

**BELL SYSTEM PRACTICES**  
**Outside Plant Construction**  
**and Maintenance**

**SECTION G50.635.1**  
**Issue 2, August, 1953**  
**AT&T Co Standard**

## **CABLE SPLICING — GENERAL**

### **JOINTS IN ALUMINUM CONDUCTORS**

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#### **1. GENERAL**

1.01 This section replaces Issue 1 and Addendum G50.635.1. ↗

It describes a method of joining aluminum conductors to aluminum conductors as well as aluminum conductors to copper conductors at straight and bridge splices, by means of twisted joints and pressed aluminum sleeves. The section has been reissued to cover changes made in the sizes of the C Splice Sleeves required for joining various conductor combinations and to advise of the color bands that are now placed on the sleeves to facilitate identification. ↘

1.02 **Precaution:** Aluminum conductors have less tensile strength than corresponding gauges of copper conductors and it is, therefore, necessary to exercise greater care in handling aluminum conductors.

#### **2. DESCRIPTION OF JOINT**

2.01 The connection obtained by just twisting the wires together, as in splicing copper conductors in exchange cables, is not adequate because the oxide coating on aluminum wires results in a high resistance joint. In order to obtain a satisfactory electrical connection, it is necessary to press a metal sleeve over the twist, using a B or C Sleeve Presser, depending on the size of the sleeve.

2.02 Because of the increase in the size of the joints made with pressed metal sleeves, larger prepared cotton sleeves are generally required to insulate the joints, as indicated in Paragraph 3.07. In order to keep the bulk of the splice to a minimum, not more than six joints should be made in a row at one time.

### 3. TOOLS AND MATERIALS

#### Tools

3.01 The **B Sleeve Presser** (large wire groove) is used on **044, 054, 064 and 074 C Splice Sleeves**. The **C Sleeve Presser** is used on **084, 094 and 104 C Splice Sleeves** except for the five combinations marked by an asterisk in Paragraph 3.05.

3.02 The exposed bearing surfaces of the pressers adjacent to the three small rivets of the toggle mechanism should be kept lubricated at all times with Western Electric No. 3 Lubricating Compound, in order to minimize wear and to facilitate operation of the pressers. The lubricant should be applied to the surfaces at least 15 minutes before the tools are used.

3.03 The bearings should occasionally be cleaned with a kerosene soaked cloth to remove accumulated lubricant residue. **Do not dip the tool in kerosene.** After cleaning with kerosene, the tool should be relubricated as indicated above.

#### Materials

3.04 **C Splice Sleeves:** The sleeves listed below are required in making joints which include one or more 17, 20, 22 or 24-gauge aluminum conductors. The numerical designation of the sleeve is derived from the bore diameter of the sleeve in inches. The sleeves, except the 094 and 054 sizes, are marked with a color band as shown in the table to facilitate identification. The two unmarked sizes can readily be identified by the difference in their outside diameters. The sleeves are made of aluminum and are 1/2 inch long. The C sleeves are supplied in envelopes containing 250 sleeves.

<u>Size of Sleeve</u>	<u>Color of Band</u>	<u>Size of Sleeve</u>	<u>Color of Band</u>
Sleeve, Splice C, 044	Red	Sleeve, Splice C, 084	Red
Sleeve, Splice C, 054	None	Sleeve, Splice C, 094	None
Sleeve, Splice C, 064	Blue	Sleeve, Splice C, 104	Blue
Sleeve, Splice C, 074	Tan		

3.05 The following table lists the various conductor combinations and the size of sleeve that should be used on each.

**Precaution:** The tightness of a twisted joint will, in some cases, affect the size of sleeve required. Therefore, if the size of sleeve specified fits loosely on the joint, try the next smaller size to determine whether it can be used.

*See*

Straight Splices

<u>Gauge of Conductors to be Spliced</u>	<u>Size of C Splice Sleeve</u>	<u>Gauge of Conductors to be Spliced</u>	<u>Size of C Splice Sleeve</u>
17 and 17	094	20 and 20	064
17 and 20	084	20 and 22	064
17 and 19	084	20 and 24	054
17 and 22	074	20 and 26	054
17 and 24	074	22 and 22	054
17 and 26	074	22 and 24	054
19 and 20	074	24 and 26	044
19 and 22	064	24 and 24	044
19 and 24	054	24 and 26	044

Bridge Splices

Three Wires

Four Wires

<u>Gauge of Conductors to be Spliced</u>	<u>Size of C Splice Sleeve</u>	<u>Gauge of Conductors to be Spliced</u>	<u>Size of C Splice Sleeve</u>
17, 17 and 17	104	17, 17, 19 and 22	104
17, 17 and 19	104	17, 17, 19 and 24	104
17, 17 and 20	104	17, 17, 19 and 26	104
17, 17 and 22	094	17, 17, 20 and 24	104
17, 17 and 24	094	17, 17, 20 and 26	094
17, 17 and 26	094	17, 17, 22 and 22	104
17, 19 and 19	094	17, 17, 22 and 24	104
17, 19 and 20	094	17, 17, 22 and 26	104
17, 19 and 22	094	17, 17, 24 and 24	094
17, 19 and 24	084	17, 17, 24 and 26*	104



### Bridge Splices (Contd.)

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Three Wires		Four Wires	
Gauge of Conductors to be Spliced	Size of C Splice Sleeve	Gauge of Conductors to be Spliced	Size of C Splice Sleeve
17, 19 and 26	084	17, 17, 26 and 26	104
17, 20 and 20	084	17, 19, 19 and 20	104
17, 20 and 22	084	17, 19, 19 and 22	104
17, 20 and 24	084	17, 19, 19 and 24	094
17, 20 and 26	084	17, 19, 19 and 26	094
17, 22 and 22	084	17, 19, 20 and 20	104
17, 22 and 24	084	17, 19, 20 and 22	094
17, 22 and 26	084	17, 19, 20 and 24	094
17, 24 and 24	074	17, 19, 20 and 26	094
17, 24 and 26	074	17, 19, 22 and 22	094
17, 26 and 26	074	17, 19, 22 and 24	094
19, 19 and 20	084	17, 19, 22 and 26	084
19, 19 and 22	084	17, 19, 24 and 24	094
19, 20 and 20	084	17, 19, 24 and 26*	094
19, 20 and 22	084	17, 19, 26 and 26	094
19, 20 and 24	074	17, 20, 20 and 20	104
19, 20 and 26	074	17, 20, 20 and 22	094
19, 22 and 22	074	17, 20, 20 and 24	094
19, 22 and 24	064	17, 20, 20 and 26	094
19, 22 and 26	064	17, 20, 22 and 22	094
20, 20 and 20	074	17, 20, 22 and 24	094
20, 20 and 22	074	17, 20, 22 and 26	094
20, 20 and 24	074	17, 20, 24 and 24	084
20, 20 and 26	074	17, 20, 24 and 26	084
20, 22 and 22	074	17, 20, 26 and 26	084
20, 22 and 24	064	17, 22, 22 and 22	084
20, 22 and 26	064	17, 22, 22 and 24	084
20, 24 and 24	064	17, 22, 22 and 26	084
20, 24 and 26	054	17, 22, 24 and 24	084
20, 26 and 26	054	17, 22, 24 and 26	084
22, 22 and 22	064	17, 22, 26 and 26	084
22, 22 and 24	054	17, 24, 24 and 24	084
22, 22 and 26	054	17, 24, 24 and 26*	084
22, 24 and 24	054	17, 24, 26 and 26*	084
22, 24 and 26	054	17, 26, 26 and 26	074
22, 26 and 26	054	19, 19, 19 and 20	104
24, 24 and 24	054	19, 19, 19 and 22	094
24, 24 and 26	054	19, 19, 20 and 20	094
24, 26 and 26	044		

### Bridge Splices (Contd.)

<u>Four Wires</u>		<u>Four Wires</u>	
<u>Gauge of Conductors to be Spliced</u>	<u>Size of C Splice Sleeve</u>	<u>Gauge of Conductors to be Spliced</u>	<u>Size of C Splice Sleeve</u>
19, 19, 20 and 22	094	20, 20, 22 and 26	084
19, 19, 20 and 24	094	20, 20, 24 and 24	074
19, 19, 20 and 26	084	20, 20, 24 and 26	074
19, 19, 22 and 22	084	20, 20, 26 and 26	074
19, 19, 22 and 24	084	20, 22, 22 and 22	074
19, 19, 22 and 26	084	20, 22, 22 and 24	074
19, 20, 20 and 20	094	20, 22, 22 and 26	074
19, 20, 20 and 22	084	20, 22, 24 and 24	074
19, 20, 20 and 24	084	20, 22, 24 and 26	074
19, 20, 20 and 26	084	20, 22, 26 and 26	074
19, 20, 22 and 22	084	20, 24, 24 and 24	064
19, 20, 22 and 26	084	20, 24, 24 and 26	064
19, 20, 24 and 24	084	20, 24, 26 and 26	064
19, 20, 24 and 26	084	20, 26, 26 and 26	064
19, 20, 26 and 26	084	22, 22, 22 and 22	074
19, 20, 22 and 24	074	22, 22, 22 and 24	074
19, 22, 22 and 22	074	22, 22, 22 and 26	064
19, 22, 22 and 24	074	22, 22, 24 and 24	064
19, 22, 22 and 26	074	22, 22, 24 and 26	064
19, 22, 24 and 24	074	22, 22, 26 and 26	064
19, 22, 24 and 26	074	22, 24, 24 and 24	054
19, 22, 26 and 26	074	22, 24, 24 and 26	054
20, 20, 20 and 20	084	22, 24, 26 and 26	054
20, 20, 20 and 22	084	22, 26, 26 and 26	054
20, 20, 20 and 24	084	24, 24, 24 and 24	054
20, 20, 20 and 26	084	24, 24, 24 and 26	054
20, 20, 22 and 22	084	24, 24, 24 and 26	054
20, 20, 22 and 24*	084	24, 26, 26 and 26	054

\* For these combinations use the B Sleeve Presser.

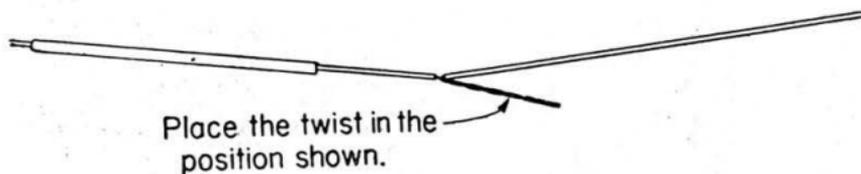
3.06 If a sleeve larger than the 104 size would be required, such as in joining four 17-gauge conductors, join the conductors by means of joining two 3-wire splices made in separate rows.

3.07 **Cotton Sleeves:** The 5/32-inch prepared cotton sleeve is used to insulate joints made with an 044, 054 or 064 C Splice Sleeve; the 1/4-inch prepared cotton sleeve is used with 074, 084, 094 or 104 C Splice Sleeve.

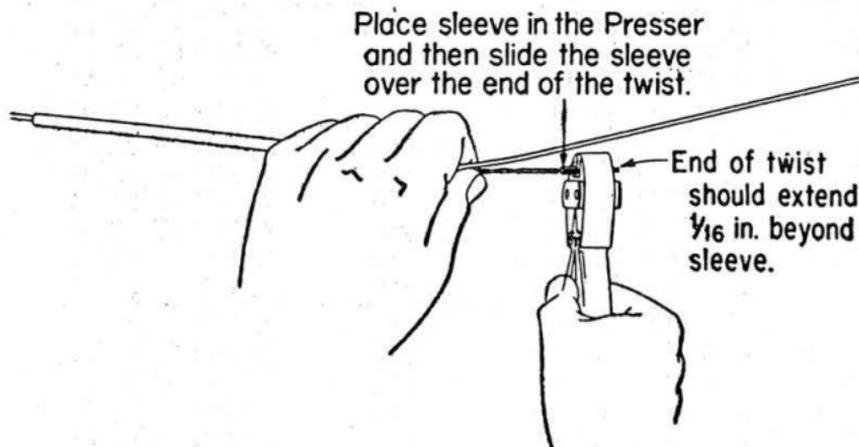
#### 4. JOINING WIRES

4.01 The twisted straight or bridge joint should be made in the wires in substantially the same manner as in splicing copper conductors. Care must be taken to make the end of the twist tight enough to permit the metal splice sleeve to be slid over it. In making bridge joints all the wires should be meshed together in the twist so that no wire is wrapped around the twist of the other wires.

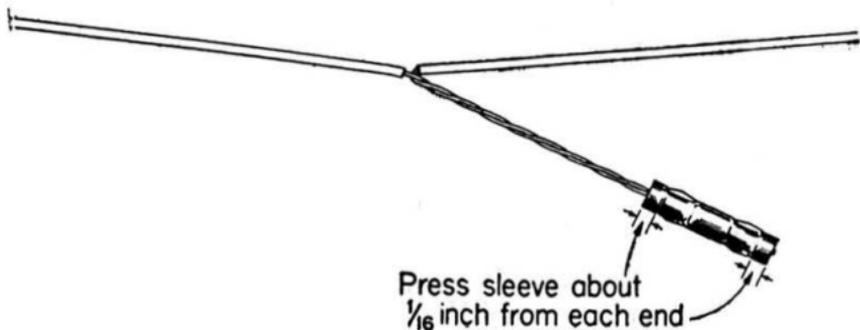
4.02 After the twist has been made and cut to length, place the twist in the position shown.



4.03 Place a splice sleeve of the appropriate size in the groove of the sleeve presser (B or C Sleeve Presser, depending on the size of the sleeve) so that one end extends about 1/16 inch outside of the jaws. Slide the sleeve over the twist, allowing the end of the twist to extend 1/16 inch beyond the sleeve.



4.04 Make 2 presses in the sleeve as shown, making sure that the handles of the presses are brought firmly together.



4.05 Insulate the joint with a prepared cotton sleeve in the usual manner.

