



THE CODE AUTHORITY[®]

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Installation Considerations for Ceiling Radiation Dampers

By Howard Hopper / Managing Editor

Building codes include requirements for several types of dampers, including fire, smoke, and combination fire-smoke and ceiling radiation dampers. Each type of damper is Listed by UL for use in particular code applications. However, since ceiling radiation dampers serve a somewhat different purpose than the other damper types, there is often confusion about where a ceiling radiation damper should be used. To better understand ceiling radiation

dampers; let's examine the protection provided by each type of damper:

- Fire dampers are intended to resist the passage of flames, but their ability to resist the passage of smoke or radiant heat has not been investigated.
- Smoke dampers are intended to resist the passage of smoke, but their ability to resist the passage of flame or radiant heat has not been investigated.
- Combination fire-smoke dampers are intended to resist the passage of flame and smoke, but their ability to resist the passage of radiant heat has not been investigated.
- Ceiling radiation dampers are intended to limit the transfer of radiant heat into the concealed space when installed in the ceiling membrane of a fire-resistance rated floor-ceiling or roof-ceiling assembly.

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Scan with your mobile QR Code Reader to find out more about UL support for code authorities.



UL-ese

Definitions
of terms
frequently
used at UL

Ultimate Fire Wizard

An Internet-based tool that allows architects, designers and code authorities to quickly identify fire-resistance-rated assembly designs that meet their project specifications. The wizard can be found at www.ul.com/firewizard.



Candle Safety Discussions

A Great Idea for Your Family

By Howard Hopper / Managing Editor

One of my teenage daughters recently began burning candles in her bedroom to set the right mood for her homework and Facebook sessions. This did not seem to pose a problem until one day when I noticed a lit candle sitting directly on a stack of papers on her desk. This prompted me to find out more about home fires started by candles.

Statistics compiled by the National Fire Protection Association (NFPA) indicate that:

- 55 percent of home candle fires begin because the candle is too close to combustible material
- More candle fires begin in the bedroom than in any other room
- Children and older adults have the highest death risk from candle fires.

It was a bit unnerving to see that my daughter's candle burning habits were associated with three of the identified risk factors. I then went to the U.S. Fire Administration's (USFA) Web site and found candle fire safety tips that include:

- Avoid using lighted candles
- If you do use candles, ensure they are in sturdy metal, glass or ceramic holders and placed where they cannot be easily knocked down

- Keep candles out of the reach of children and pets
- Set a good example by using matches, lighters and fire carefully
- Children should never be allowed to play with matches, lighters or candles
- Never put candles on a Christmas tree
- Never leave the house with candles burning
- Extinguish candles after use
- Establish a fire-safe home, especially a safe sleeping environment
- And NEVER leave burning candles unattended

My daughter and I discussed candle safety, and I feel better knowing that she now has a better understanding of the potential risks and safe practices that should be followed. Hopefully, she will maintain and apply this awareness throughout her life.

How about you and your family? Is it time for you to have a discussion with your spouse, children, parents and loved ones to make sure that they are aware of candle safety concerns and safe practices? Be safe, folks!

Questions & Answers

Are swimming pool luminaires listed for use in saltwater pools? If so, how can these be identified?

The first step in answering this question is to define what is meant by saltwater pools. This may be confusing because some chlorine or bromine generators use salt as an input ingredient. UL has determined that the salt levels used by these generators result in treated water that has a conductivity similar to fresh water. In comparison, seawater has a much higher natural salt concentration and, hence, a much higher conductivity.

Accordingly, swimming pool luminaires intended for use in seawater installations are subjected to an electric shock test that uses water with conductivity representative of seawater, which is

more conductive than the water used in the freshwater luminaire tests.

Therefore, luminaires intended for use in swimming pools filled with tap (municipal) or well water, including water that has been salt-treated for chlorine or bromine generation, are marked as suitable for fresh water. Luminaires intended for use in swimming pools filled with seawater are marked as suitable for seawater. Luminaires that have been evaluated for both applications are marked for both.

Swimming pool luminaires are investigated in accordance with the requirements in UL 676, the Standard for Safety for Underwater Luminaires and Submersible Junction Boxes. These products are Listed under the Swimming Pool and Spa Equipment, Luminaires and Forming

Shell (WBDT) product category, which can be found in the Online Certifications Directory at www.ul.com/database.

For additional information on swimming pool luminaires, please contact Mike Shulman in San Jose, Calif., at **Michael.Shulman@us.ul.com** or at **+1.408.754.6703**.

UL engineers answer questions concerning UL and its operations, UL Standards for Safety, product certifications, and the code applications for which products are certified.



New Briefs

Flammable Refrigerant Forum Examines Key Safety Issues

UL recently hosted a stakeholder forum to discuss the use of flammable and semi-flammable refrigerants in appliances and HVAC/R equipment. The forum served as a catalyst for the U.S. safety system to anticipate and ultimately address safety challenges presented by flammable refrigerants. More than 30 individuals representing government agencies, code authorities, industry interests and UL attended the forum and shared their unique perspectives regarding post-production transport, installation, use, storage, servicing and, ultimately, disposal of HVAC/R equipment and appliances employing flammable refrigerants.

The U.S. relies on a comprehensive safety system to protect the public. Equipment standards are a part of the system, but equally important elements include the efforts of producers, installers, code enforcers and others. The technical knowledge of users and service personnel is also an important part of the system.

In addition to providing background and perspective, forum participants shared the status of their areas of responsibility with respect to flammable refrigerants. Upon completion of the general discussion on stakeholder impact, the participants summarized the gaps identified and related observations. The intent was to capture where stakeholders could individually or collectively take future action. A report of the meeting can be found on www.ul.com/refrigerantforum.

For additional information please contact Bob James in Tampa, Fla., at **Robert.J.James@us.ul.com** or at **+1.813-956-8669**.

LED RETROFIT KITS

for Luminaires and Signs

By John Taecker / Senior Regulatory Engineer

With businesses and consumers looking for ways to cut their energy costs, the use of energy efficient light emitting diode (LED) technologies in new lighting equipment installations is on the rise. There is also a move underway to install LED retrofit kits in existing incandescent and fluorescent luminaires and signs as a less expensive alternative to installing new LED luminaires and signs.

When Listed products are modified in the field, it is not possible for UL to confirm that the product continues to meet applicable certification safety requirements unless the field modifications are investigated by UL. However, an effective alternative to a UL field evaluation is the use of retrofit products and retrofit kits that are specifically investigated and certified by UL for field installation in previously Listed and installed luminaires and signs. As noted below, a number of different LED retrofit kits are currently certified.

Luminaire retrofit kits

Luminaire retrofit kits are currently Classified under the Luminaire Conversions, Retrofit (IEUQ) product category. This category covers retrofit devices or kits intended for field installation in UL Listed luminaires, office furnishing luminaires or portable luminaires. These products have been investigated to determine that, when used in accordance with the manufacturer's instructions, they do not adversely affect the operation of the complete unit.

The IEUQ category includes reflector kit retrofits intended to replace reflectors in fluorescent luminaires. Installation may involve relocation, removal or replacement of wiring, lampholders and ballasts. Reflector kits are not intended to be installed on luminaires

used as air-handling registers unless the accompanying installation instructions specify the kit is suitable for this use.

This category also includes retrofit kits intended to replace the luminaire's original light source, such as a fluorescent light. LED retrofit luminaire conversion kits are the most common and may be one of several types of LED retrofit kits. The kits either replace ballasts with an LED power supply or remove the ballast and wire the LED module or LED tubular lamp directly to the branch circuit wiring. LED module or light sources consist of a separately installed LED module or a replaceable tubular LED lamp that may use the original fluorescent lamp holders or be provided with new lamp holders. A luminaire modified in accordance with the retrofit kit instructions to no longer accept the original replaceable lamp has a new label – provided by the retrofit kit manufacturer – affixed near the retrofit kit installer to indicate that the luminaire has been modified and can no longer operate the originally intended lamp(s).

In recognition of the continuous technological advances in LED lighting and the challenges associated with installation of LED retrofit kits with tubular LED lamps, UL has created new categories for LED retrofit kits. These categories cover permanent and portable luminaire conversions (IFAR) and luminaire



conversions in commercial refrigerator and freezer lighting (IFAS). All certifications of LED retrofit luminaire conversion kits will be transitioned to these new categories during the next several months.

Self-ballasted LED lamps

Self-ballasted LED lamps intended to be installed in Edison screw-type, GU24 and other ANSI lamp bases and connected directly to line voltage supplies are Listed under the Self-ballasted LED Type Lamp category (OOLV). These products may be used in Listed permanently connected and portable luminaires and electric signs. Unlike LED retrofit kits, the Listed self-ballasted LED lamps are intended for use only in luminaires that do not need to

be modified or rewired to accommodate Listed self-ballasted LED lamps.

Self-ballasted LED lamps are generally for use in dry, indoor locations unless additionally investigated and marked for applications such as damp locations (not directly exposed to water). Products investigated and marked for wet locations may have additional restrictions regarding use or orientation.

Self-ballasted LED lamps have been investigated for use in the smaller of a 6- or 8-inch diameter totally enclosed recessed luminaire if they will physically fit, unless marked as not for use in a totally-enclosed luminaire. Products marked “Suitable for Use in Open Luminaires” are intended to replace tungsten-halogen lamps in applications where the luminaire is open and does not require an additional lamp containment barrier.

Electric sign retrofit kits

LED retrofit kits used to convert non-LED type electric signs are Classified under the Sign Conversions, Retrofit (UYWU) product category. These products consist of a power source, LEDs and the mounting means necessary to change the type of illumination originally contained in the sign to LED illumination. The kit installation instructions specify the type of sign in which the kit is intended to be installed. The kits are also marked to specify use only with the electric signs of specific manufacturers.

Exit sign retrofit kits

The Exit Sign Retrofit Kits (GGET) product category covers retrofit kits used to convert exit signs. Products covered under this category are intended for field installation in Listed Exit Fixtures (FWBO) or Listed Exit Lights (FTBR) using no more than two light sources. These devices have not been investigated as replacement light sources in edge-illuminated exit signs.

Exit sign retrofit kits are intended for use in indoor, dry locations unless marked as being suitable for wet locations, for indoor wet locations or for damp locations.

Types EFG (exit fixture general) and EFI (exit fixture independent) retrofit kits are intended for installation into UL Listed products with the product identity of “Exit Fixture” provided as part of the Listing Mark. Type EFG kits are intended for use only in single- or double-faced stencil exit fixtures having specific interior dimensions. Type EFI kits are self-contained assemblies that are independent of the original exit fixture except for mechanical support and electrical supply.

Type ELG (exit light general) and Type ELI (exit light independent) retrofit kits are intended for installation into UL Listed products with the product identity of “Emergency Lighting Equipment” provided as part of the Listing Mark. Type ELG and ELI kits are the same as Type EFG and EFI kits, respectively, except the kits are intended for use only in UL Listed exit lights that are energized by an AC power source in normal mode and by an internal or external DC power source in emergency mode.

Installation considerations

When inspecting installations of LED retrofit kits, care should be taken to verify that kits bear appropriate UL Classification Marks and are installed in accordance with the manufacturer’s installation instructions. Markings on the kits should also be examined to verify they are being installed in appropriate applications.

For additional information on LED retrofit kits for luminaires and electric signs, please contact Lee Hewitt in Northbrook, Ill., at Lee.C.Hewitt@us.ul.com or at +1.847.664.2906. For additional information on retrofit kits for exit signs, please contact Mike Shulman in San Jose, Calif., at Michael.Shulman@us.ul.com or at +1.408.754.6703.

Webinar Addresses UL Retrofit Programs

On May 10, 2011 UL is hosting a complementary webinar on UL’s retrofit programs, with emphasis on LED retrofits into luminaires. The importance and meaning of a Retrofit Classification Mark on a UL Listed luminaire is covered, along with a comparison of US and Canadian requirements. We will also discuss the qualifications of retrofit installers.

Go to www.ul.com/retrofit for details.



Ceiling Radiation Dampers (continued)

Ceiling membrane considerations

To achieve the fire-resistance rating required by building codes, floor-ceiling or roof-ceiling assemblies generally are protected either through the use of a direct-applied protection material or through a ceiling membrane specifically designed to remain in place and resist passage of heat and flames into the concealed space above a ceiling.

To determine the hourly fire-resistance rating, the floor-ceiling or roof-ceiling assembly is placed on top of a test furnace and subjected to the UL 263 fire test exposure from underneath. The hourly fire-resistance rating is the time during which the assembly maintains its structural integrity, limits the temperature rise of any structural steel supports and limits the temperature rise on the unexposed (top) surface.

When a membrane ceiling is used to provide protection, the ceiling membrane needs to protect the components of the floor-ceiling or roof-ceiling assembly above the membrane from high temperatures, radiant energy and flames of the test furnace. Openings in the membrane, such as those provided for fluorescent lighting fixtures (luminaires), need to be protected with materials with suitable thermal insulation properties. Similarly, HVAC duct openings penetrating the ceiling membrane need to be provided with thermal protection against radiant heat during the fire exposure. Ceiling radiation dampers provide this protection.

Ceiling damper options

Floor-ceiling and roof-ceiling designs such as those included in the UL Online Certifications Directory include details on specific constructions that provide the desired hourly fire-resistance rating. For assemblies utilizing a ceiling membrane for

protection, the design typically includes a description of the air ducts within the cavity of the assembly and the ceiling radiation dampers that protect the HVAC openings in the ceiling membrane. The ceiling radiation damper described in the design reflects the damper used during the UL 263 fire exposure test. For assemblies utilizing an acoustical ceiling, a hinged-door type damper typically protects HVAC openings.

The design may also call for the use of Duct Outlet Protection System A and/or B, which are described in the guide information for the assemblies. For assemblies using a gypsum board ceiling, the design will typically specify use of a UL Classified ceiling damper.

UL 555C investigations

Ceiling dampers are investigated either as part of the fire-resistance-rated floor-ceiling or roof-ceiling assembly or in accordance

Membrane Protection Using Air Terminal Units and Air Diffusers

Section 716.6.2 of the International Building Code (IBC) includes requirements for protecting duct and air transfer openings that penetrate the ceiling membrane of a fire-resistance rated floor-ceiling or roof-ceiling assembly. UL classifies units under three product categories that have been investigated for use in this application. As previously described, UL Classified ceiling dampers (CABS) are intended to protect air ducts that penetrate the membrane, and automatically shut in the event of a fire.

Air terminal units serve a similar function as ceiling dampers, but are:

- Designed to regulate the flow and distribute conditioned air within a building

- Ceiling mounted at the ends of ducted air systems
- Designed to be compatible with acoustical ceilings but are independently supported as shown in installation instructions supplied with each unit
- Investigated using the UL 263 time-temperature fire exposure
- Classified under the Air Terminal Unit product category (BZGU).

Ceiling air diffusers also serve a similar function as ceiling dampers, but are:

- Designed for dispersing the flow of air through suspended membrane ceilings
- Provided with factory-installed protection material that serves as a heat-transmission barrier

- Investigated using the UL 263 time-temperature fire exposure
- Classified under the Ceiling Air Diffusers product category (BZZU).

Ceiling air diffusers may be open on top when used with return air plenum (when permitted in the Classification information) or connected to air supply or air return ducts using Listed Class 0 or Class 1 air ducts and connectors. When flexible air ducts and/or connectors are used they should be supported by minimum 1 inch wide hangers or saddles at intervals, as necessary, to ensure that the duct and/or connector will not contact the back of the ceiling.

with requirements in UL 555C, the Standard for Safety for Ceiling Dampers. This standard includes requirements and methods of tests that apply to ceiling dampers intended for installation in fire-resistance rated floor-ceiling and roof-ceiling assemblies.

Among other tests, UL 555C includes a fire endurance test that utilizes the same time-temperature curve used in UL 263. The investigation of ceiling dampers for use in floor-ceiling or roof-ceiling assemblies previously rated with a hinged-door type damper involves a comparison of the fire resistance performance of the ceiling damper with that of a hinged-door type damper. This is done to confirm that the substitution of the ceiling damper does not reduce the hourly fire endurance rating of an assembly previously rated with the hinged-door type damper.

Classified ceiling dampers

Ceiling dampers that comply with UL 555C requirements are Classified under the Ceiling Dampers product category (CABS) found in the Online Certifications Directory at www.ul.com/database. The Classification covers ceiling damper models for use in lieu of hinged-blade type dampers in floor-ceiling or roof-ceiling designs that contain air ducts and specify the use of a hinged-blade type damper over each duct outlet; or in specific floor-ceiling and/or roof-ceiling designs. An air duct with a hinged-door type damper must be a specified component of the floor-ceiling and/or roof-ceiling design for a ceiling damper to be an acceptable option, unless the ceiling damper is Classified for use in the design.

Ceiling dampers are to be installed in accordance with the manufacturer's installation instructions. These instructions will specify the location of a ceiling damper

in a duct outlet relative to the ceiling level for ceiling dampers intended for installation in a duct outlet in lieu of hinged-door type dampers. This location must be followed during installation to achieve the hourly fire-resistance rating specified in the design.

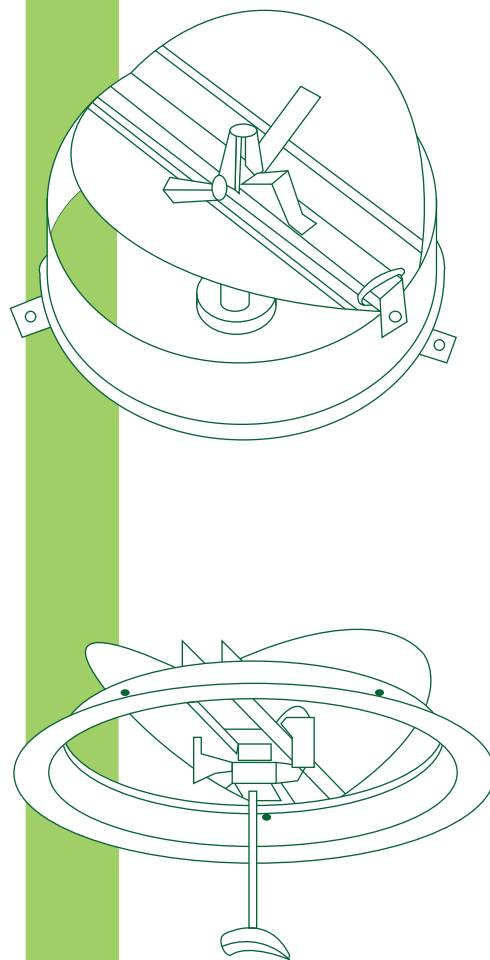
The individual Classification information indicates whether each damper type can be used in all designs conforming to the specifications under the Classification or if each type can be used only in specific designs that show the Classified company name and damper type.

Installation considerations

Ceiling dampers, which are referred to as ceiling radiation dampers in the International Building Code, are required by Section 716.3.1 to bear the label of an approved testing agency and comply with the requirements of UL 555C or be tested as part of a fire-resistance-rated floor- or roof-ceiling assembly.

To determine if a ceiling damper is suitable for use in a floor-ceiling or roof-ceiling assembly, it will either be specified directly in the assembly design details or Classified for use with the specific design. The UL Classification Mark on a ceiling damper includes the UL symbol, the word CLASSIFIED and reference to the UL Fire Resistance Directory. The Classification Mark on a damper may also include direct reference to the specific designs for which it has been found suitable. Manufacturer's installation instructions are included with all ceiling dampers and include directions and information needed for proper installation.

For additional information on ceiling dampers, please contact Rich Walke in Northbrook, Ill., at Richard.N.Walke@us.ul.com or at +1.847.664.3084.





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Calendar of Events



May 9-13, 2011

NFPA Training Seminar Week
Nashville
www.nfpa.org

May 12-14, 2011

AIA National Convention and
Design Exposition
New Orleans
[www.aia.org/conferences/
index.htm](http://www.aia.org/conferences/index.htm)

May 16-22, 2011

IGCC and ISPSC Code
Development Hearings
Dallas
www.iccsafe.org/

June 12-15, 2011

NFPA Conference and Expo
Boston
www.nfpa.org

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