1. GENERAL

1.1. Introduction

1.1.1 The Installation Supplier shall ensure, as part of the evaluation of the installation, that all equipment added, rearranged or modified is properly installed and in conformance with AT&T installation specifications.

1.1.2 The Installation Supplier shall ensure, as part of the evaluation of the installation, that all work has been done in accordance with the detail specifications or approved changes to the detail specifications.

1.1.3 This section covers the grounding requirements in the Cable Entrance Facility (CEF).

1.1.4 Changes in this issue of Section P are summarized in Table P-1.

1.2. Non-Insulating Joint Cable Entrance Facility (CEF) or Cable Vault

1.2.1 The CEF is the area of a structure where communications cables first enter from the outside plant, and serves as the interface linking the outside plant cables to the main distributing frame(s) (MDF, Mainframe, or termination frame) in Carrier Communications Space, SHO/VHO, and customer premises locations. A below ground CEF is also known as a cable vault. The paired cables that leave the CEF and attach to the connectors on the main
distributing frames are known as tip cables or stub cables. The area within the CEF where protection measures are applied is identified as the cable protection area.

1.2.2 Each lineup of cable rack in the CEF shall be equipped with at least one insulated ground bar near each point of cable entry. These ground bars (also known as CEF ground bars) define the cable protection areas. Refer to Figure P-1.

1.2.3 In a horizontal-entry CEF the protection area ground bars shall be located between the entrance conduit (point of cable entry) and the splice frame, normally between the second and third cable racks, or second bay, above the top horizontal support arms. As an alternate location, in CEF areas with a single line-up, the insulated ground bar may be mounted on the wall.

1.2.4 In a vertical-entry CEF system, the protection area ground bar is located horizontally to provide a connection point for all metallic cables.

1.2.5 All of the protection area ground bars located in all cable entrance facilities shall be bonded to each other with a minimum 1/0 AWG conductor to form a CEF grounding system.

1.2.6 The bonding conductor shall be run on the top horizontal and secured every 18 inches with cord.

1.2.7 A 1/0 AWG grounding conductor shall be installed from the Carrier Communications Space or SHO/VHO location ground system (OPGP or other main building ground bar) to the associated CEF grounding system.

1.2.8 Each lineup of cable rack in the CEF shall be bonded to the associated protection area ground bar with a #6 AWG bonding conductor. Use a two (2) hole crimp type connector, drill the upright, remove the paint and coat contact surface with a thin coat of NO-OX-ID “A”.

1.2.9 Each ST 21 Peth (polyethylene) sheath entrance cable shall be bonded to the protection area ground bar nearest its point of entry (maximum 18 cables per bar). The bonding conductor shall be a #6 AWG conductor equipped with a single hole crimp type lug for connection to the cable splicing case. Lockwashers are required to ensure a secure connection.

1.2.10 Each new or rearranged cable with lead sheath shall be bonded to the available protection area ground bar nearest its point of entry. The #6 AWG bonding conductor shall be attached to the lead sheath using a B or D bond clip. The bonding clip is normally located between the 2nd and 4th verticals. Connecting a grounding conductor to a lead sheath by soldering on existing cable is not acceptable.

1.2.11 The metallic shield and any other metallic components (other than the communications conductors) of all cables, including fiber optic, entering a structure shall be bonded to the structure's ground system. In Carrier Communications Space or SHO/VHO location cable entrance facilities, this bond is usually made at the protection area.

1.2.12 Foil-lined air pipes shall also be bonded to the nearest protection area ground bar. Airpipe fittings are available for this purpose. #6 AWG bonding conductors shall be used. Several air pipes may be connected together.
1.2.13 Connections to the protection area (CEF) ground bar shall be made using two (2) hole crimp type connectors.

1.2.14 If Cable Rearrangement Facility (CRF) cabinets are in the CEFs, a 1/0 AWG dedicated conductor shall be run from each CRF cabinet/panel to the OPGP, CO ground bar, or other main building ground bar.

1.2.15 All #6 AWG and 1/0 AWG bonding conductors shall be tinned, stranded and insulated.

1.3. Insulating Joint CEFs

1.3.1 Carrier Communications Spaces or SHO/VHO locations may be located in areas where stray DC currents are present in the earth from external sources such as dc powered public transportation systems, cathodic protection rectifiers or large welding establishments. The low earthing resistance of the Carrier Communications Space or SHO/VHO grounding electrode system picks up a portion of these stray currents from the earth and conducts it to the CEF, where it exists on the metallic shields of outside plant cables. At a location outside the Carrier Communications Space or SHO/VHO location, where bare metallic components of the outside plant are in direct contact with the earth, the stray DC current leaves the plant and re-enters the earth, returning to its source. This discharge of DC current causes corrosion of outside plant components at that remote location.

1.3.2 Conduction of stray DC currents to the outside plant cable shields can be prevented by installing insulating joints in all cable shields and other metallic components entering the CEF. An insulating joint is an opening in the outside plant cable or air pipe that breaks the continuity of the sheath, shield, metallic strength member and moisture barriers, which interrupts the flow of DC currents that may cause corrosion.

1.3.3 Cable corrosion protection in the CEF shall be provided by creating a minimum ¾ inch air gap in the lead sheaths of lead cable, the metallic shields of composite-sheath cable, the metallic components of optical fiber cable, and the metallic components of air pipes.

1.3.4 The metallic cable shield and other metallic components on the field side of the insulating joint shall be connected to a #6 AWG copper conductor insulated from the framing structure. This conductor shall be joined to a common # 6 AWG minimum isolation bonding conductor which is also insulated from the framing structure. This conductor shall terminate on an insulated bus bar located at the top of the cable rack, constituting the field side of an isolated protection area. See Figure P-2.

1.3.5 Outside plant entry cables shall be electrically isolated from the CEF framing structure by either hardwood insulating members placed between the cable racks and framing structure or by durable insulators placed between the cables and cable hooks or cable support arms.

1.3.6 The metallic cable shield on the Carrier Communications Space or SHO/VHO office side of the insulating joint shall be connected to a second bus in the protection area which is bonded to the structure grounding system following the requirements for a Non-Insulating Joint CEF, except no bond is made between the OSP cable sheath and the tip cable sheath. See drawing P-2.
1.3.7 To maintain a path to ground for lightning and ac currents, the insulating joint shall be bridged with a bridging capacitor between the protection area bus bars or across each cable isolation gap. See Figure P-2.

**FIGURE P-1 – CEF / CABLE VAULT GROUNDING**

(A detailed diagram showing connections between main structure ground and the cable entrance facility, with labels for single and multiple bus bars, grounding connections, and bonding conductors.)
FIGURE P-2 – INSULATING JOINT CEF

[Diagram of Insulating Joint CEF with labels for Outside Plant, Cable Entrance Facility, Insulated #6 AWG, 10,000 uf, 1,000 uf, Outside Plant Cable, Field Side, Central Office Side, and Cable Protection Area.]

[END OF SECTION]