1 Scope

This specification establishes the materials, design, marking, installation, inspection, and performance requirements of ILSCO's compression and mechanical grounding connectors used to make connections for grounding and bonding in above grade and direct burial applications within the grounding system. Products included within ILSCO's PermaGround® connector system are SureCrimp® copper compression connectors, mechanical grounding connectors, irreversible compression grounding connectors, flexible braid, and bus bars.

2 Materials

2.1 All ground compression connections shall use ILSCO's SureCrimp® and irreversible compression grounding connectors.

2.2 All ground mechanical connections shall use ILSCO's mechanical grounding connectors.

2.3 All grounding connector designs requiring protective plating shall use electro-tin plating in compliance with ASTM B545 and B571.

2.4 SureCrimp® compression connectors shall be manufactured from high strength seamless copper tubing in compliance with ASTM B75.

2.5 Irreversible compression grounding connectors shall be manufactured from high strength copper alloy in compliance with ASTM B152.

2.6 Mechanical grounding connectors shall be manufactured from copper alloy with over 80% copper content, in compliance with ASTM B30 or ASTM B148, and include either silicon bronze or stainless steel hardware.

2.7 Connectors shall be RoHS compliant.

2.8 Flexible braid shall be manufactured from copper. The ferrule ends shall be made from seamless copper. Both the braid and the ferrule ends shall be electro-tin plated.

2.9 De-Ox® oxide inhibiting compound shall be pre-applied on the connector or applied during field installation. The compound shall be compatible with the conductors used with the connector.

3 Design

3.1 All ground connectors shall be designed for short circuit fault capacity rated to the maximum sized conductor indicated by the connector marking.

3.2 All compression and mechanical connectors shall be range taking; accepting different conductor sizes.

3.3 All mechanical wire binding connectors shall be designed to withstand 160% of the recommended installation torque.

3.4 Flexible braid ends shall be trimmed to a smooth surface completely filling the ferrule; reducing the risk of electrical arcing and preventing cuts and lacerations during handling. The braid ferrule shall not contain flared ends to maximize the braid contact area when mounted to a bonding surface.

4 Marking

4.1 All connectors shall be clearly and permanently marked with the following information:

4.1.1 Manufacturer's inspection symbol
4.1.2 Catalog number
4.1.3 Sizes of the conductors accommodated
4.1.4 Application die index number, if applicable
4.1.5 Sizes of electrodes, pipes, tubing, or rebar accommodated, if applicable
4.1.6 Certification marking:

- *UL Listing mark, and*
- *CSA Certification mark, and*
- *"Direct Burial", or "DB", if rated for direct burial in earth and embedment in concrete*

5 Installation

5.1 Installation of connectors shall be made in accordance with information sheets provided with the connectors and available at www.ilsco.com.

5.2 For compression connectors, information sheets shall contain all of the UL and CSA approved crimping tools, application dies, and minimum number of crimps for each combination.

5.3 For mechanical connections, information sheets shall contain the required UL and CSA approved torque values.

5.4 Connectors shall be capable of installation during all types of weather events, humidity levels, and field conditions using standard industry tools and without special safety precautions or procedures.

5.5 Installation of all connectors shall not require flammable materials, ignition, or produce any flames, hazardous materials, or byproducts.

6 Inspection

6.1 Application dies shall provide a permanent embossment, onto the compression connector, of the die index number and manufacturer's symbol, on each successful crimp. The index number shall match the marking on the connector information sheet.

6.2 Connector marking information shall be legible for post- installation inspection

6.3 Compression connectors with site-windows shall allow for post-installation verification of acceptable conductor insertion.

7 Performance

7.1 Connectors shall be Listed by Underwriters Laboratories (UL) per ANSI/UL 467 Standard for Grounding and Bonding Equipment.

7.2 Connectors shall be Certified by Canadian Standards Association (CSA) per CSA C22.2 No. 41 Bonding and Grounding of Electrical Equipment.

7.3 All system connectors shall be compliant for direct burial in earth and embedment in concrete.

7.4 Compression connectors should be UL Listed, per 7.1, and CSA Certified, per 7.2, with ILSCO, Milwaukee, Greenlee, Thomas & Betts, Anderson, and Burndy compression tools, and, if the compression tool is die-taking, their equivalent application dies.

7.5 SureCrimp® compression connectors shall be UL Listed, per 7.1, and CSA Certified, per 7.2, with solid copper conductors, stranded class B/C copper conductors, and flex class G, H, I, K, M, and DLO copper conductors.

7.6 Irreversible compression grounding connectors shall UL Listed, per 7.1, and CSA Certified, per 7.2, with solid copper conductors and stranded class B/C copper conductors.

7.7 All mechanical grounding connectors shall be UL Listed, per 7.1, and CSA Certified, per 7.2, with solid copper conductors and stranded class B/C copper conductors.