

NFPA Forum Submission

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Lightning Protection and Bonding of Metallic Gas Lines

The interconnection bonding of metallic piping systems and lightning protection systems is an issue which surfaces in the field, on lightning protection system inspections and in the office through questions from fire professionals, utility workers, contractors and sometimes engineers. Now a proposed class action settlement has put an even brighter spotlight on this issue. The Lightning Protection Institute (LPI) provides clarification on this issue.

Where lightning protection is provided for a structure, the installation safety standards (NFPA 780, UL96A and LPI-175) require that all grounding media, including underground metallic piping systems be interconnected to provide a common ground potential. Removal of these bonds required by the safety standards can create a potential for fire and other damage within a protected structure. To clear up confusion surrounding the purpose of the required bond, it may be necessary to explain its purpose. The bond is not intended as an additional grounding electrode, but instead is there to provide potential equalization or common potential for all building grounded systems. The lightning protection system provides a superior ground path as compared to an isolated gas transmission system. In the circumstance where lightning attaches external gas transmission piping, jumps the isolation fitting and approaches the interior of the building, the lightning protection bond would serve to protect against infiltration. Protective measures and bonding are also acknowledged in the Gas Safety Standards, "Transportation of Natural or Other Gas by Pipeline."

Lightning strikes can present hazards for mechanical systems due to differences in potential between any non-bonded metallic system piping or independently grounded power or communication systems, since arcing may occur. Gas piping systems present a unique problem because they convey flammable fuel gas which may add to the fire hazard if any system components fail. A product known as corrugated stainless steel tubing (CSST) used to transmit fuel gas, has been found to be susceptible to damage from arcing by direct or nearby lightning strikes. In some situations, lightning has created holes and cracks in the CSST, allowing gas leakages which can result in fire. In worse case scenarios, a slow leak can create a gradual gas buildup and lead to a catastrophic explosion.

The potential for lightning damage to homes and buildings with CSST has caused such concern that the Circuit Court of Clark County Arkansas proposed Settlement of a class action lawsuit to provide payment vouchers for lightning protection systems for persons and/or entities who own structures in the US, in which CSST was installed as of

September 5, 2006. These vouchers are intended to defray some of the costs of installing a complete lightning protection system, or alternately for bonding and grounding of certain systems in a structure. The voucher values range from \$200 to \$2,000 toward the installation of a lightning protection system, and \$75 to \$160 toward bonding and grounding improvements. The Court will hold a Final Approval Hearing on February 1, 2007 to consider whether to approve the Proposed Settlement, award attorneys' fees and allow reimbursement of expenses.

Internal gas lines must always be connected through bonding. In a nutshell, bonding provides a common potential for all items within the structure to avoid side-flashing from the lightning protection system to anything associated with the gas inside. The gas utility may provide a system of cathodic protection to protect their underground lines. This protection would be defeated by a grounding interconnection; therefore, the lightning protection contractor implements the connection on the customer side of the meter, not on the utility side. In the event that there are various points of entry for the gas to the structure, only one connection is generally needed between systems within the first 12 ft above grade—as long as everything is continuous.

Multiple isolated gas line entrances to a structure may require a connection to each separate line. Gas lines that extend up on the roof, particularly those found on a commercial construction site should be bonded at the top and bottom of their elevations.

Parties requesting the removal of gas bonds should provide documentation, explaining their desire to violate the lightning protection safety standards. Without the required bond, the structure could be at risk.

The LPI is a not-for-profit, nationwide organization founded in 1955 to promote lightning protection education, awareness and safety. In addition to publishing the LPI-175 Standard of Practice to help ensure the best possible quality in lightning protection materials and installation techniques, the Institute offers certification, education programming and is a leading resource for lightning protection information and system requirements. For more information, visit the LPI website at www.lightning.org.

For more information on the CSST settlement, call 1-800-420-2916 or visit the website at www.csstsettlement.com.