

Fire-Rated Assemblies

Why is a fire rating important?

Many people live in multi-family homes where individual living spaces are accessed via common corridors, stairways and entry/exit doors. These common entry/exit passageways are constructed to provide approved levels of fire protection that enable occupants to safely exit a building in the case of an emergency.

DMF Lighting provides luminaires, such as the M Series with OneFrame™ technology, which is code compliant for a maximum two-hour fire rating when installed in the appropriate fire-rated assembly¹. This is suitable for use in common entry/exit passageway applications where a fire rating is required².

What is the IBC?

The International Building Code® (IBC³), developed by the International Code Council (ICC), is a model building code that has been adopted and used as a base code standard throughout most of the USA. The IBC® is in use or has been adopted in 50 states, the District of Columbia, the U.S. Virgin Islands, Guam and the Northern Marianas Islands⁴. For example, the California Building Code 2016 is based on the 2015 IBC®. Local municipalities often adopt their state building codes with local additions and amendments. Note, most municipalities adopt the IBC® fire rating requirements unaltered.

What does the IBC say about fire rating?

The IBC® is a complex and lengthy document with comprehensive requirements. Chapter 7 on Fire and Smoke Protection Features⁵ is key, and in particular Section 714 Penetrations:

The provisions of this section shall govern the materials and methods of construction used to protect through penetrations and membrane penetrations of horizontal assemblies and fire-resistance-rated wall assemblies.

¹ When used with an appropriate fire rated assembly, such as those with gypsum wallboard membranes.

² Other fire barriers or methods of protection maybe utilized, such as a concrete structure or a sprinkler system.

³ International Building Code is a trademark of the International Code Council, Inc.

⁴ See IBC Adoption: <http://www.iccsafe.org/about-icc/overview/international-code-adoptions/>

⁵ The quotes are taken from the 2018 edition of the IBC.

Technical Bulletin

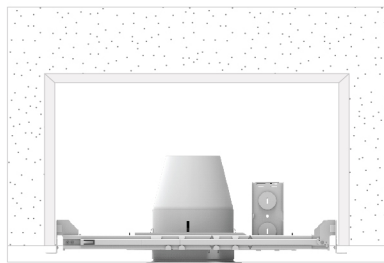


Penetrations of ceiling membranes are covered in Section 714.5 where subsection 714.5.2 Membrane Penetrations states:

Where floor/ceiling assemblies are required to have a fire-resistance rating, recessed fixtures shall be installed such that the required fire resistance will not be reduced.

How can a recessed fixture be installed without reducing the fire rating of the floor/ceiling assembly? The traditional approach is shown in diagram below:

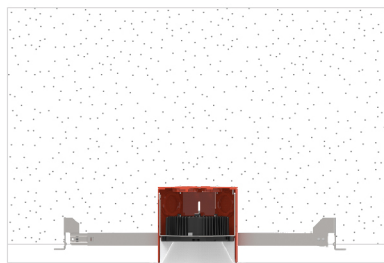
TRADITIONAL FIRE RATED BOXING



Although this is an effective method, it requires the ceiling space to have boxed-out cavities, using the same fire-rated membrane material, to mount the recessed fixtures in. This approach adds significant costs and requires extra space above the ceiling plane that may not always be available.

M Series with OneFrame™ technology provides a new method of achieving the same result and is shown in the diagram below:

ONEFRAME TECHNOLOGY



The Fire Rated M Series junction box reduces installation costs significantly because it eliminates the requirement to create boxed-out cavities at the time of construction by utilizing one of the exceptions provided by subsection 714.5.2:

Ceiling membrane penetrations of maximum 2-hour horizontal assemblies by steel electrical boxes that do not exceed 16 square inches (10 323 mm²) in area, provided that the aggregate area of such penetrations does not exceed 100 square inches (44 500 mm²) in any 100 square feet (9.29 m²) of ceiling area, and the annular space between the ceiling membrane and the box does not exceed 1/8 inch (3.2 mm).

UL 514A Standard for Safety – Metallic Outlet Boxes

One of the many UL listings the Fire Rated M Series has been granted is QCIT.E469361 which can be found at the provided footnote link⁶. This UL listing states that the Fire Rated M Series is a qualified metallic outlet box or in IBC terminology, steel electrical box. UL's Fire-resistance Ratings – ANSI/UL 263 BXUV.GuidelInfo states in section III - Floor-Ceilings and Roof-Ceilings, sub-section 6 – Metallic Electrical Outlet Boxes, can be used in fire-rated floor-ceiling and roof-ceiling assemblies, as described below, and detailed fully in the footnote link⁷:

Metallic outlet and switch boxes with metallic or nonmetallic cover plates may be used in floor-ceiling and roof-ceiling assemblies with ratings not exceeding 2 hours. These assemblies should have gypsum wallboard membranes. The metallic outlet boxes should be securely fastened to the joists and the opening in the gypsum board facing should be cut so that the clearance between the box and the gypsum board does not exceed 1/8 in. The surface area of individual boxes should not exceed 16 sq in. The aggregate surface area of the boxes should not exceed 100 sq in per 100 sq ft of ceiling surface.

Note the requirement for the contractor to create a tight, not to exceed 1/8" cut-out in the gypsum wallboard to ensure the integrity of the fire rated membrane.

The M Series has also been granted an unparalleled combination of other safety certifications, including Sound, Air-Tight, Concrete-Tight, IC, and Wet Location ratings. You can be confident that M Series is compliant in a wide range of installations.



⁶ http://database.ul.com/cgi-bin/XYV/template/LISEXT/1FRAME/showpage.html?name=QCIT.E469361&ccnshorttitle=Metallic+Outlet+Boxes&objid=1084503597&cfid=1073741824&version=versionless&parent_id=1073991686&sequence=1

⁷ <http://productspec.ul.com/document.php?id=BXUV.GuidelInfo>