

ENGINEERING REPORT

TOPIC: Dynamic Fire Damper Testing and Maintenance

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The testing and maintenance of fire dampers is not a new idea. However, more and more Authorities Having Jurisdiction (AHJ's) and building owners are requiring fire dampers to be operational tested and maintained on a regular basis. The reason for this requirement is a greater awareness of the life and property protection capabilities of the dampers.

AHJ's are requiring operational test to determine if the damper will function when needed in order to resist the spread of fire. Operational testing normally involves removing or melting the fusible link and letting the damper close. Once the damper has proven to close, it is reopened and the fuse link replaced. All the dampers installed in a building must be tested prior to occupancy and again 1 year later under normal operating conditions. Reference NFPA 80 and NFPA 105

Operational test and regular maintenance presents a couple of problems.

1. Most fire dampers are installed in areas of the building that are not easily accessible. Fire dampers are installed in penetrations of fire walls and floors as required by the building codes and access to the damper itself is normally through a small access door.
2. Fire dampers can be extremely difficult to test and re-set due to their design (all manufacturers' utilize the same basic curtain type design). There are two main types of fire dampers: dynamic fire

dampers and static fire dampers. Dynamic fire dampers have been UL tested to close against system air pressure and velocity. Static fire dampers, on the other hand, are UL tested to prevent the passage of flame and not tested to close under system air pressure and velocity. The main difference between the two designs is dynamic dampers (in most cases) utilize springs to pull the curtain blades closed against the air pressure and velocity while static dampers rely solely upon gravity to pull the curtain blades closed (static dampers designed for floor installation utilize closure springs with enough force to only pull the curtain blades closed).

Dynamic fire dampers are becoming more popular with designers because dynamic damper may be used in either a static system (fans off) or dynamic system (fans on) and static damper can only be used with static systems (fans off).

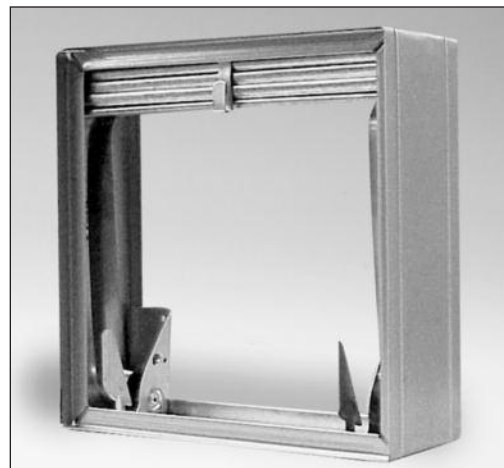
Limited access and closure springs on dynamic curtain blade fire dampers and floor mounted static curtain blade fire dampers do not make testing and maintenance friendly. However, they are life and property friendly because they will close when properly applied and installed.

A solution to the operational acceptance testing problem is to know the testing requirements before hand and coordinate with the AHJ.

A solution to the maintenance testing is not so simple.



Typical Curtain Blade Static Fire Damper



Typical Curtain Blade Dynamic Fire Damper

Maintenance should be performed per NFPA80 and NFPA 105 requirements "Each damper shall be tested and inspected after the damper is installed, then one year after installation. The maintenance testing and inspection frequency shall then be every 4 years, except in hospitals, where the frequency shall be every 6 years."

Access to the dampers remains a problem; a motorized fire damper that can be operated from a remote, easy accessible, location and can be equipped with position indication for operation verification. A motorized fire damper can be more easily maintained compared to a standard dynamic fire damper and contributes to maintenance and insurance savings. All motorized fire dampers are dynamic rated and may be utilized in place of any static or dynamic curtain blade fire damper.

Another solution to access and maintenance on dynamic curtain blade fire dampers is the use of multiple blade dynamic fire dampers. Multiple blade fire

dampers are easy to both test and re-set because the blades can be operated and held open via a hand lever or a pair of pliers while the fuse link is replaced.

Additional solution for round ducts is the use of a true round fire damper. Round fire damper allows the fusible link to be replaced easily then the damper the damper can be adjusted to it's full open position.

Summary

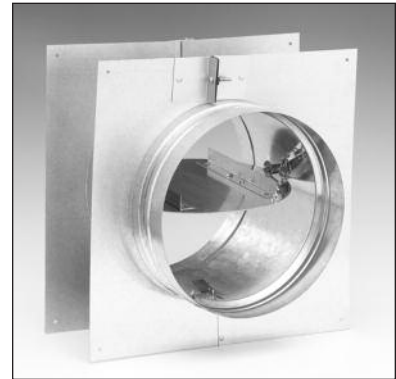
Testing and maintenance of fire dampers, especially dynamic curtain blade fire dampers, can be extremely difficult. There are however, other types of dynamic fire dampers that make testing and maintenance easier. The benefits of these dampers are realized in areas like maintenance and insurance. Before designing around 'standard' curtain type dynamic fire dampers; check with the AHJ and owner to review the operational testing and maintenance requirements of the building being designed.



**Typical Motorized
Fire Damper**



**Typical Multiple Blade
Fire Damper**



**Typical Round
Fire Damper**

