Membrane Penetrations for Boxes Other than Electrical Boxes

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A question that arises with reasonable frequency for STI’s Engineering Services group is what procedures to follow when a large steel panel is installed as a membrane penetration within a gypsum wallboard assembly. Since it is a membrane penetration, which by definition only breaches a single side of the rated wall assembly, this condition will likely require some additional planning because access can be limited if the wallboard is installed on the non-penetrated side too quickly. It is important to make sure any firestopping materials are installed far enough in advance of the wall being closed in to allow an opportunity for a proper inspection if required.

The International Building Code (IBC) is very explicit in its requirements for membrane penetrations of panels that are not considered electrical boxes. These applications must be protected with a firestop system that has been tested per ASTM E814 or UL 1479, which is the standard procedure we are all familiar with for both through and membrane penetrations. The more critical requirement the IBC imposes is for the firestop system to have an equal F and T Rating that is equivalent to the fire-resistance rating of the wall assembly. The exact code language can be found in Chapter 714.3.2 of the 2015 Edition of the IBC (see Chapter 714.4.2 if using 2018 Edition).

The IBC does typically require an equal F and T Rating for penetrations within a horizontal assembly, unless certain exceptions are met. However, it is unusual to require equal F and T Ratings for penetrations within a wall assembly. The more onerous requirements for panels serves to prevent a hot spot from developing if a fire breaks out. This area of concentrated heat where an unprotected panel is located could degrade the intact portion of the gypsum wall prematurely and also potentially ignite combustible materials in contact with the opposite side of the wall.

Solutions to meet the code requirements for this special category of membrane penetrations do exist. A good example is a system like W-L-7212. The insulative blanket in this system provides a solution to the challenge of guaranteeing a T Rating. STI has recently introduced a new product along these same lines in the E-Wrap™ Endothermic Wrap. Stay tuned for new solutions utilizing the E-Wrap™ or other alternative methods for firestopping panels while remaining in compliance with the relevant IBC requirements.