

# Unapproved Utilities and Membrane Penetrations in Exit Enclosures

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This month's Lessons Learn Bulletin focuses on penetrations into and openings through an exit enclosure for utilities and membrane penetrations for the installation of metallic electrical boxes.



**Lesson Learned Statement:** Penetrations into exit enclosures are very common in both new and existing buildings. They are classified as either through-penetrations or membrane penetrations. These penetrations are limited by requirements prescribed in the NFPA 101 Life Safety Code and the Underwriters Laboratories, Fire Resistance Directory.

**Discussion:** For the purpose of this bulletin, we will define an exit enclosure as the enclosure around an exit stair or exit passageway. Exit enclosures are designed to provide a continuous protected path of travel to the exit discharge. The exit enclosure shall not be used for ***any purpose that has the potential to interfere with it as an exit.***

Over the years, Environmental Health and Safety continues to see an increasing number of through-penetrations in exit enclosures and exit passageways for the routing of unapproved utilities. Some examples include roof drains that don't support the stair roof, medical gas lines, HVAC ductwork, natural gas piping, high voltage power, acid waste drain lines and elevator sump pump drains lines like shown in the picture of this bulletin.

The NFPA 101 Life Safety Code **Chapter 7, Section 7.1.3.2.1 (9)** defines the utilities allowed to penetrate an exit enclosure for the purpose of serving the exit enclosures. It is worth pointing out the intent of the code is to not penetrate one wall of the exit enclosure with utilities listed in Section 7.1.3.2.1 and exit out another wall of the exit enclosure. When unapproved utilities penetrate an exit enclosure, it is often difficult to correct and very expensive, due to the limited options available to address these types of deficiencies.

In addition to through-penetrations, membrane penetrations have recently become a concern of Environmental Health and Safety, due to the sizes of the metallic electrical boxes installed and their locations in the exit enclosure walls. Although NFPA 101 does not specially address the size and location of the metallic electrical boxes, the Underwriters Laboratories, Fire Resistance Directory does. A review of the UL Directory, states the surface area of individual metallic boxes shall not exceed 16 sq. in. The aggregate surface area of the boxes shall not exceed 100 sq. ft. of wall surface. Metallic boxes located on opposite side of a wall shall be separated by a minimum horizontal distance of 24 in. This distance can be reduced when wall opening protection material is installed with the metallic boxes.

It is recommended that anyone involved in the design or installation of equipment that might affect the exit enclosure, first review the requirements in both the in NFPA 101 Life Safety Code **Chapter 7, Section 7.1.3.2.1 (9)** and the Underwriters Laboratories, Fire Resistance Directory, to ensure your design or installation is code compliant. By understanding and following this recommendation it will help ensure your design and installation complies with the NFPA 101 Life Safety Code and the Underwriters Laboratories, Fire Resistance Directory.

If you have questions concerning this bulletin or need assistance, please contact Environmental Health and Safety's Fire and Life Safety group at 713-792-2888 or email us at [askEHS@mdanderson.org](mailto:askEHS@mdanderson.org).