Coffee Break Training - Fire Protection Series

Inspection Techniques: Electrical "Classified Locations": Gas and Vapor "Material Groups" (Part 7)

No. FP-2011-25 June 21, 2011

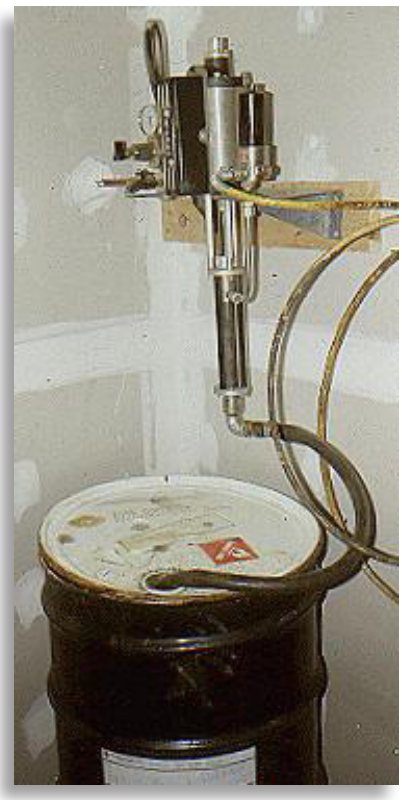
Learning Objective: *The student shall be able to describe the principles employed to address material-specific properties in hazardous locations.*

Coffee Break Training FP-2011-20 introduced the overall framework of hazardous electrical locations, and the following week explained generic Class I locations for flammable liquids and gases. Today, we go into more detail in describing Class I "material groups."

The explosive characteristics of gas- or vapor-air mixes differ depending upon the specific product involved. For Class I locations, the classification involves an analysis of the potential maximum explosion pressure of a vapor- or gas-air mixture, and an assessment of the likelihood that specific electric equipment will cause an ignition under a variety of conditions.

To conduct the latter analysis, two critical elements are evaluated under controlled laboratory conditions:

1. **Maximum experimental safe gap (MESG)**—the maximum distance between two parallel metal surfaces (such as wires in a splice or joint) that has been found to prevent an explosion in a test chamber from expanding to a secondary chamber containing the same gas or vapor at the same concentration.
2. **Minimum igniting current (MIC) ratio**—the ratio of the minimum current required from an electrical spark to ignite the most easily ignitable mixture of a gas or vapor, divided by the minimum current required from an inductive spark discharge to ignite methane under the same test conditions.



Electrical equipment in the vicinity of flammable vapors must meet specific safety criteria.

The combination of maximum experimental safe gap and minimum igniting current ratio are used to assign hazard classifications to specific materials such as acetylene, kerosene, methyl ethyl ketone, and methane. These material groups are labeled A, B, C, and D. Next week's Coffee Break Training will explain how MESG and MIC interrelate to create material groups.

Electrical equipment used in these areas must be listed and labeled for both the class and the specific group of the gas or vapor that will be present. For additional information, refer to the National Fire Protection Association (NFPA) 70, *National Electrical Code®*, Chapter 5 *Special Occupancies*.