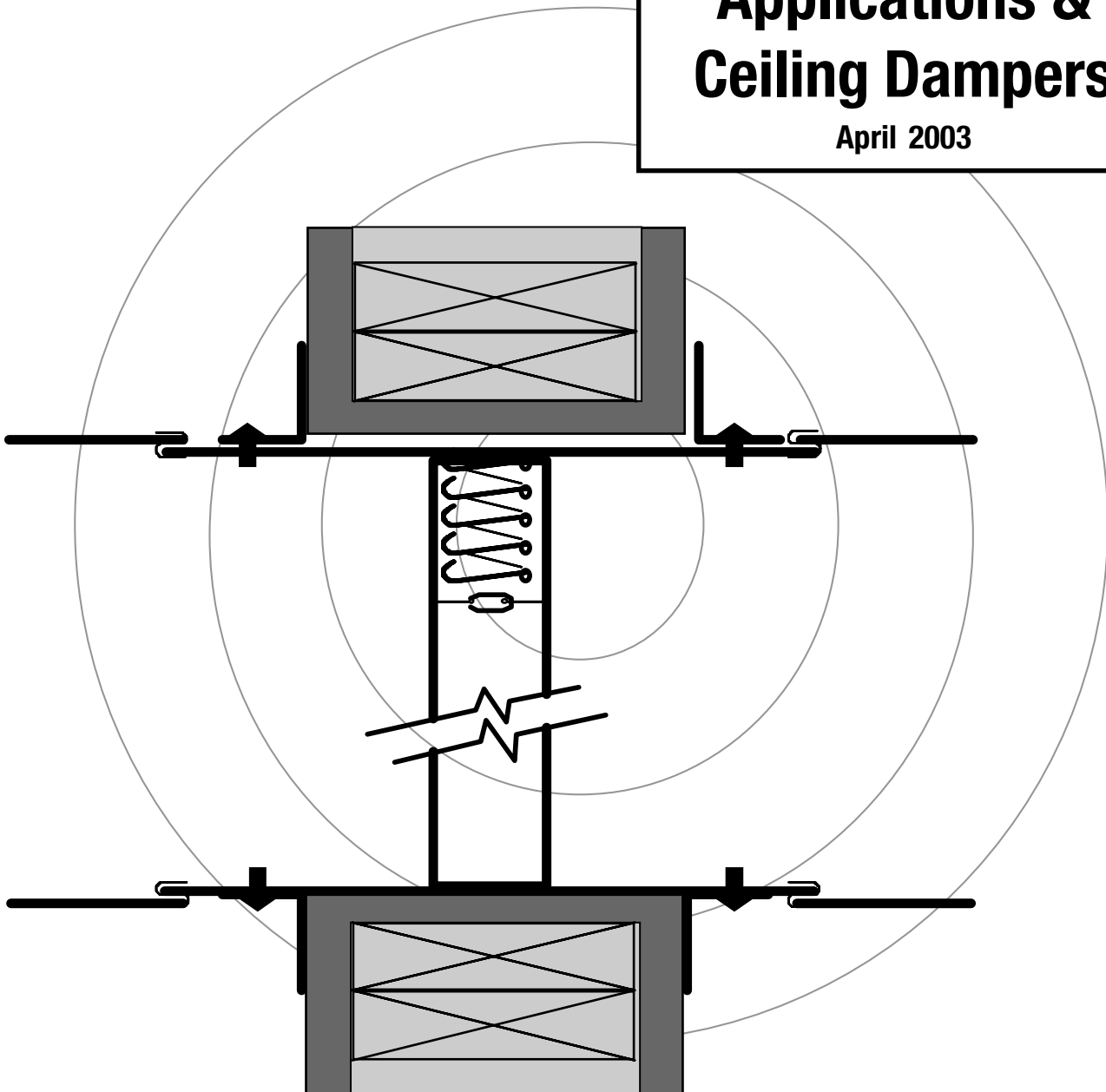


**Marking and
Application Guide**

**Dampers for Fire
Barrier and Smoke
Applications &
Ceiling Dampers**

April 2003



Underwriters Laboratories Inc. (UL) has developed this guide for use by contractors, code and inspection authorities, installers, users and system designers to aid in the understanding of the scope of UL certification of the products discussed herein. The guide is also intended to assist in determining the suitability of these products for use in specific applications.

This guide includes certification information on *Fire Dampers, Smoke Dampers, Combination Fire and Smoke Dampers, Corridor Dampers, and Ceiling Dampers*. Because the installation of these products are generally governed by local building code, Authorities Having Jurisdiction should be consulted prior to installation of the damper types discussed in this guide.

The markings described in UL 555, UL 555C, and UL 555S are required on the various types of dampers for proper and safe installations. Markings that apply only to servicing and operating the equipment, or markings placed on the equipment by the manufacturer that are not required by UL, are not covered in the Guide.

This guide may be revised as necessary due to the development of new products, changes in product requirements, code revisions, or when clarification is required. To confirm the current status of any UL Marking Guide, please consult the Regulators page of the UL Web Site at <http://www.ul.com/regulators/index.html>.

Let us know what you think of this Guide. Send your comments and suggestions to:

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DAMPER MARKING & APPLICATION GUIDE

DAMPER TYPES

Dampers are segregated into five unique product types. Their functions vary depending on the damper type.

Fire Dampers

Fire Dampers are used to prevent transmission of flame where air ducts penetrate fire barriers. A fire barrier is a fire-resistant-rated vertical or horizontal assembly of materials designed to restrict the spread of fire in which openings are protected. They can also be employed in air transfer openings in walls and partitions. Building codes specify where fire dampers are required. Fire dampers are available in two types, static fire dampers and dynamic fire dampers.

Fire Dampers for Use in Static Systems, as their name implies, are used in duct systems or penetrations where there is no or negligible airflow when the damper closes. Fire Dampers for Use in Dynamic Systems are required at locations in which fan pressure will be on during a fire incident, and are expected to be able to operate (close) against the air velocity and pressure produced by the system fan.

Both fire dampers for use in dynamic and static systems certified by UL carry an hourly fire resistance rating, usually 1-1/2 or 3 hours. Fire dampers for use in dynamic systems are also provided with an airflow rating which indicates the maximum velocity and static pressure that the damper is designed for. Refer to the section in this guide entitled *Airflow Ratings* for a more detailed explanation of the limitations of the ratings.

The basic standard used to evaluate fire dampers is the *Standard for Fire Dampers, UL 555*.

Smoke Dampers

Smoke dampers are intended for installation in ducts and air transfer openings that are designed to resist the passage of air and smoke. The devices are installed to operate automatically, controlled by a smoke detection system, and where required, capable of being positioned from a remote command station.

Smoke dampers may be required where ducts penetrate through smoke barriers, or at other locations within an engineered smoke control system. A smoke barrier is a continuous membrane, either vertical or horizontal, such as a wall, floor, or ceiling assembly, which is designed and constructed to restrict the movement of smoke. Smoke dampers can be used

in HVAC systems where the fans are shut down in the event of fire, and can also be used in smoke control systems designed to operate during a fire incident. Smoke dampers are designed to operate against air velocity and fan pressure.

Smoke dampers certified by UL carry a leakage class rating that indicates the level of air leakage measured through the damper under test conditions. Smoke dampers are also provided with an airflow rating which indicates the maximum velocity and static pressure for which the damper is designed. Refer to the section in this guide entitled *Airflow Ratings* for a more detailed explanation of the limitations of the ratings.

The basic standard used to evaluate smoke dampers is the *Standard for Smoke Dampers, UL 555S*.

Combination Fire & Smoke Dampers

These dampers are used at locations that are designated as both fire barriers and smoke barriers to prevent the passage of both flame and smoke.

Dampers that are marked as combination dampers comply with both the *Standard for Fire Dampers, UL 555* and the *Standard for Smoke Dampers, UL 555S*.

Corridor Dampers

A corridor (sometimes referred to as exit corridor or tunnel corridor) is an enclosed exit access component that defines and provides a path of egress travel to an exit. Corridor dampers are combination fire & smoke dampers that have been evaluated for mounting only in specific corridor ceiling constructions. The specific corridor ceiling construction details are described in the installation instructions provided with the dampers.

Corridors are intended as a means of egress in the event of a fire emergency. The Building Codes define the use and location of corridors in building construction. The Building Codes should be consulted for construction specifications for corridor ceilings.

Ceiling Dampers

Ceiling dampers are used to limit the passage of heat in *fire resistive floor-ceiling or roof-ceiling assemblies* where ducts or other penetrations are made only through the ceiling membrane of the fire resistive assembly. *Fire resistive ceiling membranes* are part of *floor-ceiling or roof-ceiling assemblies* that have been evaluated for their fire resistive capabilities when evaluated in accordance with the *Standard for Building Construction Materials, ANSI/UL 263 (ASTM E119, NFPA 252, UBC 7-1)*. Fire rated designs evaluated by UL are published in UL's *Fire Resistance Directory*.

Since ceiling dampers are intended to function only as heat barriers, and the Building Codes have not defined the use of these products in so far as their use as smoke barriers, the UL certification does not include the use of these products to limit the migration of smoke.

Ceiling dampers are evaluated by UL in one of two ways as explained below.

Ceiling Dampers For Use In Lieu Of Hinged Door Type Dampers

Ceiling dampers can be investigated for use in lieu of hinged door type dampers in floor-ceiling or roof-ceiling designs which contain air ducts and specify the use of hinged door type dampers over each duct outlet. The basic Standard used for a ceiling damper evaluated in this fashion is *The Standard for Ceiling Dampers, UL 555C*. It is important to note that ceiling dampers covered by this scheme are only intended for use in those UL fire resistive designs that indicate the use of a hinged door type damper in the design. This information is located in UL's Fire Resistance Directory in the text and drawings of the specific designs. The UL Classification of the ceiling damper does not cover the product for general installation in any floor or ceiling design.

Ceiling Dampers For Use In Specific Fire Resistive Designs

Alternatively, some ceiling dampers have been investigated for use only in one or more, specific UL fire resistive floor-ceiling or roof-ceiling designs. Dampers covered by this method of evaluation are generally tested along with the specific design construction in accordance with the *Standard for Building Construction Materials, ANSI/UL 263*. Information describing the installation of ceiling dampers covered under this scheme, including a reference to the specific ceiling damper model, is included in the text and drawings for the specific designs, in UL's *Fire Resistance Directory*. The Classification text for the ceiling damper will also make reference to the specific floor-ceiling or roof-ceiling designs for which it is intended to be installed. An example of this scenario can be found in UL *Fire Resistive Designs L501, L521, and L550*.

The use of ceiling dampers versus horizontal fire dampers, combination dampers and corridor dampers are distinctly different. Refer to the section in this guide entitled *Horizontal dampers* for a detailed explanation of these differences.

HORIZONTAL DAMPERS

One of the most common questions concerning dampers is the use of horizontal dampers. The correct damper depends on the situation. *Fire Resistive Assemblies* come in many types. Essential to all assemblies is the use of a protection material for the structural element supporting the floor. The entire assembly must also resist the passage of heat through to the top of the floor. The membrane ceiling, acoustical material and ceiling grid or gypsum

wallboard *never* comprise the hourly rating by itself. The membrane retards the passage of heat into the plenum space. Duct openings through the membrane only, or through the entire fire resistive assembly, are treated differently.

The *Standard for Air-Conditioning Systems, NFPA 90A* provides guidance for ducts penetrating through fire resistive assemblies. As a rule, vertical ducts rising through fire rated floors are to be protected within fire rated shaft enclosures. There are only a few exceptions to these criteria in NFPA 90A. As the fire resistive shaft rises through the structure, it is not necessary to protect the opening at the floors the duct passes through because the duct is located in a fire rated shaft. The shaft should be penetrated horizontally so that vertical dampers can be used to protect the penetration through the shaft.

If the situation arises that a vertical duct extends up through a fire rated floor assembly by one of the exceptions in NFPA 90A, then the horizontal type fire damper is the appropriate damper to use.

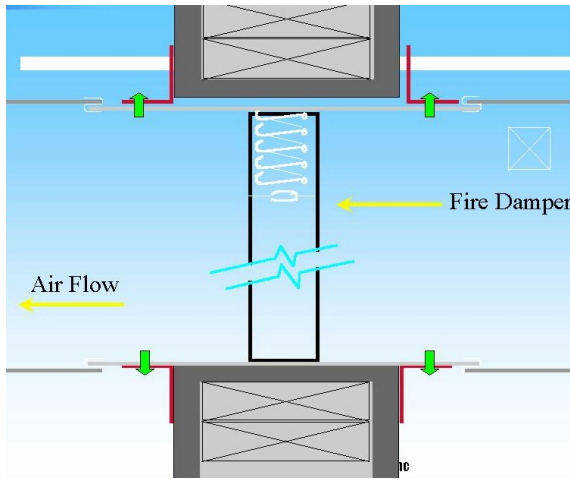
When the duct penetrates through the membrane protection only, and not through the floor, then a ceiling damper is used. However, the certification of ceiling dampers does not cover the product for general installation in any floor or ceiling design. Refer to the section in this guide entitled *Ceiling Dampers* under *Damper Types* for a detailed explanation of the limitations of the certifications applied to ceiling dampers.

For corridor ceiling applications, the corridor damper is the appropriate damper.

In all cases, the damper manufacturer's installation instructions depict the appropriate installation parameters and limitations.

INSTALLATION INSTRUCTIONS

Each container of dampers is supplied with a copy of the installation instructions appropriate for the specific damper model. The instructions are covered under UL's factory follow-up program along with the damper. The instructions contain the information necessary to properly install the damper as well as limitations on the installation of the product such as the type of floor or wall construction that is required for the correct installation.



Note: In this common fire damper installation, the damper is secured in the opening using retaining angles. Ducts are attached to the damper sleeve using breakaway methods. A remote sensor device may activate the damper actuator.

COMMON FIRE DAMPER INSTALLATION

Some manufactures elect to provide basic instructions that cover only common installations, and then rely on supplemental instruction pages that cover particular or unique installation scenarios. As with the basic installation instructions, the supplemental instructions are also covered under UL's factory follow-up program.

MULLIONS

The certifications covering fire dampers are limited to the single and/or multiple assembly sizes that are evaluated. The size limitations are specified in the published certification information for each damper model.

In certain circumstances, steel mullions can be used to divide a large wall or vertical partition opening into smaller individual openings, allowing fire dampers for use in static systems to be sized and installed within the limitations of the certification. These mullions are generally fabricated in the field. Damper manufacturers can provide installation details covering the fabrication, installation and use of mullions.

Because airflow ratings of fire dampers for use in dynamic systems and combination fire & smoke dampers are size dependent, the use of the mullions discussed herein are only intended for application with fire dampers for use in static systems. Further, the mullions are limited to use in vertical partitions.

DAMPER ACTUATORS

Smoke dampers and combination fire and smoke dampers are equipped with actuators (electric motors or pneumatic) to remotely control the dampers. These actuators are factory mounted. The airflow and pressure ratings marked on the dampers are dependent upon the particular combination of damper type, actuator type and linkages between the damper blades and actuator. As such, *field mounting or substitution of actuators is not covered within the scope of the UL certification of the product*. However, this does not necessarily preclude replacement of actuators in the field. Like any appliance, field servicing of these products is not covered under the scope of the UL certification and factory follow-up service program. As with any part of the damper, it is expected that replacement of actuators in the field be done in accordance with the damper manufacturer's normal field servicing program.

Under certain circumstances, UL can conduct a *Field Inspection or Field Evaluation* on products that have been modified in the field. For additional information on field inspections and evaluations, refer to the section in this guide entitled *Field Services*.

DETECTORS AND SMOKE DAMPERS

Smoke dampers may be required to be closed by smoke detectors. Section 8.3.5 of the *Life Safety Code, NFPA101* requires dampers to be activated by a detector.

Duct type smoke detectors have a minimum and maximum airflow rating. The ratings must be compatible with the ratings of the smoke damper. Smoke dampers have a minimum airflow rating of 0 fpm and the maximum is marked on the damper. Duct type smoke detectors typically have a minimum airflow rating of 300-500 fpm. However, there are duct type smoke detector models available that are rated for use at zero airflow. For HVAC systems that are shut down in the event of a fire, smoke dampers equipped with duct type detectors, with a greater than zero minimum airflow rating, may also need to be controlled with a device that will shut the damper in the event that the damper is in the open position and the fans are shut down.

AIRFLOW RATINGS

Dynamic Fire Dampers, Combination Fire and Smoke Dampers, and Smoke Dampers are marked with airflow and closure pressure ratings. These ratings represent the maximum airflow and closure pressure ratings tested for that product. The closure pressure rating is not the pressure drop across an open damper.

Airflow ratings are marked in 1000 fpm increments with a minimum rating of 2000 fpm. Closure pressure ratings are marked in increments of 2 in. WG with a minimum closure pressure rating of 4 in. WG.

The end user needs to analyze the expected airflow across an open damper in the design of the HVAC system. There are many permutations of opened and closed dampers that

may occur under different fire scenarios. The airflow rating for a particular application is not necessarily one that matches the normal design airflow within the ducts. Some dampers may become fully isolated against the fan pressure. Authorities having jurisdiction should field-test various combinations of opened and closed dampers to represent the worst expected condition across the damper.

Similarly, closed dampers may be isolated against the fan pressure and have a pressure higher than the rating. These dampers would be unable to be opened. This has significance for system designs that require dampers to be opened under fire and/or smoke conditions.

METHODS USED TO REDUCE OR LIMIT THE MOVEMENT OF SMOKE

In order to determine the proper damper to use, some background information on the methods used to limit smoke movement is necessary. There are design guides published that provide specific information on the design of systems such as *smoke control systems*. This guide provides only an overview of the different designs with an emphasis on the role that a damper may have on the system.

There are different methods used to limit the movement of smoke through the HVAC system. The amount of smoke generated from a fire can be quite substantial. It is important to recognize that the goal of the system designer is to reduce the migration of smoke to other parts of a building to prolong evacuation time. An improper damper use can be detrimental to the performance of the system. This guide is not intended to advocate one type of method over another.

There are three different basic approaches used to limit smoke migration. There is a barrier or *passive* system Standard's such as NFPA 90A recommends that the fans should be shut down in the event of a fire. A *smoke control system* utilizes the use of fans to create pressure differentials across smoke boundaries. A *smoke management system* uses a variety of methods to reduce or confine smoke movement in large spaces such as malls and atria.

For *passive* systems, consideration should be given for how smoke dampers are to close in the event of a fire and/or the presence of smoke in the HVAC duct. The user should be aware of the limitations of the different devices used to signal the damper to move to the closed position. See the section on *duct type* smoke detectors for a further explanation. The user should decide on the basic strategy to reduce smoke migration such as only closing the dampers adjacent to the fire or to close all of the dampers in the system. The building controls strategy then should match the control strategy for the dampers.

For *smoke control systems*, the dampers may be used to assist with the development of the pressure differentials in the different smoke zone boundaries. The user needs to determine the expected performance of the dampers in the system and match the control system accordingly. Consideration should be given for the mode of damper failure (open or closed) in the event that the fire scenario exceeds the limitations of the dampers or control system.

The *smoke dampers* are tested to elevated temperature noted on the Classification Marking (label). The dampers will continue to operate under elevated temperatures and can be used by firefighters to adjust *smoke control* strategies but the dampers will not operate indefinitely. Extreme heat and fire conditions can damage control systems and render the dampers without power. There are significant fire related safety issues with respect to having dampers fail (loss of power, etc.) in the open position. Heat, fire and smoke could travel beyond the open damper.

An analysis of different fire scenarios can be conducted to estimate the airflow and pressure conditions across different dampers within the system. The airflow and pressure ratings of the dampers should exceed the worst case projections from the analysis. Controlling smoke movement during a fire is a complex engineering task. Building Codes generally provide equivalency clauses that allow for other engineered methods to control the movement of smoke that are not identified in Standards such as NFPA 92A and 92B. Smoke dampers can also be used in these systems, provided that the designer of such a system is cognizant of the limitations of the individual components that make up the system.

MAINTENANCE

Like any mechanical device, dampers require periodic maintenance to ensure continued proper operation. The level of maintenance required is dependent on several factors including the product manufacturer's and system designer's recommendations, code requirements, and the complexity of the system in which the damper is installed.

Periodic maintenance of dampers should include the following:

- Removal of debris buildup from the damper and surrounding area
- Manual cycling of dampers released by fusible links
- Cycling of damper and actuator assemblies

Additional information on periodic testing can be found in the *Recommended Practice for Smoke-Control Systems, NFPA 92A (Refer to Section 5.4, 2000 Edition)*, and the *International Building Code (Refer to paragraph 909.12, 2000 Edition)*.

CERTIFICATIONS - UL CLASSIFICATION VS. UL LISTING

As with many products used for fire resistance, dampers are commercially installed and are not generally considered consumer products. Therefore, the requirements in the Standards that cover dampers are limited in scope to specific hazards (such as fire), and performance under specified conditions (such as smoke control). As such, the certification of dampers falls under UL's *Classification Service*. The term "Classification" is used as part of the UL Mark displayed on the dampers. It is important to distinguish the difference between "*UL Listed*" and "*UL Classified*" and the relation these terms have with the expression "*listed*" as used in the Building Codes.

Unlike products such as dampers that are *UL Classified*, products that are *UL Listed* have been evaluated with regard to all reasonably foreseeable hazards including fire, electrical shock and casualty hazards. Important points to remember are, in either case, the Standard applied to the product dictates what tests are required, and that when the product is submitted to UL for certification, the product is evaluated with regard to all tests specified in the Standard.

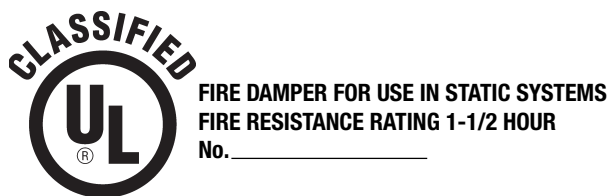
The expression "*listed*" in the Building Codes generally indicates that the product is required to have been evaluated in accordance with the appropriate Standards by an independent third party certification agency, such as UL. The expression "*listed*" in the Building Codes should not be confused with the term "*UL Listed*" as explained above. UL is unique in this regard, and it is important to recognize that not all certification agencies make this distinction in their certification services.

DAMPER MARKINGS

The UL Classification Marking (label) is the only method used by UL for products that have been produced under UL's Classification and Follow-Up Service Program. In addition to the UL Classification symbol, additional information is located on the label that has significance towards the installation and use of the damper. Examples of markings used on dampers are shown below:

Fire Dampers for use in Static Systems

UL Classification Marking



Fire Dampers for use in Dynamic Systems

UL Classification Marking



Additional Marking

Airflow rating (2000 fpm minimum, and 1000 fpm increments), Closure pressure rating (4 in. WG minimum, and 2 in. WG increments).

Smoke Dampers

UL Classification Marking

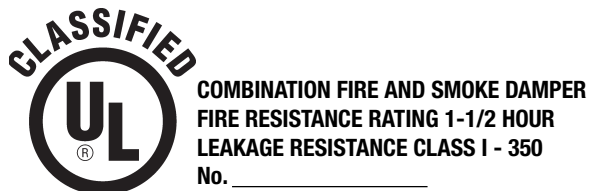


Additional Marking

Airflow rating (2000 fpm minimum, and 1000 fpm increments), Closure pressure rating (4 in. WG minimum and 2 in. WG increments).

Combination Fire and Smoke Dampers

UL Classification Marking



Additional Marking

Airflow rating (2000 fpm minimum, and 1000 fpm increments), Closure pressure rating (4 in. WG minimum and 2 in. WG increments).

Corridor Dampers

UL Classification Marking



Additional Marking

Airflow rating (2000 fpm minimum, and 1000 fpm increments), Closure pressure rating (4 in. WG minimum and 2 in. WG increments).

CEILING DAMPERS



Because the hourly rating of ceiling dampers is dependent on the specific or various fire resistance designs in which it can be installed, an hourly fire resistance rating is not marked on the product. Therefore, the marking of ceiling dampers consists of the UL Classification symbol, the product category "Ceiling Damper", and a reference to the product category description in UL's fire resistance directory. For those ceiling dampers intended only for use in one or more specific designs, the marking includes a reference to those designs.

FIELD SERVICES

Field Inspections

UL's Field Inspection Service is for products that are eligible to bear the UL Listing or Classification Mark at the time of production, but for which the manufacturer did not apply the UL Mark. A field inspection can also be conducted on a product that has been modified in the field to verify that the modified product is in compliance with UL's factory coverage for that product. Interchanging an operator is an example of a typical field modification. For these reasons, the field inspection may be especially useful to code or inspection authorities.

During the conduct of the field inspection, a local UL representative visits the installation site and examines the products to determine whether they continue to conform to the applicable UL Follow-Up Service Procedure. (The Follow-Up Service Procedure contains the requirements used by UL when conducting Follow-Up Service visits at production facilities). If a Field Inspection confirms that a product is indeed eligible to bear a UL Mark, the manufacturer or designated representative can then immediately apply the authorized UL Marking to the product.

Only the manufacturer of the product in question can request a field inspection. The appropriate regulatory authority is notified before the field inspection, and is offered the opportunity to witness the inspection.

Field Evaluations

Another field service option is the UL *Field Evaluation*. This option would be chosen if the request was from a party other than the product manufacturer, or when it is necessary to determine that the product complies with certain requirements in the Standard.

Through the Field Evaluation Service, experienced UL technical staff members conduct on-site safety evaluations - including construction examination, installation review and testing (if necessary) - of products or systems that have already been installed. If the product meets UL's safety requirements, a Field Evaluation Mark is applied on the spot. Only products or systems that can be thoroughly evaluated outside of UL's laboratories after installation are eligible for this Mark, provided they meet UL's requirements.

Anyone directly involved with a product - including manufacturers, owners and contractors - can request a field evaluation of the product. Many times, code authorities prompt field evaluations.

The appropriate Regulatory Authorities are even given the opportunity to witness the evaluation. Following the evaluation, UL will notify the regulatory authorities of the results of the evaluation and the application of the Field Evaluated Product Mark, if the installation meets UL's requirements. Authorities will also be notified if the installation is not in compliance with UL's safety requirements, and is not eligible to bear the Mark.

UL field evaluated product marks are serially numbered, dated, and can include the model designation of the product. These marks only apply for the particular installation evaluated. To protect their integrity, field evaluated product marks are tamper-resistant.

APPENDIX A

DOCUMENTS REFERENCED IN THIS GUIDE

ANSI / UL 263 (ASTM E119, NFPA 252, UBC 7-1)	Standard for Building Construction Materials
UL 555	Standard for Fire Dampers
UL 555S	Standard for Smoke Dampers
UL 555C	Standard for Ceiling Dampers
NFPA 90A	Standard for the Installation of Air-Conditioning and Ventilating Systems
NFPA 92A	Recommended Practice for Smoke-Control Systems
NFPA 92B	Guide for Smoke Management Systems in Malls, Atria, and Large Areas
NFPA 101	Life Safety Code
	International Building Code

APPENDIX B**DAMPER CLASSIFICATION INFORMATION**

Note: This information is updated more often than this Marking Guide – consult UL if a question arises.

Ceiling Dampers (CABS)

Ceiling dampers are designed to function as a heat barrier in air handling openings penetrating fire resistive membrane ceilings.

Ceiling dampers have been investigated for use in lieu of hinged door type dampers in floor-ceiling or roof-ceiling designs which contain air ducts and specify hinged door type damper over each duct outlet. Ceiling dampers are to be installed in accordance with installation instructions provided with the product. The location of the ceiling damper in duct outlet relative to the ceiling level is specified in the installation instructions; this location must be followed during installation in order to obtain the rated assembly performance.

The Classification information for each Classified Company indicates whether (1) each damper type can be used in all designs conforming to the specifications under the Classification or (2) only for specific design(s) which show the Classified company name and damper type. In the latter case, the individual design numbers are shown on the Classification Marking.

The Standard used as a basis for investigating products in this category is UL 555C, “Ceiling Dampers”. Fire performance measured by UL 555C is based upon the assumption that air movement shall be effectively stopped at the start of a fire.

LOOK FOR CLASSIFICATION MARK ON PRODUCT

The Classification Marking of Underwriters Laboratories Inc. (shown below) on the product is the only method provided by Underwriters Laboratories Inc. to identify Ceiling Dampers which have been produced under its Classification and Follow-Up Service.

**UNDERWRITERS LABORATORIES INC. ®
CLASSIFIED
CEILING DAMPERS
FIRE RESISTANCE CLASSIFICATION
SEE PRODUCT CATEGORY
IN UL FIRE RESISTANCE DIRECTORY**

Dampers For Fire Barrier And Smoke Applications (EMME)

GENERAL

This category covers fire dampers, smoke dampers, combination fire and smoke dampers, and corridor dampers.

Installation — All dampers covered under this category are intended to be installed in accordance with the installation instructions provided with the dampers. Authorities Having Jurisdiction should be consulted before installation. Unless otherwise indicated in the installation instructions, the annular space between the sleeves of fire dampers, combination fire and smoke dampers, or corridor dampers, and the wall opening shall not be filled with firestop materials such as fill, void or cavity materials.

Air Flow and Pressure Ratings — Fire dampers for use in dynamic systems, smoke dampers, combination fire and smoke dampers, and corridor dampers are marked with the maximum airflow and static pressure HVAC system conditions for which the damper has been evaluated. The airflow (velocity) ratings are established in increments of 1000 CFM/ft² of damper area (FPM), with the minimum being 2000 CFM/ft². The airflow ratings are established based on test conditions with the damper in the full open position. The static pressure ratings are established in increments of 2 in. WG, with the minimum being 4 in. WG. The static pressure ratings are established based on test conditions with the damper in the full closed position.

Sizes — The maximum sizes expressed in inches representing the maximum width and maximum height are shown in the individual Classifications for each fire damper model, for both single sections and multiple section assemblies.

Abbreviations — The following abbreviations are used in the individual Classifications:

Fire Resistance Rating

- HR Class — Hourly Classification

Damper Mounting Position

- V — Vertical
- H — Horizontal
- V, H — Vertical & Horizontal

Maximum Damper Size

- W — Width
- H — Height

FIRE DAMPERS

Fire dampers are intended for installation where air ducts penetrate or terminate at openings in walls or partitions; in air transfer openings in partitions; and where air ducts extend through floors as specified in NFPA 90A, “Standard for the Installation of Air Conditioning and Ventilating Systems.” Fire dampers are prescribed for use by codes such as the BOCA National Building and Mechanical Codes, SBCCI Standard Building and Mechanical Codes, ICBO Uniform Building and Mechanical Codes, and the International Building and Mechanical Codes.

Fire dampers have been evaluated for fire resistance ratings of 1-1/2 or 3 h as indicated in the individual Classifications.

Fire Dampers for Use in Dynamic Systems — Fire dampers for use in dynamic systems are intended for use in dynamic HVAC systems that remain operational during a fire, and may also be employed in static systems.

Fire Dampers for Use in Static Systems — Fire dampers for use in static systems are intended for use only in static HVAC systems that are automatically shut down in the event of a fire.

SMOKE DAMPERS

Smoke dampers are intended for the protection of openings in smoke barriers, or in engineered smoke control systems as specified in NFPA 90A. Smoke dampers are prescribed for use by codes such as the BOCA National Building and Mechanical Codes, SBCCI Standard Building and Mechanical Codes, ICBO Uniform Building and Mechanical Codes, and the International Building and Mechanical Codes.

Leakage ratings for smoke dampers are identified as Class Designation I, II or III as shown in the following table. Leakage ratings of the dampers are established at a minimum differential pressure of 4 in. water gauge (WG), across the closed damper. Leakage rates may also be established at higher differential pressures, in increments of 2 in. water gauge.

**Maximum Leakage
(CFM/ft²)**

Class	4 In. WG	6 In. WG	8 In. WG	10 In. WG	12 In. WG
I	8.0	9.5	11.0	12.5	14.0
II	20.0	24.0	28.0	31.5	35.0
III	80.0	96.0	112.0	125.0	140.0

Leakage ratings of smoke dampers are determined at elevated temperatures. The elevated temperatures are in increments of 100°F with the minimum temperature being 250°F. Leakage ratings of smoke dampers are established based on test conditions using heated air.

Classified dampers are marked with respect to the Leakage Class at elevated test temperature.

COMBINATION FIRE AND SMOKE DAMPERS

Combination fire and smoke dampers are intended for use in locations that are designated as both fire barriers and smoke barriers. These products can also be described as combination fire/smoke dampers as defined by the International Building Code (IBC) 2000. Combination fire and smoke dampers have been evaluated for both a fire resistance rating of 1-1/2 or 3 h, and a leakage rating as defined under "SMOKE DAMPERS." Leakage ratings of combination fire and smoke dampers are determined at an elevated temperature 250°F or 350°F. Leakage ratings of combination fire and smoke dampers are established based on test conditions using heated air.

CORRIDOR DAMPERS

Corridor dampers are intended for use where air ducts penetrate or terminate at horizontal openings in the ceilings of interior corridors, as defined in the City of Los Angeles Uniform Building Code, the Uniform Building Code, or where permitted by the Authority Having Jurisdiction.

Corridor dampers have been evaluated for, and are intended for, installation only in specific corridor ceiling constructions as defined in the installation instructions provided with each damper.

Corridor dampers have been evaluated for both a fire resistance rating of 1 h, and a Class I or II leakage rating as defined under "SMOKE DAMPERS." Leakage ratings of corridor dampers are determined at an elevated temperature 250°F or 350°F. Leakage ratings of corridor dampers are established based on test conditions using air. Corridor dampers have also demonstrated acceptable closure performance when subjected to 150 fpm velocity across the face of the damper during fire exposure.

RELATED PRODUCTS

For dampers intended for installation in air handling openings penetrating fire resistive membrane ceilings, see Ceiling Dampers (CABS).

REQUIREMENTS

The basic standard used to investigate fire dampers for use in dynamic systems and fire dampers for use in static systems is UL 555, "Fire Dampers."

The basic standard used to investigate smoke dampers is UL 555S, "Smoke Dampers."

Combination fire and smoke dampers, and corridor dampers, are evaluated in accordance with the applicable requirements of both UL 555 and UL 555S.

LOOK FOR CLASSIFICATION MARK ON PRODUCT

The Classification Mark of Underwriters Laboratories Inc. on the product is the only method provided by UL to identify products manufactured under its Classification and Follow-Up Service. The Classification Mark for these products includes the UL symbol, the word "CLASSIFIED" above the UL symbol (as illustrated in the Introduction of this Directory), a control number, and one of the following product names as appropriate: "FIRE DAMPER FOR USE IN DYNAMIC SYSTEMS + HR," "FIRE DAMPER FOR USE IN STATIC SYSTEMS + HR," "SMOKE DAMPER - LEAKAGE RESISTANCE CLASS ++ - +++," "COMBINATION FIRE AND SMOKE DAMPER + HR - LEAKAGE RESISTANCE CLASS ++ - +++" or "CORRIDOR DAMPER + HR - LEAKAGE RESISTANCE CLASS ++ - +++."

+ - 1, 1-1/2, or 3 as appropriate

++ - I, II or III as appropriate

+++ - Elevated test temperature, °F

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