Fire Doors

Fire rated doors have been, and continue to be, an important segment in the side-hinged door industry. But, what does it mean when a building code requires a rated door and what does it mean when someone sells a rated door?

Unlike other performance characteristics such as water penetration, design pressure, or energy efficiency, fire doors may be tested and rated as individual components or as an assembled unit. If the local code requires the opening to be protected, then every component in the unit must be rated for use in a fire door assembly. Typically, components such as door slabs, frames and glazing bear a label from an inspection service. Other components such as weatherstrip, astragals and locks may just bear a certification mark. A fire label on a door slab is not an indication that the entire assembly is rated. Some codes only require the door slab to be tested and rated.

When NFPA 80, Standard for Fire Doors and Other Opening Protective is referenced by code, there are very specific requirements for the fire door assembly. This is an extremely important document for anyone in the business of hanging fire doors. Not only does it outline which components must be listed and labeled, it also includes specifications on operation, clearance and installation. NFPA 80 outlines hinge requirements from how many to how thick. It also details what can and can’t be done to a fire door outside of inspection services. In other words, what work can be done to a door without a contract with an inspection agency. The standard requires preparation of fire doors for locks, latches, hinges, closers, glass lights, astragals, etc. be performed under label services.

Duration (20 minute, 60 minute, 90 minute, etc) is not the only performance characteristic that may be required of a fire door assembly. There is also pressure (neutral or positive), smoke and draft control, hose stream, and surface temperature rise.

Prior to the publication of the 1997 Uniform Building Code, fire doors were only required to be tested under neutral pressure conditions. That is, the pressure in the test furnace is uniform and the same as pressure on the unexposed side. Under positive pressure testing, there is a neutral pressure plane established 40 inches above the bottom of the door. Above that plane, the pressure on the furnace side is greater than the pressure on the unexposed side. This forces hot gases and flames through to top of the door while cool air flows into the furnace through the bottom. This theoretically simulates real world fire conditions and is a harder test to pass. More than a decade has passed since the first model codes referenced positive pressure, but it still is not required in all building codes. Positive pressure rated doors must indicate so on the label.

There are two types of positive pressure rated doors. The first is a “Category A” door. These are doors that do not require any additional edge seals to meet positive pressure requirements. “Category B” doors, however, require the application of additional edge seals or gaskets to achieve positive pressure. These edge seals are typically intumescent (meaning they expand under intense heat) and are usually applied to the frame. These surface applied seals needed for positive pressure are referred to as “Category G” edge seals.

Smoke and draft control is a function of the seals and gaskets on a door assembly. The gaskets required to achieve smoke and draft control are referred to as “Category H” gaskets. They are also typically applied to the frame. Some inspection agencies require that an “S” be on the fire door label to indicate that the door is eligible for smoke and draft control if the proper gaskets are applied. This mark does not imply the door itself is smoke rated, though some refer to the door as an “S-label” door.

Temperature rise may also be required by code. This is the increase in surface temperature on the unexposed side of a fire door, measured 30 minutes into a test. They are classified as 250°F, 450°F and above 650°F. The lower numbers represent better insulating doors. Temperature rise is also often included on a fire door label.

Who can apply a fire door label? A fire door label from an inspection service can only be applied by someone who is authorized to do so by that inspection agency. This is typically a door machine shop (pre-hanger) or a door manufacturer. It may also be a field inspector that represents the agency. Serialized fire labels are an indication that the door is in compliance with the listing in its present condition. Other marks on a fire door, such as ink stamps, only indicate that the door was manufactured in accordance with a listing and are eligible for further processing by an authorized party. Roman numerals are often used by inspection agencies on ink stamps to represent the duration that the door construction is eligible to meet (i.e. XX for 20-minute).

As with all building code compliance related issues, the authority having jurisdiction (AHJ) determines what is required to demonstrate compliance with the local code. Some may accept a product listing, while others may require a label. Serialized labels from an independent inspection agency are the most widely accepted method to show compliance. Unfortunately, local codes vary from jurisdiction to jurisdiction and enforcement varies by AHJ.