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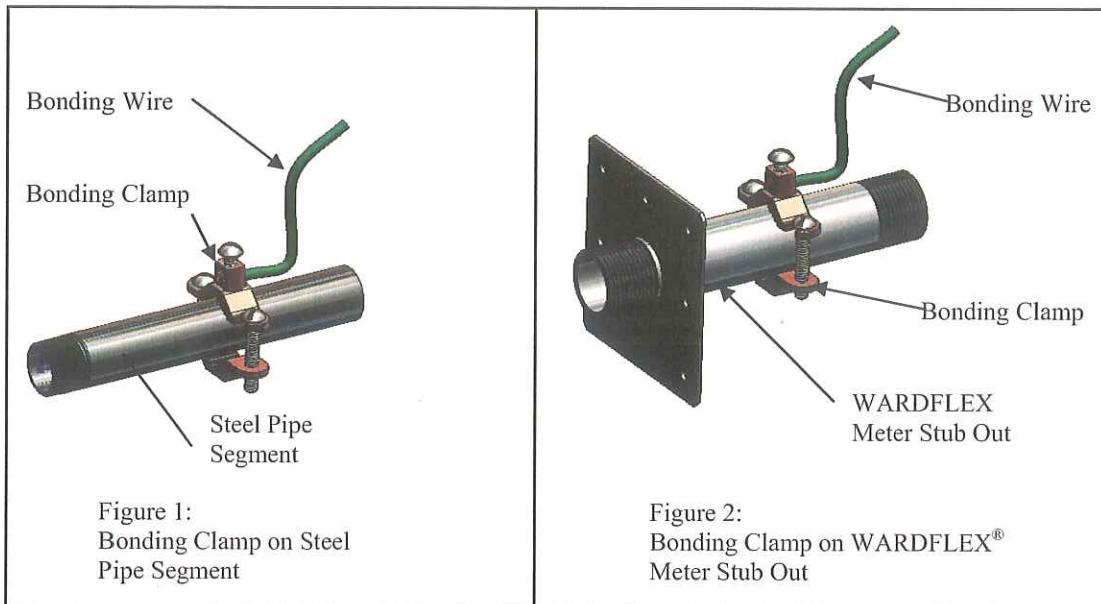
Technical Bulletin: # WF2008-1 WARDFLEX® CSST Electrical Bonding

This technical bulletin supersedes all prior documents relating to the electrical bonding of WARDFLEX® CSST gas piping system and defines the mandatory manufacturer's requirements for direct bonding.

Direct bonding is required for all natural and LP gas piping systems incorporating WARDFLEX® CSST whether or not the piping system is connected to an electrically powered gas appliance. Direct bonding is included as part of the manufacturer's requirements for both single family and multi-family buildings. A person knowledgeable about electrical system design, local electrical code, and these requirements should specify the bonding for commercial applications.

WARDFLEX® CSST installed inside or attached to the exterior of a building or structure shall be electrically continuous and directly bonded, by a qualified person, to the ground system of the building. The gas piping is considered to be directly bonded when installed in accordance with the following instructions:

- A bonding jumper is permanently and directly connected to the electrical service grounding system. This can be achieved through a connection to the electrical service equipment enclosure, the grounded conductor at the electrical service, the grounding electrode conductor (where of sufficient size) or to the one or more grounding electrodes used.
- A single bond connection is made to the building gas piping downstream of the utility meter or second stage regulator (LP systems), but near the gas service entrance (either outdoors or indoors) of the structure, or downstream of the gas meter of each individual housing unit within a multi-family structure. A "daisy chain" configuration of the bonding conductor is permitted for multi-meter installations. A bonding connection shall not be made to the underground, natural gas utility service line or the underground supply line from a LP storage tank.
- The bonding conductor is not smaller than a #6 AWG copper wire or equivalent. The bonding conductor is installed and protected in accordance with the NEC.
- The bonding conductor is attached in an approved manner in accordance with NEC and the point of attachment for the bonding conductor is accessible.
- Bonding/grounding clamp used is listed to UL 467 or other acceptable national standards.
- The bonding clamp is attached at one point within the piping system to a segment of rigid pipe or a pipe component such as a nipple, fitting or manifold provided it is manufactured with an appropriate and Code listed material. The bonding clamp must be attached such that metal to metal contact is achieved with the steel pipe component. Remove any paint or applied coating on the pipe surface beneath the clamp. See Figures 1 and 2 for guidance. The corrugated stainless steel tubing portion of the gas piping system shall not be used as the point of attachment of the bonding clamp at any location along its length.



Proper grounding and bonding may reduce the risk of 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 metallic systems in the structure to become energized. If these types of systems are not properly bonded, the difference in potential between the systems may cause the charge to arc from one system to another system. Arcing can cause damage to CSST. Bonding and grounding as set forth above should reduce the risk of arcing and related damage.

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 Systems, and other standards.