

## Understanding Fire Dampers Testing & Certification

### What is UL and UL Classification?

**UL** is the abbreviation of **Underwriters Laboratories Inc.** (USA) which is a global independent safety science company innovating safety solutions from the public adoption of electricity to new breakthroughs in sustainability, renewable energy and nanotechnology. Dedicated to promoting safe living and working environments, UL helps safeguard people, products and places in important ways, facilitating trade and providing peace of mind.

To provide **UL Classification** for fire dampers, smoke dampers, combination fire & smoke dampers, UL performs the required tests in its own labs (e.g. *Fire endurance & hose stream test, Salt spray exposure test, Aging test etc.*) as well as in approved independent airflow labs (e.g. *Temperature degradation test, Operation test, Dynamic closure test, Leakage test etc.*).

### UL Classified Fire Dampers – Applicable test standard: UL 555

For **UL Classification of Fire Dampers**, applicable standard for UL testing is **UL 555**. Typical tests performed as per UL 555 includes (not necessarily in given sequence):

1. **Fire Endurance & Hose Stream Test** → *Fire resistance ratings: 1.5h or 3h*
2. **Salt Spray Exposure Test**
3. **Spring Closing Force Test**
4. **Cycling Test** → *250 cycles for manual fire dampers or  
20,000 cycles for motorized fire dampers (open-close)*
5. **Dynamic Closure Test** → *Minimum dynamic rating required: 2000 fpm @ 4 in.w.g.*

Fire dampers are installed in HVAC ductwork where it penetrates the openings in fire barriers. Fire damper is normally open and in case of fire, it is closed automatically upon detection of heat (via. fusible link). Fire dampers can be further divided into two broader categories i.e. a) Static fire dampers and b) Dynamic fire dampers.

**a) Static fire dampers** are installed in HVAC systems that automatically shut down in the event of a fire or are installed in air transfer openings in walls/partitions. As a result static fire dampers don't have to close against any airflow for the safety position.

- For **vertically installed** static fire damper, generally **no spring force is required to close the blades** because the blades close with the force of gravity itself.
- For **horizontally installed** static fire damper, **it is mandatory to have the springs installed** because the spring force is needed to pull the blades horizontally (i.e. against the force of gravity) to close them for safety.
- For **UL Classification**, all tests given in above list are performed except **Sr. 5**.

**b) Dynamic fire dampers** are installed in HVAC systems that are operational in event of a fire. As a result these fire dampers have to close against airflow for the safety position .

- For both **vertically & horizontally installed** dynamic fire damper, **spring force is required to close the blades** for safety position.
- For **UL Classification**, all tests given in above list are performed except **Sr. 3**.

**UL Classified Fire Dampers – Applicable test standard: UL 555 - - - continued!**

**NFPA 90A** (*Standard for Installation of Air-conditioning & Ventilation Systems*) describes the installation criteria of fire dampers in fire barriers having different fire resistance ratings. Below is the excerpt taken from the **NFPA 90A : 2012 Edition**.

**Section 5.4.1.1: Fire dampers** used for the protection of openings **in walls, partitions, or floors with fire resistance ratings of less than 3h** shall have a **1.5h** fire protection rating in accordance with ANSI/UL 555, *Standard for Safety Fire Dampers*.

**Section 5.4.2: Fire dampers** used for the protection of openings **in walls, partitions, or floors with fire resistance ratings of 3h or more** shall have a **3h** fire protection rating in accordance with ANSI/UL 555, *Standard for Safety Fire Dampers*.

**UL Classified Smoke Dampers – Applicable test standard: UL 555S**

For **UL Classification of Smoke Dampers**, applicable standard for UL testing is **UL 555S**. Typical tests performed as per UL 555S includes (not necessarily in given sequence):

1. **Salt Spray Exposure Test**
2. **Cycling Test** → 20,000 cycles for motorized smoke dampers (open-close)
3. **Temperature Degradation Test** → Elevated temperature 250°F or 350°F
4. **Operation Test** → At ambient temperature & elevated temperature 250°F or 350°F
5. **Leakage Test** → At ambient temperature & elevated temperature 250°F or 350°F
6. **Accelerated Aging Test**

Smoke dampers are always motorized as they are connected with Smoke Management System. As standard construction, smoke detector is not generally installed on a smoke damper because there are already several smoke detectors installed inside the protected zone and/or inside ducts.

As per NFPA 90A, **Class 2 is the minimum acceptable leakage** for a smoke damper with a **minimum elevated temperature of 250°F**. There are two possible applications of a smoke damper as given in NFPA 90A:

1. **Used for protection of openings in smoke barriers**
  - Installed in HVAC ductwork.
  - Smoke damper is normally open and in case of fire, it is closed via. smoke management system to stop the smoke leakage across the smoke barrier.
2. **Used in engineered smoke-control systems**
  - Installed in smoke extraction ductwork.
  - Smoke damper is normally close and in case of fire, it is opened via. smoke management system to facilitate the smoke extraction.

**Special Note:**

**Combination fire & smoke damper should not be used in engineered smoke-control system for smoke extraction application.** Why? Thermal responsive device installed in a combination fire & smoke damper has a rating of 165°F typically, therefore, it will trip at this temperature and the damper will be closed and no smoke extraction will be possible afterwards.

**UL Classified Combination Fire & Smoke Dampers –  
Applicable test standards: UL 555 & UL 555S**

For **UL Classification of Combination Fire & Smoke Dampers**, applicable standards for UL testing are **UL 555 & UL 555S**. Typical tests performed as per UL 555 includes (not necessarily in given sequence):

1. **Fire Endurance & Hose Stream Test** → *Fire resistance ratings: 1.5h or 3h*
2. **Salt Spray Exposure Test**
3. **Cycling Test** → *250 cycles for manual fire dampers or  
20,000 cycles for motorized fire dampers (open-close)*
4. **Dynamic Closure Test** → *Minimum dynamic rating required: 2000 fpm @ 4 in.w.g.*
5. **Temperature Degradation Test** → *Elevated temperature 250°F or 350°F*
6. **Operation Test** → *At ambient temperature & elevated temperature 250°F or 350°F*
7. **Leakage Test** → *At ambient temperature & elevated temperature 250°F or 350°F*
8. **Accelerated Aging Test**

**Combination fire & smoke dampers** are installed in HVAC ductwork at locations that are designated as fire barrier as well as smoke barrier. It is normally open and in case of fire, it is either closed upon detection of smoke (via. smoke management system) or automatically upon detection of heat (via. thermal responsive device).

We have already described the installation criteria of fire dampers and smoke dampers as per NFPA 90A in their relevant topics above, both of those apply for combination fire & smoke dampers.

Combination fire & smoke dampers should not be used in smoke extract applications because of the reason explained in special note in previous heading.

**Aldes Middle East's UL Classified dampers range**

**Static Fire Dampers:**



FD 150CH



FD 150AH



**Dynamic Fire Dampers:**



FD 150CH-D



FD 150AH-D



MD 125

## Aldes Middle East's UL Classified dampers range - - - continued!

### Smoke Dampers:



SD 125

### Combination Fire & Smoke Dampers:



FD 125

## Follow Up Service by UL

UL's Follow UP Service (FUS) representatives visit Aldes Middle East FZE's factory at least once per quarter and sometimes even twice a month (depending on the quantity of products produced). During their inspection visit, they make sure that all the UL guidelines are being followed during the manufacturing of the UL classified products. They also check the UL Labels usage record and physically check the available UL labels as well as different components to verify that there is no change in the construction/quality of the product that was initially tested at UL's laboratory.

## Requirements to maintain UL Classification of dampers

As a manufacturer, we are bound to produce the same product specifications as were tested at UL. Product specifications cannot be altered on client's request without re-testing or engineering evaluation done by UL. This is very important that the client understand this obligation.

Sometimes client's specifications require a UL classified product but with different material and/or thickness. For example, a client specifications ask for a 1.5h UL classified curtain fire damper having 1.5mm thick GI casing/frame and 1.2mm thick GI blades. Primary importance shall be given for buying a 1.5h UL classified curtain fire damper while thickness of material is of secondary importance and can even be ignored. If any manufacturer has a better design and is offering 1.5h UL classified curtain fire damper having 1.2mm thick GI casing/frame and 0.8mm thick GI blades instead of having 1.5mm thick GI casing/frame and 1.2mm thick GI blades, then it is definitely acceptable.

## ISONE Fire Dampers with CE Marking

Other than the UL Classified fire dampers range, Aldes also offers **special fire dampers range, i.e. ISONE** having **CE marking**. ISONE fire dampers provide **most safe compartmentation** because of their special construction that not only stops the transfer of flames & smoke but it also stops the transfer of heat. ISONE dampers were tested in Efectis Lab (France) as per **EN 1366-2** which is the European standard for testing of fire dampers. ISONE has **EI 120S classification**; where **E** represents fire integrity, **I** represents thermal insulation, **120** means 2h fire rating and **S** represents smoke leakage classification. It is widely being used in substations, hospitals and hotel projects. Even **UAE Fire Code** also recommends using similar fire dampers (especially for sensitive buildings).



ISONE EM  
(BF / BLF Mechanism)



ISONE EM  
(ISONE® Mechanism)

For update regarding other products or sending any enquiry,  
please visit our website

[www.aldes.ae](http://www.aldes.ae)

