

ENGINEERING REPORT

TOPIC: Combination Fire/Smoke Damper Release Devices

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By Richard L. Cravy

Combination Fire/Smoke dampers are part of a larger category of products known as life safety products. They are tested in accordance with the stringent requirements of Underwriters Laboratory (U.L.) Standards for Safety UL555 and UL555S. Fire/smoke dampers must be dependable and quick acting to save life and property.

U.L. testing requires release devices of fire/smoke dampers to sense heat and operate within a one minute time frame. Testing of fusible rod and fusible link devices (used on most fire/smoke dampers) have shown they, typically, barely meet the one minute criteria.

Ruskin provides additional insurance with fast acting heat detection for fire smoke/dampers. **The Ruskin Electronic Fuse Link (EFL) and Pneumatic Fuse Link (PFL) detect heat in 1/3 to 1/2 the time of standard fuse rods or fuse links.** Quicker detection simply means increased safety and property protection in fire conditions.



EFL Quick Detect/Controlled Closure Device

The EFL and PFL serve a two-fold purpose. First, they prevent possible duct damage. This is accomplished by closing and locking the damper via the actuator and its accompanying spring (the EFL/PFL also incorporate a normally closed fail safe feature). A fusible link or fuse rod lets the damper close too fast when it releases (instantaneously) which has the

potential for costly duct disruption or collapse. The EFL and PFL are controlled closure devices which allow the damper to close in 3 to 10 seconds rather than instantaneously. For additional information on this subject, see Engineering Report No. 795:1 (Controlled Closure Fire/Smoke Damper Design Eliminates HVAC Duct System Damage.) Second, the EFL and PFL are designed to detect heat faster. This means they act much quicker than fusible links or fuse rods which have extra mass that must melt away prior to activation.

The EFL and PFL were tested like other release devices. Sample damper assemblies were placed in an opening in a concrete slab and installed per Ruskin's installation instructions. The concrete slab was placed over a horizontal furnace and power was applied to the damper operator. The damper cycled to the open position, and the assembly was subjected to the fire endurance test. This verified the damper would close within one minute and stay closed for 1 1/2 hours or 3 hours as described in Standard UL555.

Testing was completed with a "worse-case" scenario by having the operator and heat actuated device on the non-exposed side of the furnace. U.L. tested the EFL and PFL with the 285°F option (when a 285°F primary



Easy Reset

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release device is qualified, the next lower temperature device is automatically qualified). It took only 1/2 the time after furnace ignition for the EFL 285°F to close the damper (vs. a fuse rod or link). The PFL 285°F required only **13 seconds** after furnace ignition to close the damper. Such a big improvement provides additional insurance against loss of life and property.

Ruskin has a whole line of quick release devices. In addition to the EFL and PFL there is the TS150EZ. The TS150EZ is the "reopenable Firestat" option and is designed for dynamic smoke management systems. All these devices offer controlled closure while being quick detecting. They also allow the damper to be reset from outside the duct. The EFL is *standard* on all fire smoke dampers with electric actuators. The PFL is *standard*

on all fire smoke dampers with pneumatic actuators. If remote blade position indication is needed, Ruskin can provide an SP100 switch. When a pneumatic actuator is ordered with a non-standard EFL or TS150EZ an EP switch is required to interface between the two.

To summarize: Ruskin developed these quick detecting, controlled closure devices to improve life safety and to better protect property and ductwork. Quicker heat response time prevents the spread of flame and smoke through the ductwork while eliminating damage that can be caused by instantaneous closure.

Contact your local Ruskin representative for more information on these or any other Ruskin fire smoke damper advantage.

SUGGESTED SPECIFICATION

Each combination fire/smoke damper shall be equipped with a quick detect heat-actuated temperature release device to prevent duct and HVAC component damage. Instantaneous damper closure is unacceptable.

All fire/smoke dampers equipped with a UL approved electric actuator shall have an EFL or PFL when pneumatic actuators are provided. The EFL/PFL shall release in half the time of a fuse rod or link at temperatures of 165°F (74°C), 212°F (100°C) or 285°F (141°C).

Upon detection, the EFL/PFL shall close and lock the damper during test, smoke detection, power failure, or fire conditions through actuator closure spring. At no time shall the actuator disengage from damper blades.

The EFL/PFL shall allow the damper to be automatically and remotely resettable after test, smoke detection, or power failure conditions.

RUSKIN®

3900 Dr. Greaves Rd.
Kansas City, MO 64030
(816) 761-7476
FAX (816) 765-8955
www.ruskin.com

