

ELECTRICAL BONDING AND GROUNDING

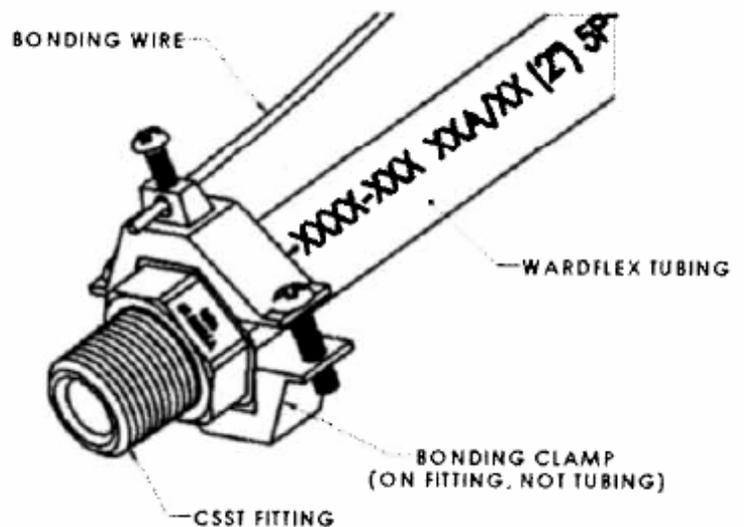
In accordance with NFPA 70 National Electrical Code (NEC), proper bonding and grounding of gas piping systems in a structure and the structure's electrical system is required by a qualified electrician. The requirement provides an effective electrically continuous path in an effort to conduct stray voltage/current safely to ground. The NEC also states that it is good practice to bond all metallic systems and objects. In accordance with these requirements, WARDFLEX® requires the gas-piping system to be bonded to the electrical earth grounding system of the structure through the use of a bonding clamp and wire.

- The bonding point must be in as close proximity to the electrical panel as practical; close proximity of the bonding point to the gas meter is also desirable.
- The wire gauge for this bond must be sized, at a minimum, for the full amperage available through the electric service.
- Further minimizing impedance over the bonding assembly is desirable. The NEC should be referred to for additional requirements and specific techniques for bonding and grounding.

For attachment to the WARDFLEX® gas piping system, bonding clamps must be attached to the WARDFLEX brass fitting, to a steel manifold, or to a rigid pipe component connected to a WARDFLEX® fitting. The corrugated stainless steel portion of the gas piping system shall not be used as the bonding attachment point under any circumstance.

The WARDFLEX® flexible gas piping or other gas system components shall not be used as a ground electrode or as the grounding path for appliances or electrical systems.

Bonding and grounding requirements are also contained specifically in the code.



Installation Practices - (Electrical Bonding/Grounding)

Direct bonding of Gastite® CSST is required for all gas piping systems incorporating Gastite® CSST whether or not the connected gas equipment is electrically powered. This requirement is provided as part of the manufacturer's instruction for single-family and multi-family buildings. Bonding for commercial applications should be designed by engineers knowledgeable in electrical system design and the local electrical code.

Gastite® CSST installed or attached to a building or structure shall be electrically continuous and direct bonded to an effective ground-fault current path. The gas piping system shall be considered to be direct bonded when installed in accordance with the following.

The piping is permanently and directly connected to the electrical service equipment enclosure, the grounded conductor at the electrical service, the grounding electrode used. A single bond shall be made at or near the service entrance of the structure or the gas meter of each individual housing unit within a multi-family structure. The bonding conductor shall be 6AWG copper wire. Bonding jumpers shall be attached in an approved manner in accordance with NEC-2008 Article 250.70 and the point of attachment for the bonding jumper shall be accessible. Bonding/grounding clamps listed to UL 467 comply with this requirement. This bond is in addition to any other bonding requirements as specified by local code.

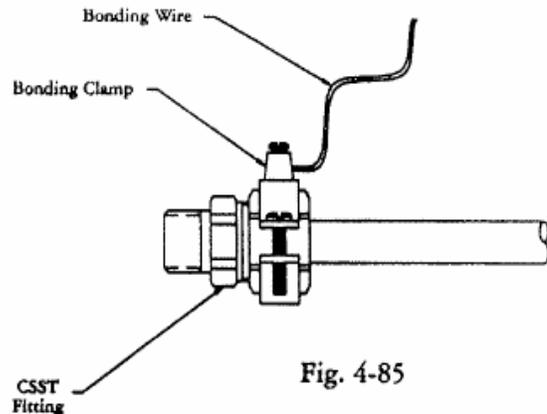


Fig. 4-85

For attachment to the CSST gas piping system, a single bonding clamp must be attached to either a Gastite® brass fitting, a steel manifold or to any rigid pipe component. The corrugated stainless steel tubing portion of the gas piping system shall not be used as the point of attachment of the bonding conductor at any locations along its length under any circumstances. See Figure 4-85 through 4-87. Proper grounding and bonding may reduce the risk for damage and fire from a lightning strike. Lightning is a highly destructive force. Even a nearby lightning strike that does not strike a structure directly can cause systems in the structure to become energized. If the systems are not properly bonded, the differences in potential between the systems may cause the charge to arc to another system. Arching can cause damage to CSST. Bonding and grounding as set forth above should reduce the risk of arching and related damage.

".....each above ground portion of gas piping systems which is likely to become energized shall be electrically continuous and bonded to a designed, permanent, low impedance effective ground fault current path."

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Depending upon conditions specific to the location of the structure in which the WARDFLEX® system is being installed, including but not limited to whether or not the area is prone to lightning, the owner of the structure should consider whether or not a lightning protection system is necessary or appropriate. Lightning protection systems are beyond the scope of this bulletin, but are covered by NFPA 780 which is the Standard for the Installation of Lightning Protection System, and other standards.

Depending upon conditions specific to the location of the structure in which the Gastite system is being installed, including but not limited to whether or not the area is prone to lightning, the owner of the structure should consider whether a lightning protection system is necessary or appropriate. Lightning protection systems are beyond the scope of this manual, but are covered by NFPA 780 which is the Standard for the Installation of Lightning Protection System, and other standards.

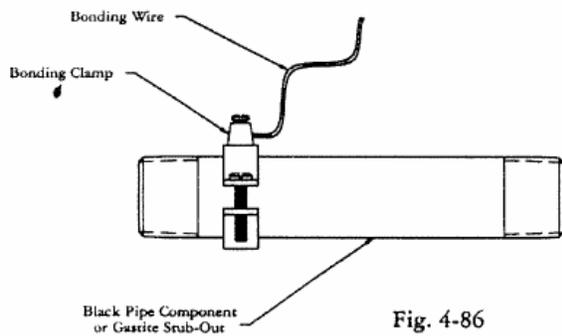


Fig. 4-86

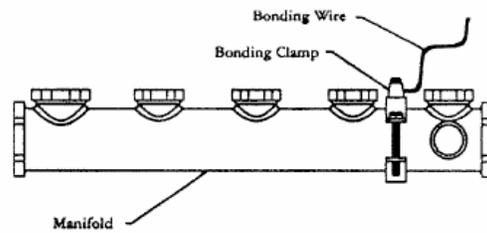


Fig. 4-87