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Bonding of Gas Piping

Code: 2017 Electrical Code **Date:** June 12, 2018
Section: 250.104(B)

Question 1:
How does section 310 of the NC Fuel Gas Code and section 250.104(B) of the NEC co-regulate the bonding of gas piping?

Answer 1:
The electrical code requires all gas piping likely to become energized to be bonded by one of five methods as a means to provide a fault path. The fuel gas code has restrictions to which method can be used that are determined by type of piping installed. There are three general types of gas piping: (1) all gas piping except CSST; (2) CSST that is not arc-resistant; and (3) CSST that is arc-resistant.

Therefore, the following methods of bonding shall be observed for the three piping categories.

Piping Category 1: NC Fuel Gas Code § 310.1 Pipe and tubing other than CSST. Each above-ground portion of a gas piping system other than corrugated stainless steel tubing (CSST) that is likely to become energized shall be electrically continuous and bonded to an effective ground-fault current path. Gas piping other than CSST shall be considered to be bonded where it is connected to appliances that are connected to the equipment grounding conductor of the circuit supplying that appliance.

Use NEC 250.104(B) for Piping Category 1.

Piping Category 2: NC Fuel Gas Code § 310.1.1 CSST. Corrugated stainless steel tubing (CSST) gas piping systems shall be bonded to the electrical service grounding electrode system. The bonding jumper shall be not smaller than 6 AWG copper wire or equivalent.

Use the manufacturer's instructions and NEC 250.104(B) excluding methods (1), (2), or (3) for Piping Category 2.

Piping Category 3: NC Fuel Gas Code § 310.1.1 Exception: CSST with an arc-resistant jacket listed by an approved agency for installation without the direct bonding, as prescribed in this section, shall be installed in accordance with Section 310.1 and the manufacturer's installation instructions.

Use the manufacturer's instructions and NEC 250.104(B) for Piping Category 3.

Question 2:
If a metallic connection from the gas piping to the equipment grounding conductor that bonds an appliance exists via metal-to-metal welds, clamps, pipe threading, is the gas piping then "bonded" to the equipment grounding conductor?

Answer 2:
Yes.

In addition to the metal pipe threads to connect the gas piping to the appliance, section 250.8 of the NEC recognizes eight additional methods for bonding. Once an approved metallic bond has exists between the gas piping and the equipment grounding conductor, section 250.104(B)(1) is satisfied.

Therefore, this method is not allowed for bonding CSST that is not arc-resistant. CSST that is not arc-resistant is only allowed to use method (4) or (5) of section 250.104(B) of the NEC per section 310.1.1 of the NC Fuel Gas Code. *See Question 1*.

Question 3:
Except for Corrugated stainless steel tubing (CSST / Piping Category 2), both the NEC and NC Fuel Gas Code require bonding of gas piping only when the piping is likely to become energized. Are there any circumstances where piping is not likely to become energized?

Answer 3:
Yes.

Gas piping is likely to become energized when such piping physically touches current-carrying conductors (insulated or not), current-carrying cable assemblies, or raceways that contain current-carrying conductors. Additionally, gas piping is likely to become energized when installed into an appliance that utilizes electrical energy.

However, if the gas piping has no contact with the electrical system then the piping is not likely to become energized.

Example 1: A set of gas logs with a 120 volt fan motor utilizes electrical energy shall require the gas piping to be bonded.

Example 2: A set of gas logs without any electrical apparatus that uses electrical energy shall not require the gas piping to be bonded.

Gas logs that have a battery or capacitor milliamp lighting mechanism is not consider as utilizing electrical energy for purposes of this interpretation.

Corrugated stainless steel tubing (CSST / Piping Category 2) is always require to be bonded in accordance with section 310.1.1 of the NC Fuel Gas Code.