



**CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.  
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NEW YORK, NY 10003**

**DISTRIBUTION ENGINEERING  
DEPARTMENT OFFICE**

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**UNDERGROUND COPPER AND ALUMINUM  
SERVICE CONNECTIONS**

**FILE: CONSTRUCTION STANDARD MANUAL NO. 3**

<b>TARGET AUDIENCE</b>	<b>ELECTRIC CONSTRUCTION DISTRIBUTION ENGINEERING REGIONAL ENGINEERING</b>
<b>NESC REFERENCE</b>	<b>ALL SECTIONS</b>

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Filing Information		Construction Standards		Manual No. 3	

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# UNDERGROUND COPPER AND ALUMINUM SERVICE CONNECTIONS

## **1.0 SCOPE**

This specification describes the methods to be used when connecting low voltage copper or aluminum service cables to the underground network distribution system.

## **2.0 APPROVED SERVICE CABLES AND APPLICABLE SPECIFICATIONS**

**2.1** The standard sizes of copper cable which are approved for services on new installations are: 500MCM, 4/0 AWG, 2/0 AWG, #2 AWG, and #6 AWG. Aluminum cables shall not be used on new service installation **except for URD applications**. Existing aluminum cable sizes on the UG system are: 350MCM, 4/0 AWG, 3/0 AWG, 2/0 AWG, 1/0 AWG and #4 AWG.

**2.2** Underground Service Connections should conform to the following specifications.

**2.2.1** [EO-6208-C](#) Customers Electric Service Installations Buildings with Basements at Property Line indoor metering

**2.2.2** [EO-6209-C](#) Customers Electric Service Installation Buildings With Basements Back of Property Line Without Property Line Box Indoor Metering.

**2.2.3** [EO-2610-B](#) Property Line Splice Box Requirements for Building Back of Property Line.

**2.2.4** [EO-6211-C](#) Customer Electric Service Installation Building Without Basement at Property Line Indoor Metering

**2.2.5** [EO-6212-C](#) Customer Electric Service Installation Buildings Without Basements Back of Property Line Without Property Line Box Indoor Metering.

**2.2.6** [EO-6214-C](#) Customer Electric Service Installation buildings with sub-Sidewalk Space Outside of Property Line Indoor Metering

**2.2.7** [EO-6215-B](#) Customer Electric Service installation Building With or Without Basement, Back of Property Line, Without Property Line Box Outdoor Metering.

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### **3.0 CONNECTIONS APPROVED FOR UNDERGROUND STRUCTURES AND CUSTOMERS END LINE BOXES**

Connectors indicated in this section are approved for use in the Customer End line boxes and underground structures. These connectors are permissible for temporary or permanent service connections. Split bolt connectors are not approved for permanent service connections. A “Pair of Pants” connection is not approved for use on insulated service cable applications. A “Pair of Pants” connection joins adjacent cable conductors into one side of a connector.

#### **3.1 Connecting Copper and Aluminum Service Cables**

- 3.1.1** It is preferred to connect copper service cable to copper crabs or connectors.
- 3.1.2** It is preferred to connect aluminum service cable to aluminum connectors or crabs. Aluminum connectors are filled with oxidation inhibitor when manufactured.
- 3.1.3** It is permissible to connect aluminum service cables to copper connectors or crabs. Copper connectors or crab pockets shall be filled with an approved oxidation inhibitor prior to inserting the aluminum conductor. The stock number for the oxidation inhibitor is 631-0015. The connections shall be made in accordance with the following drawings:
  - a.** [EO-12783-C](#) Phase connections for aluminum services in 4/0 copper pockets
  - b.** [EO-12784-C](#) Phase and neutral connections for aluminum services in 350 MCM aluminum pockets
  - c.** [EO-12785-B](#) Neutral connections for aluminum services in 4/0 copper pockets
  - d.** [EO-12786-B](#) Neutral connections for aluminum services in 500MCM copper crab joints
  - e.** [EO-12787-B](#) Phase connections for aluminum services in 500MCM copper pockets

#### **3.2 Compression Tools**

Compression connectors connecting service cables are approved for use in End line boxes and Underground structures.

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**3.2.1** Battery operated compression tools listed in [EO-100179](#) are approved for End line box connections.

**3.2.2** Hydraulic compression tools listed in [EO-100547](#) are approved for Underground and End line box use.

a. Table 1 provides a list of dies and indents based on the Burndy Y-46 or equivalent tool.

**3.2.3** Where more than one indent is specified, the indents shall start from the inner portion and progress to the outer portion of the connector or crab pocket.

### **3.3** Straight Connectors

Connectors listed in the following specifications are approved for use. Table 1 provides the proper indenting tool and dies information. Connectors known as “Insulinks” shall not be used for underground service connections.

#### **3.3.1** Copper Cable Connections

a. [EO-4147-C](#) COMPRESSION TYPE COPPER CONNECTORS FOR LOW VOLTAGE JOINTS

b. Existing “butt connectors” used on service neutral conductors may remain on system, however insulated neutral service conductors having stranded (not solid) conductor shall be sealed to prevent water from being transported to customer premises.

#### **3.3.2** Aluminum Cable Connections:

a. [EO-12903-D](#) ALUMINUM CONNECTORS FOR UNDERGROUND SERVICE CABLES

b. [EO-7879-D](#) ALUMINUM CONNECTORS FOR UNDERGROUND MAINS CABLES

### **3.4** Lugs

Lugs listed in the following specifications are approved for use. Refer to table 1 for the proper indenting tool and dies. Details for bus connections are given in [EO-5243](#).

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### 3.4.1 Copper Lugs

- a. [EO-14929-C](#) NEMA-TYPE COMPRESSION LUGS, COPPER AND ALUMINUM
- b. [EO-2260-D](#) COPPER COMPRESSION LUGS FOR 4/0, 500 MCM & 750 MCM CABLE

### 3.4.2 Aluminum Lugs

- a. [EO-12984-C](#) ALUMINUM COMPRESSION LUG FOR 350MCM & 750MCM ALUMINUM CABLES
- b. [EO-14929-C](#) NEMA-TYPE COMPRESSION LUGS, COPPER AND ALUMINUM

## 3.5 Sizing Corrugated Adapters

Approved copper insert and corrugated reducing adaptors with their drawing and stock numbers. These adapters are generally used in crab joint pockets for reduction to the intended conductor. When reducing adapters are used, they shall be inserted flush with the edge crab pocket

### 3.5.1 EO-1216-C CORRUGATED REDUCING ADAPTER FOR COMPRESSION TYPE CONNECTORS

## 3.6 Neutral Connections

3.6.1 When connecting aluminum cable neutrals to the copper system, "Oil Stop" connectors must be spliced between the copper connector or crab pocket and the aluminum cable to prevent the flow of water. The following drawings show the correct method of splicing.

- a. [EO-12784-C](#) Phase and neutral connections for aluminum services in 350 MCM aluminum pockets
- b. [EO-12785-B](#) Neutral connections for aluminum services in 4/0 copper pockets
- c. [EO-12786-B](#) Neutral connections for aluminum services in 500MCM copper crab joints

3.6.2 Only Insulated crabs and Connectors are permitted to be installed in the customer end line box.

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### 3.7 Insulated Crabs

Except as noted in 4.4 insulated crabs are listed in [EO-100511](#) PURCHASE RECOMMENDATION FOR SECONDARY CRAB JOINTS, are approved for service connections.

## 4.0 CONNECTIONS APPROVED FOR CUSTOMER END LINE BOXES.

Connectors indicated in this section shall only be applied in Customer End line boxes. These connectors shall not be used for temporary service connections in UG structure unless otherwise indicated in the section. Split bolt connectors are not approved for permanent service connections in customer end line boxes. A “Pair of Pants” connection is not approved for use on insulated service cable applications. A “Pair of Pants” connection joins adjacent cable conductors into one side of a connector.

**4.1** Multi-Port #6 AWG – 1/0 AWG Insulated Mechanical Connectors for Aluminum or Copper Conductors. Installation and Reference Drawing # [376522](#)

**4.1.1** Three Port Connector C/S available on Drawing [376522](#)

**4.1.2** Four Port Connector C/S available on Drawing [376522](#)

**4.1.3** Five Port Connector C/S available on Drawing [376522](#)

**4.2** Four Port Mechanical Connector for #2 AWG – 500kcmil Copper Conductor. This connector may be used to temporarily connect service cables (Shunts) in underground structures.

**4.2.1** The approved Manufacturer’s installation instructions are listed in [EO-11012](#).

**4.2.2** C/S for the connector 573-0700

**4.2.3** C/S for replacement shear bolt: 571-9976

**4.3** The following three port 500kcmil cabs are approved for End Line Box use only.

**4.3.1** Three 500kcmil Port Compression Connector - Vertical Inlet C/S 573-0742

**4.3.2** Three 500kcmil Port Compression Connector - Angled Inlet C/S 573-0775

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4.4 The following insulated crabs per [347431](#) are approved for End Line Box use only:

4.4.1 #2 3-Way - 0-Way Crab, C/S 573-0668

4.4.2 #2 4-Way - 0-Way Crab, C/S 573-0676

4.4.3 #2 5-Way - 0-Way Crab

**5.0 EXHIBITS**

5.1 EXHIBIT 1 – Table 1 Nest and Indent list for Burndy Y46 Tool.

George Murray (Signature on File)  
 George Murray  
 Cable Systems - Manager  
 Distribution Engineering

Thomas Campbell

<p><b>REVISION 5:</b></p> <p>Designated “Pair of Pants” connections as being not approved for insulated service cable applications.</p>	<p><b>FILE:</b></p> <p>CONSTRUCTION STANDARD MANUAL NO. 3</p>
<p><b>Due for review / revision: 3/1/26</b></p>	

**UNDERGROUND COPPER AND ALUMINUM  
SERVICE CONNECTIONS**

**Exhibit 1**

**Table 1 Connector and Lug Indent Index based on the Burndy Y46 compression  
tool.**

<b>COPPER</b>			
<b>SIZE [AWG]</b>	<b>NEST</b>	<b>INDENT</b>	<b>NUMBER OF INDENTS (Each Side)</b>
#8 through 2/0	P26D	P34PR	1-1
4/0	P28D	P34PR	1-1
500kcmil	P34D	P44PR or P44PR-1	2-2
750kcmil	P39D	P44PR or P44PR-1	2-2
<b>ALUMINUM</b>			
<b>SIZE [AWG]</b>	<b>NEST</b>	<b>INDENT</b>	<b>NUMBER OF INDENTS (Each Side)</b>
#8 through 1/0	P28D	P34PR-5	2-2
1/0 through 4/0	P31D	P34PR-5	2-2
4/0 through 300kcmil	P34D	P34PR-5	2-2
4/0 through 350kcmil	P35D	P34PR-5	3-3
500kcmil through 600kcmil	P44D	P48PR-1	3-3
500kcmil through 750kcmil	P45D	P48PR-1	3-3