



## Fire Door Testing and Maintenance

Operating tests indicate a statistically high number of fire doors fail to close when trip-tested during simulated fire conditions. These doors, however, rarely failed to operate properly because of faulty design or improper installation. Rather, they failed from a lack of proper maintenance.

### Types of Fire Doors

There are four basic designs of fire doors:

- Horizontal Sliding
- Swinging or Hinged
- Vertical Roll-Up
- Vertical Sliding (Guillotine)

Each of these designs, except the vertical roll-up door, is available in a variety of materials including steel, metal-clad wood, solid-core wood, and composite construction (mineral core, etc.). To be acceptable to the local building or fire prevention codes or other authority having jurisdiction, the door and door frame assembly must have been tested and labeled by a recognized testing agency such as Underwriters Laboratories. Underwriters Laboratories currently classifies twelve different types of fire doors: access, bullet-resisting, chute, curtain, dumbwaiter, freight elevator, passenger elevator, rolling steel, service counter, sliding, special purpose, and swinging doors. Detailed information on types of fire-rated doors is provided in the Underwriters Laboratories Building Materials Directory. A thorough summary of fire door ratings, types, construction and installation details and much more is contained in the NFPA 80, Standard for Fire Doors and Windows.

### Maintenance Guidelines

NFPA 80 lists five specific requirements for proper care and maintenance of fire doors. They include inspection, lubrication and adjustment, prevention of door blockage, maintenance of closing mechanisms, and repair of fire doors and windows.

As with any preventive maintenance program, regular inspection of all fire door components is essential. The door should close fully and freely without binding or hesitating in its operation. Swinging doors must latch solidly and with positive force. Horizontal and vertical sliding doors must come to rest against their stops and within the sill and wall binders so they press against the wall. Also, sliding doors should overlap the door opening by at least four inches on the sides and top (and on the bottom if the door is installed above floor level, such as on a conveyor opening.)

Vertical rolling steel doors should close with a positive force, coming to rest tightly against the floor sill. If either the push-down spring or governor is improperly adjusted, the door will fail to close completely or will close with too much force and bounce partly open.

### Inspection

The entire fire door assembly, including all hardware such as hinges, rollers, door guides, closing mechanisms, and latching hardware should be examined frequently. Any damaged or inoperative parts should be replaced immediately. A critical part of the inspection process is to determine that the door operates normally and freely. Latches or hold-shut devices must operate to keep the door in the closed or latched position. Wood doors should be inspected regularly for signs

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of dry rot. If the fire door assembly includes chains, cables, or ropes, these should be examined for signs of wear or stretching. Corrective or replacement action for any discovered problem should not be put off.

Mounting bolts and hardware, and the wall on which they are mounted, should also be inspected for signs of damage, loosening, or strain.

### **Lubrication and Adjustment**

Door guides, rollers, and bearings should be kept well lubricated. Latches, hold-open and door-closer devices should be lubricated and adjusted as recommended by the manufacturer or installer. Door-closer mechanisms should allow swinging doors to close with a smooth, even force that will allow the door to lock or latch solidly in the closed position. Drafts and back pressure during a fire may cause the door to reopen if not held securely.

If such a door is installed in emergency exit paths, though, bear in mind that the closing force should not be so great that a smaller adult or child would have difficulty opening the door in a panic situation.

### **Prevention of Door Blockage**

Door openings and the surrounding areas on both sides of the door should be kept clear of all storage. There are two very important reasons for this. Material left in the vicinity of the door may be accidentally moved into an obstructing position, preventing the door from closing completely. Secondly, listed and labeled fire doors, while they are rated in terms of hours of fire exposure, nevertheless do transmit heat to the unexposed side of the door. The amount of heat actually radiated will depend on the design and material used, but it may be severe. For this reason, a space of at least 15 to 25 feet on both sides of the door should be kept totally clear of all combustible materials.

Where the fire door or its frame show evidence of scraping, denting or puncturing, guard barriers or posts should be installed both to protect the door from vehicular damage and from binding or wedging caused by articles being stored or placed adjacent to the door. Wedging, tying, chaining, or otherwise blocking the door in the open position should always be prohibited. Approved hold-open devices that allow the door to close automatically during fire or smoke conditions are readily available for all types of listed or approved fire doors.

### **Maintenance of Closing Mechanisms**

It is essential that self-closing devices be kept in proper working condition. Doors normally kept open and equipped with automatic closing devices should be operated on a regular basis to keep them in good working condition. Improper adjustment or damage to these devices is one of the major causes of fire door failures during tests or under fire conditions. Fusible links or other heat-actuated devices should be kept clean and free of paint or other coatings.

### **Repair of Fire Doors and Windows**

Automatic sprinkler systems and special extinguishing systems such as carbon dioxide protection are looked upon as active forms of fire protection requiring periodic servicing and prompt repair, often on an emergency basis. Fire doors and windows, however, are often considered as passive protection, being part of the fire barrier construction and not needing a lot of attention. They nevertheless should be given the same maintenance and repair priorities as other fire protection equipment. Broken or damaged glazing material should be replaced with labeled glazing. Wire glass should be properly embedded in putty and any exposed joints between the frame and glass properly pointed. Any break in the face covering of the door should be repaired immediately. If a fire door, frame, or accessory were damaged to the extent that it impairs the door's operation, it should be repaired with parts from the manufacturer.

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## Windows or Vision Panels

Fire doors with fire resistance ratings up to and including a three-hour duration are permitted to have glass windows or vision panels, subject to several important restrictions. The most important of these restrictions is that the vision panel must have been installed only by the door manufacturer and that the door-window combination be tested and labeled by a recognized testing laboratory. Only wired glass, more than or equal to one-quarter inch thick, labeled for fire protection service and installed in an approved steel frame, can be used. When the wired glass requires replacement, an identical piece of labeled wired glass should be used. It should be well imbedded in putty, and all exposed joints between the metal and glass should be struck and pointed. Since each door design has a maximum permitted area of glass, the opening should never be enlarged or otherwise altered. Doors shipped by the manufacturer without window or vision panel openings should never be modified by installing a vision panel in the field; the door's structural integrity or fire resistance may be materially weakened by a field-installed opening. Glass or other vision panels are never installed in doors having four hour fire protection ratings, or in doors of 1-1/2 hour rating when installed in severe fire exposure locations.

Altering or modifying a fire door in any manner can very easily affect its behavior under fire conditions and for this reason modification will negate the door's approval or listing. The local authority having jurisdiction (the fire or building inspector, insurance carrier's representative, etc.) may be required to no longer recognize it as an approved or standard installation.

For much the same reason, when replacing any of the hardware on a fire door installation, such as the hinges, automatic closing devices and hold-open devices, locks or latches, use identical hardware supplied by the manufacturer or installer. As an example, swinging doors of composite hollow metal or other construction often contain a barrel-style lock and latch assembly. If this lock or latch assembly is replaced with a slightly different design, especially one with slightly smaller cylinder dimensions, the assembly may literally fall out during fire exposure, allowing the door to swing open at the most critical time in its life.

## Summary

Fire doors are like any other equipment or device in a building: Once installed they require continued attention in the form of inspection and maintenance. Only properly maintained fire doors will give the service for which they were designed and the protection they may someday be required to furnish. Fire doors have a variety of classifications, types, and construction, each having its own set of characteristics, installation and maintenance requirements, and methods of proper operation. Manufacturers' installation and maintenance instructions are a valuable reference in providing proper maintenance of the fire door. An excellent addition to the manufacturer's literature is the current edition of NFPA 80.

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