



Typically it is the inner corrosion liner of the duct or pipe that contains the conductive laminate. The installing contractor must provide a means off "bleeding" static buildup in this liner to a ground. This bleed-off is accomplished by use of conductive grounding clips or lugs installed through to the conductive inner laminate of the duct or pipe.

One method of accomplishing this "bleed-off" is by use of conductive elevator bolts field installed through the wall of the duct or pipe. At the desired grounding locations a hole would be field drilled through the wall of the pipe. Before installing the grounding bolt, a heavy bed of conductive resin paste would be placed around the edges of the holes. Thus, when the bolt is placed through the hole, the conductive paste would embed the flat head of the elevator bolt, squeezing out inside and outside of the hole. The elevator bolt would be drawn up tight to the duct wall by a washer and nut installed on the outside (the head of the elevator bolt goes inside of the duct).

After the bolt is installed and tightened, a thick layer of the conductive resin paste should placed over the top of the head of the elevator bolt, tapering out to the conductive liner of the duct or pipe. The inner surface of the duct or pipe liner should be "lightly" sanded to insure good adhesion and conductive contact. If the installation is piping operating under pressure, it may be necessary to also make a field "layup" over the entire head of the elevator bolt, using conductive resin and conductive veil reinforcement.

The conductive resin paste, and any conductive field layup kits, used for steps two and three above should be supplied by the manufacturer of the duct or pipe. This "paste" could be the same as the field adhesive used for joining conductive lengths of duct or pipe, and for joining fittings and flanges to the duct or pipe. The conductive resin paste or adhesive is to be a two part system using the same resin system as was used in making the duct or pipe, and already containing the required conductive fillers. The kits are to include the catalyst.

The elevator bolt, nuts and washers must be of a conductive metallic material suitable for the specific corrosive environment being handled by the duct or pipe. Minimum bolt size recommended for the grounding lugs is 1/4" diameter for 2" dia. or smaller duct or pipe; 5/16" diameter for 3" through 6" diameter duct or pipe, and 3/8" diameter for 8" dia. and larger duct and pipe.

After installation of the grounding lug, the conductivity of the installation should be checked. The resistance between the inner laminate surface of the duct or pipe immediately adjacent to the lug, and the outside threaded portion of the lug, should be 1000 ohms or less.

Each grounding lug must be discharged to a positive and continuous ground by means of a grounding cable. We suggest that this cable be not less than 12 gage.

The distance required between grounding lugs is somewhat subjective, and depends in great part on the geometry of the installation, and care in making up field joints. As a rule, we would suggest that the maximum distance between such lugs not exceed 20 ft. At least one side of each joint should be



grounded, assuming the distance on the ungrounded side of the joint and next grounding lug does not exceed the 20 ft.

For piping and duct systems that are "fitting" intensive, and where the inside of the joints can be reached for proper sealing and testing (and thus the conductivity across joints can be assured), a grounding lug may not be required at each joint. This becomes a judgement call by the owner and/or engineer. The contractor should make up a sample joint demonstrating the ability to achieve the less than 1000 ohms across the completed joint. This typical joint should be retained by the engineer as "proof of design".

A drawing(s) showing the methods of field grounding the conductive duct or pipe should be submitted to the duct or pipe manufacturer, by the engineer or installing contractor. The drawings should show proposed locations of the grounding bolts or clips. The duct or pipe manufacturer should be requested to comment on the proposed grounding system. However, since the performance of the grounding system for bleeding off static charge is entirely dependent upon the field installation techniques; the final responsibility of the grounding system belongs with the installing contractor and the supervising engineer.