold and high-valve manholes in pipe systems, and at various other locations in the outside plant for bypasses or low-pressure dry-air supply lines.

7.04 ***CA-1520L lead pipe*** has been used extensively in the past for piping air from the pressure source to the meter-panel and in some cases from the meter-panel to the individual cables. See paragraph 1.03.

B. Pressure Drop in Tubing and Lead Pipe

7.05 As air flows through a tube or pipe, a pressure drop occurs. The amount of pressure drop is dependent upon the rate of airflow, the length and internal diameter of the tubing, and the material from which it is made.

7.06 The rate of airflow may be relatively high between the pressure source and the meter-panel. The rate may be as high as 200 standard cubic feet per hour (scfh) or as low as 10 to 20 scfh.

7.07 The rate of airflow is usually relatively low between the meter-panel and an individual cable. In a well-maintained toll or trunk cable, the flow will seldom exceed 1.5 scfh, while in a subscriber cable in the early stages of pressurizing, the flow may be as high as 8 to 10 scfh.

7.08 In general, the distance between the air pressure source and the meter-panel is made as short as practical, usually 5 to 10 feet in the average case. The distance from the meter-panel to the cable connection is usually much longer and in some cases exceeds 100 feet.

7.09 In determining the kind and size of tubing to be used, it is important to consider the probable maximum airflow as well as the length of tubing involved. The diameter of the tubing should be large enough to deliver the required amount of air at the necessary pressure.

7.10 Table A lists the various kinds of tubing and gives the approximate pressure drop which may be expected in each. Note that with refrigeration tubing the outside diameter is the tubing size. Also note that with copper water tubing the ordering size is less than the inside diameter of the tubing.

TABLE A

PRESSURE DROP (PSI) PER 100-FOOT LENGTH AT 10 PSI INLET PRESSURE

AIR-FLOW RATE (SCFH)	COPPER REFRIGERATION TUBING OD (IN.)			COPPER WATER TUBING SIZE (IN.) (TYPE L)		C PLASTIC TUBING OD (IN.)		LEAD PIPE OD (IN.)
	1/4 (0.18 ID)	3/8 (0.305 ID)	1/2 (0.436 ID)	1/4 (0.315 ID)	3/8 (0.43 ID)	1/4	3/8	1/2
10	0.72	0.062	0.014	0.060	0.014	0.66	0.15	0.127
20	1.4	0.16	0.035	0.133	0.033	1.7	0.33	0.304
30	2.6	0.28	0.062	0.21	0.062	3.4	0.55	0.59
40	4.7	0.41	0.090	0.32	0.094	5.5	0.90	0.91
50	7.3	0.55	0.145	0.52	0.125	8.0	1.3	1.27
60	10.0	0.75	0.16	0.72	0.16	10.2	1.8	1.81
75		1.15	0.20	1.05	0.21		2.6	2.46
90		1.60	0.27	1.45	0.29		3.6	3.41
120		2.70	0.45	2.45	0.52		6.0	
150		4.10	0.73	3.60	0.80		8.6	
180		5.80	1.20	4.80	1.30			

C. Pressure Drop in Air Rate Indicators and 1/8-Inch Fittings

7.11 For purposes of general information, Table B lists the airflow characteristics of air rate indicators and 1/8-inch fittings.

D. Copper Tubing and Fittings

7.12 Copper tubing is commercially available in 1/8-, 1/4-, 3/8-, and 1/2-inch od sizes in both refrigeration and water tubing types. Depending upon the airflow requirements, either 3/8- or 1/2-inch refrigeration tubing is generally used at the pressure source. The 1/4-inch refrigeration tubing is generally limited to individual cable feeds from the meter panel, or to connection between air meter and air rate indicators at the panel.

7.13 Brass tubing fittings of the compression, heavy-duty type, are recommended for connecting refrigeration tubing to other tubing, piping, valves, or flanges. Brass pipe fittings are used for making connections at air meters, between air rate indicators, etc. Tube and pipe fittings are commercially available. Various fittings are illustrated and identified by name, code number, and size as shown in Fig. 30 and 31.

TABLE B

PRESSURE DROP (PSI) AT 10 PSI INLET PRESSURE

AIR-FLOW RATE SCFH	AIR RATE INDICATORS		1/8 IN. FITTINGS	
	SUPER-SEDED SINGLE SPACE TYPE	AT-7683X DUAL SCALE	AT-7683X SHUT OFF VALVE	116B STREET ELBOW
5	0.20	0.13		
10	0.55	0.36	0.024	
15	1.15	0.80	0.045	0.014
20	2.10	1.45	0.070	0.025
30			0.135	0.060
40			0.200	0.110
50			0.340	0.170
60			0.500	0.240

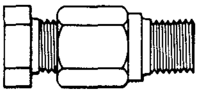
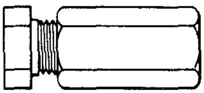
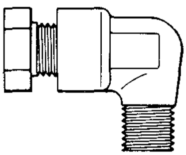
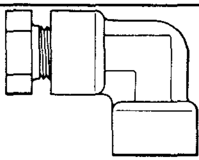
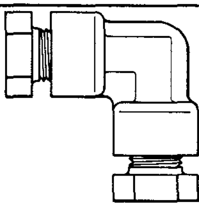
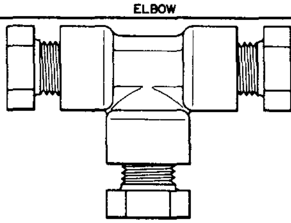
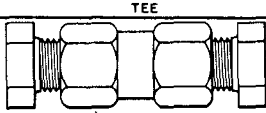
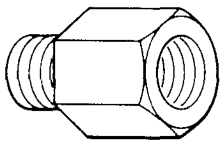
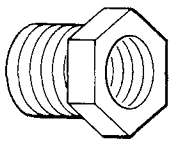
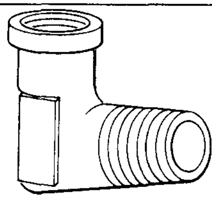
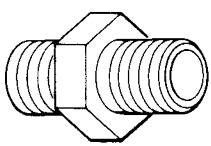
NAME AND CODE NUMBER		SIZE (INCH)	USED FOR CONNECTING		
			OD TUBING (INCH)	TO FEMALE PIPE THREAD (INCH)	TO MALE PIPE THREAD (INCH)
 CONNECTOR	88-LB	1/4 x 1/8 3/8 x 1/4 3/8 x 3/8 1/2 x 3/8 1/2 x 1/2	1/4 3/8 3/8 1/2 1/2	1/8 1/4 3/8 3/8 1/2	
 COUPLING	86-LB	1/4 x 1/8 3/8 x 1/4 1/2 x 3/8	1/4 3/8 1/2		1/8 1/4 3/8
 MALE ELBOW	89-LB	1/4 x 1/8 3/8 x 1/4 1/2 x 1/2	1/4 3/8 1/2	1/8 1/4 1/2	
 FEMALE ELBOW	90-B	1/4 x 1/8 3/8 x 1/4 1/2 x 3/8	1/4 3/8 1/2		1/8 1/4 3/8
 ELBOW	85-LB	1/4 x 1/8 3/8 x 1/4 1/2 x 3/8	(Two) 1/4 (Two) 3/8 (Two) 1/2		
 TEE	81-LB	1/4 3/8 1/2	(Three) 1/4 (Three) 3/8 (Three) 1/2		
	92-LB	1/4 x 1/8 3/8 x 1/4 1/2 x 1/2	(Two) 1/4 (Two) 3/8 (Two) 1/2	1/8 1/4 1/2	
	95-LB	1/2 x 3/8	(Two) 1/2	3/8	
 UNION	82-LB	1/4 3/8 1/2	(Two) 1/4 (Two) 3/8 (Two) 1/2		

Fig. 30—Tubing Fittings for Copper Refrigeration Tubing (Imperial Eastman—Hi-Duty Tube Fittings)

NAME AND CODE NUMBER	SIZE (INCH)	USED FOR CONNECTING TO: FEMALE PIPE THREAD (INCH)	USED FOR CONNECTING TO: MALE PIPE THREAD (INCH)
 ADAPTER 120-B	1/8 x 1/8 1/4 x 1/8 1/4 x 1/4 3/8 x 1/4 1/2 x 3/8	1/8 1/8 1/4 1/4 3/8	1/8 1/4 1/4 3/8 1/2
 BUSHING 110-B	1/4 x 1/8 3/8 x 1/8 1/2 x 1/8 1/2 x 1/4	1/4 3/8 1/2 1/2	1/8 1/8 1/8 1/4
 STREET ELBOW 116-B	1/8	1/8	1/8
 HEX. NIPPLE 122-B	1/8	(Two) 1/8	
Coupling 103-B	1/8		(Two) 1/8
Tee (see note) 101-B	1/8		

Note: Used for connecting valves for general pressure testing.

Fig. 31—Pipe Fittings for Copper Regriferation Tubing (Imperial Eastman)

7.14 To form an airtight joint with the tube fittings, shown in Fig. 32, proceed as follows.

(1) Cut the tubing to the desired length using a tubing cutter (Imperial Brass No. 227F or equivalent). A hacksaw may be used for this operation if care is used to make a right-angle cut and to remove all burns and chips with a fine file.

(2) Clean the tubing with a fine emery cloth about 1 inch back from the end to ensure a metal-to-metal contact with the sleeve.

(3) Make certain that the inside of the fitting is free from dirt or chips.

(4) Turn the nut of the fitting fingertight and then unscrew it for 1-1/2 to 2 turns so the tubing can be properly seated in the fitting.

(5) Push the tubing into the fitting until it contacts the shoulder and then tighten the nut. The sleeve will shear off at the groove when the unit is assembled (Fig. 32).

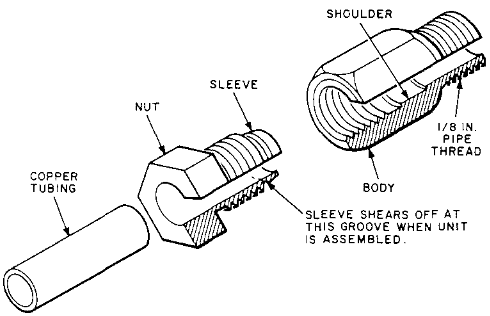


Fig. 32—Cut-Away Section of Imperial Eastman Brass Fitting for Copper Tubing

7.15 When using the pipe fittings shown in Fig. 31, coat the threads with a pipe thread compound, being careful not to get the compound into the air line.

E. Plastic Tubing and Fittings

7.16 C plastic tubing (Fig. 33) is available in single-tube form or in groups of four, seven, and ten tubes. The tubes are made of black polyethylene. Groups of tubes are enclosed in a black plastic sheath with a plastic tape core wrapper between the sheath and the tubes. The individual tubes of sheath-enclosed groups are marked for identification. The tubing is supplied in 1/4- and 3/8-inch od sizes. Lengths of 200 or more feet are furnished on disposable reels; shorter lengths are furnished in cartons.

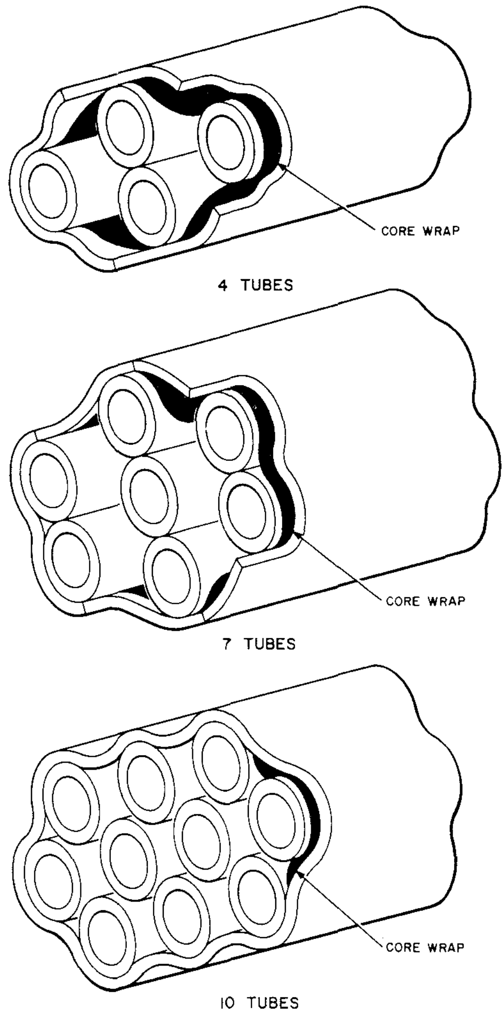


Fig. 33—C Plastic Tubing (AT-8063)

7.17 C plastic tubing is ordered by size of tubing and number of tubes as follows:

NUMBER OF TUBES	ORDERING INFORMATION
1	Tubing, Plastic, C (1/4-1 or 3/8-1)
4	Tubing, Plastic, C (1/4-4 or 3/8-4)
7	Tubing, Plastic, C (1/4-7 or 3/8-7)
10	Tubing, Plastic, C (1/4-10 or 3/8-10)

7.18 C plastic tubing (1/4 inch) is used principally in central offices for making connections between the meter-panel and the individual cables. The 3/8-inch size is used principally at manhole, pole, or other outside locations, and for making connections between the meter-panel and individual cables where the tubing length exceeds 75 feet.

7.19 The B, C, D, and E plastic tubing fittings (Fig. 34) are used for making connections to C plastic tubing at both indoor and outdoor locations. The fittings are made of tinned brass and are equipped with a plastic sleeve for making an airtight seal around the tubing. The B and C fittings have a 1/8-inch pipe thread at one end.

7.20 Plastic tubing fittings replace the previously available AT-7752X fittings which are limited to indoor use.

7.21 To form an airtight joint with the fittings:

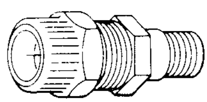
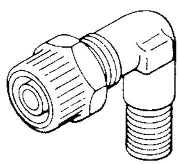
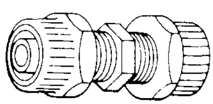
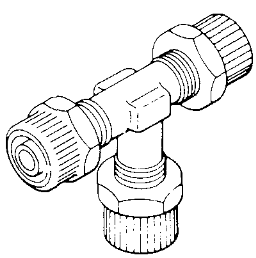
ILLUSTRATION	TYPE OF FITTING	ORDERING INFORMATION
	Connector	Fitting, Plastic-Tubing, B, (1/4 or 3/8), box of 10
	Elbow	Fitting, Plastic-Tubing, C, (1/4 or 3/8), box of 10
	Union	Fitting, Plastic-Tubing, D, (1/4 or 3/8), box of 10
	Tee Union	Fitting, Plastic-Tubing, E, (1/4 or 3/8), box of 10

Fig. 34—Plastic Tubing Fittings (AT-8847)

(1) Cut the plastic tubing to the desired length, using a sharp knife such as the R-2761 skinning knife. Care must be taken to make the cut at right angles. This is best done by laying the tubing on a flat surface and rolling it under the knife, if practical.

(2) Check the tubing for foreign matter, defects, or splits which would prevent a tight fit.

(3) If the fitting has a loose sleeve, slip the nut and then the sleeve onto the tubing. If the fitting has a captive sleeve, slip the nut and sleeve assembly onto the tubing. Then slip the tubing over the tube support (Fig. 35) and push it all the way onto the body of the fitting.

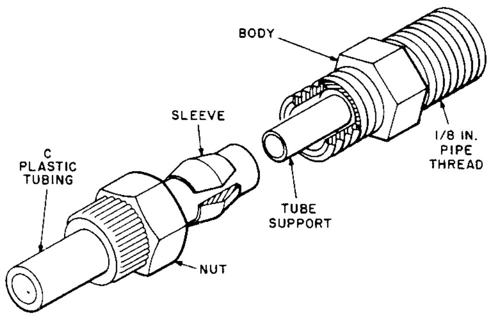


Fig. 35—Cut-Away Section of Typical Plastic Tubing Fitting Having Loose Sleeve

(4) Carefully thread the nut onto the body and tighten with the fingers until the tubing cannot be rotated in the fitting.

(5) With the system under pressure, test all joints for leaks ***using E pressure testing solution*** and retighten, if necessary.

7.22 The method used to connect the plastic tubing to a cable sheath in the vault is illustrated in Fig. 36.

7.23 In some cases, the cables in the vault may be so arranged that it will be necessary to run the individual feeds to one or more cables which may be located a considerable distance beyond the others. In such cases, the individual tubes can easily be lengthened by means of the necessary single tubes and D plastic tubing fittings.

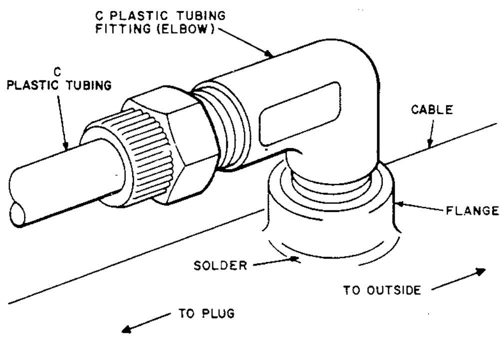


Fig. 36—Connecting Plastic Tubing for Cable Sheath

8. SOLDERING MOLDS

8.01 Soldering molds are used for soldering lead pipe connections and valves to lead sheath cable and lead sleeves. Molds used for lead pipe connections are included in this part primarily to cover existing operations.

8.02 Each soldering mold is equipped with a spring and chain assembly for securing it to the cable. The following is a list of the different soldering molds and their use:

- ***B Soldering Mold***—For soldering lead pipe connections on top surface of cables and sleeves
- ***C Soldering Mold***—For soldering lead pipe connections on the side of cables
- ***D Soldering Mold***—For soldering valves on the side of cables.

9. SHEATH PREPARATION FOR VALVES (LEAD SHEATH)

9.01 This part outlines the methods of preparing lead sheath cable for the installation of valves, flanges, and fittings directly on the sheath. These methods are designed to prevent reduction of the dielectric strength between the core and sheath at the installation point.

9.02 The ***raised sheath method*** must be used on cables having high dielectric core wrappings including all coaxial cables. Either the ***raised sheath method*** or the ***muslin spacing method*** may be used in cables having normal dielectric strength.

9.03 List of Tools

TOOL	USE
B Sheath Lifter	For use in raising the sheath to provide clearance between the sheath and core.
B Cable Core Depressor	For use in placing muslin between the core and the sheath in the muslin spacing method.

RAISED SHEATH METHOD

9.04 The raised sheath method of preparing lead sheath for placing a valve or other pressure fittings on a lead cable is as follows:

(1) Install a C flange in the usual manner, but do ***not*** drill the hole through the sheath. Excessive use of solder around the flange will interfere with proper lifting of the sheath; for this reason, use the solder ring method instead of a soldering form when placing the flange.

(2) After the soldered flange has cooled, apply tape cushions on the sheath and position the B sheath lifter over the flange as illustrated in Fig. 37.

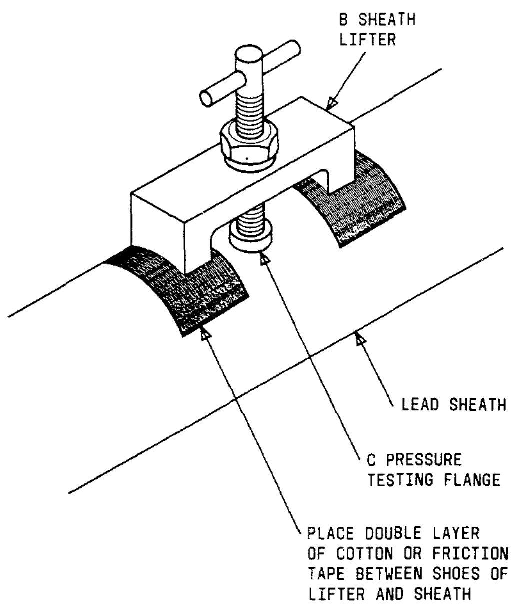


Fig. 37—B Sheath Lifter

(3) Screw the threads on the lower end of the sheath lifter stem into the threads of the flange by turning the T handle.

(4) Tighten the nut on the stem handtight against the yoke. With an open-end wrench, take 3-1/2 turns of the nut to raise the flange and sheath about 1/8 inch. Remove the sheath lifter and tape.

(5) If an F valve or flange plug is to be installed in the sheath, place the valve in the flange and test the solder work for leaks.

(6) Remove the valve and drill the hole in the sheath using a cable drill. Do ***not*** break the core wrapping paper. Install the valve in the flange and test the threaded joint.

(7) If a C valve or copper ell is to be installed, the flange should be heated and removed. Wipe the excess solder from the sheath. Then proceed with the installation of the valve.

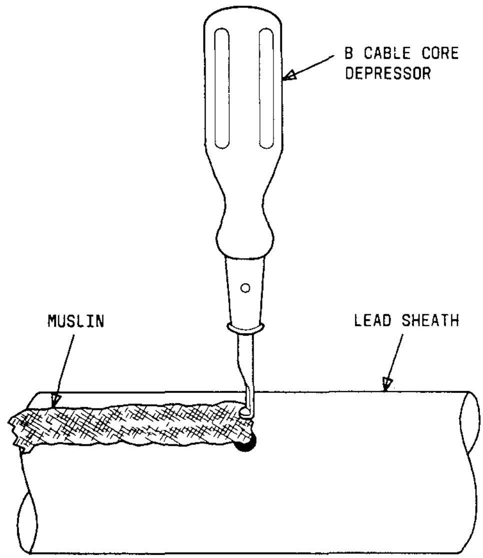


Fig. 38—B Cable Core Depressor

MUSLIN SPACING METHOD

9.05 The muslin spacing method of preparing lead sheath for installation of pressure fittings is accomplished by tucking muslin between the sheath and core. This forces the cable core away from the sheath to prevent electrical breakdown from core to sheath where the core wrapping paper is punctured. The procedure is as follows:

(1) Prepare two strips of dry muslin approximately 3/8 inch wide and 3 to 4 inches long, dependng on the size of the cable.

(2) Bore the hole in the sheath with the cable drill in the usual manner.

(3) Place the end of the B cable core depressor in the hole, and insert the toe under the edge of the sheath. Then rotate the depressor so as to smooth any projections resulting from the drilling operation.

(4) To insert the muslin, lay the end of one strip across the opening as illustrated in Fig. 38 and push it into the hole. Then tuck the muslin under the sheath lengthwise of the cable with the toe of the depressor.

(5) Remove the core depressor and move the muslin strip over the hole. Then repeat the tucking operation until a separation of about 3/16 inch is obtained between core and sheath.

(6) Tuck the second strip of muslin under the sheath in the opposite direction in the same manner.

(7) Puncture and tear the core wrapping paper with a bone knitting needle to ensure a free flow of air.

10. SHEATH PRPARATION FOR VALVES (LEPETH SHEATH)

10.01 This part describes the method of installing valves in lepeth sheath cable at locations other than splice points. At splice points, the valves are installed in the sleeve in the usual manner.

10.02 The muslin collar which is placed over the exposed conductors ensures the free flow of gas between the polyethylene wrapping and the cable sheath.

METHOD

10.03 Remove and terminate the outer protection leaving 16 inches of lead sheath exposed at the point where the valve is to be installed. Prepare the cable as outlined in (a) through (d).

(a) Remove 4 inches of lead sheath at the center of the opening, exposing the polyethylene. (See Fig. 39.)

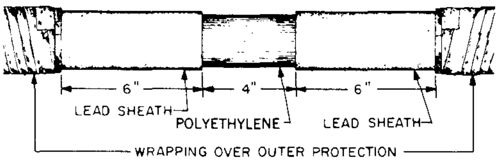


Fig. 39—Exposing Polyethylene

(b) Remove 2 inches of polyethylene at center of opening and prepare each butt as described in Section 632-317-200. Remove the core wrapping paper. (See Fig. 40.)

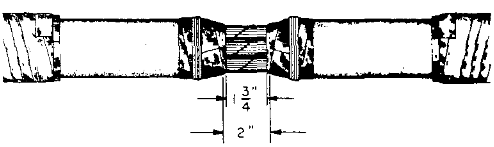


Fig. 40—Removing Polyethylene

(c) Wrap the opening with four half-lapped layers of 4-inch muslin covering the tape and about 1/2 inch of the lead sheath at each end. Secure with paper tape. (See Fig. 41.)

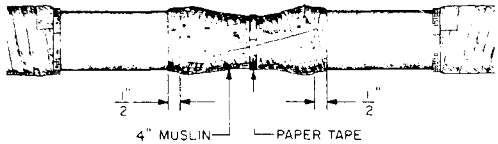


Fig. 41—Wrapping Muslin

(d) Cover the muslin with four half-lapped layers of B polyethylene tape leaving 1/2 inch of muslin exposed at each end. Secure with paper tape. Cover the polyethylene tape with one half-lapped layer of 4-inch muslin (Fig. 42).

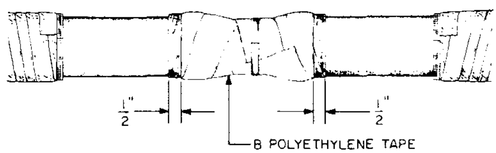


Fig. 42—Covering Muslin

10.04 Prepare a split lead sleeve 10 inches long to cover the opening. Beat in the sleeve carefully to avoid damaging the underlying polyethylene.

10.05 Support the cable close to the wiping area. It is not practical to use the B splice support under the sleeve.

10.06 Do not disturb the cable for at least 10 minutes after the wiping is completed. This will permit the polyethylene to harden. Place the valve in the sleeve in the usual manner.