



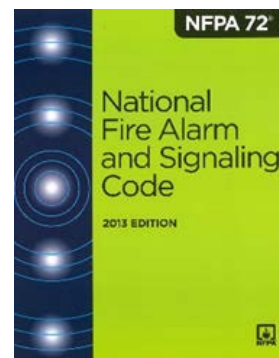
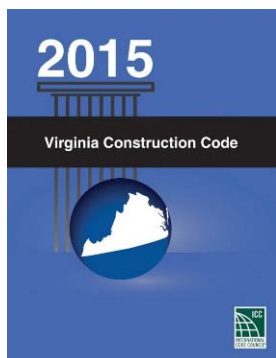
### DIVISION OF ENGINEERING & BUILDINGS

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### ✓ **Fire Door Closing Requirements**

The ability of a fire separation wall to serve its intended purpose – whether it be a fire wall, fire barrier, fire partition, or other type of rated wall – is largely dependent upon the protection of the penetrations, joints, and openings in the wall. Even within the category of wall openings, various sub-topics exist such as doors, windows, shutters, duct and air transfer openings, etc., all of which have specific code requirements. This article will examine some of the **2015 Virginia Construction Code (VCC)** requirements related to door openings in rated walls, and more specifically, the necessity for fire doors to be secured in the closed position when they are needed the most.

Fire door openings in rated exterior walls (**VCC 705.8.2**), fire walls (**VCC 706.8**), fire barriers (**VCC 707.6**), fire partitions (**VCC 708.6**), and smoke barriers (**VCC 709.5**) are all governed by a common section later in Chapter 7: Fire Door and Shutter Assemblies (**VCC 716.5**). This section addresses everything from fire door testing standards and glazing limitations to labeling requirements and door closing protocol. **NFPA 80 – Standard for Fire Doors and Other Opening Protectives** – is the referenced standard that governs the majority of installation requirements associated with fire doors. The narrow focus of this article, however, will be on the foundational requirement for fire doors to close and latch. These provisions originate in **VCC 716.5.9**.



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### Latching of Fire Doors

Before the topic of fire door closing is discussed in more detail, it is important to establish what must occur once the door is in the closed position. It is not enough for the door to simply close. Provisions must be made to ensure that the door is secured in the closed position and cannot be subject to reopening due to forces exerted on the door. In side-hinged swinging fire doors, this is accomplished by the use of an active latch bolt in the door hardware that catches a fixed door strike in the jamb as described in **VCC 716.5.9.1**.

The use of electric door strikes is generally discouraged in fire door applications since they are subject to failing in the open position (fail-safe), rendering the door unlatched and free to swing open. While fail-secure electric strike options exist, certain applications may result in re-entry restrictions such as locked stairway doors, depending on the hardware and locking arrangements specified. The failure mode for electric strikes is also typically field selectable, meaning they can be reversed at any time without notice. Strictly mechanical locking arrangements as well as some electrified hardware sets (e.g. latch retraction) are good options for fire doors.

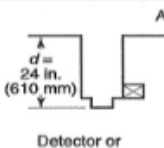
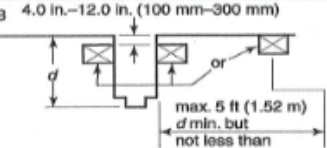
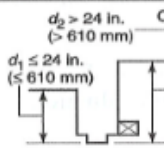
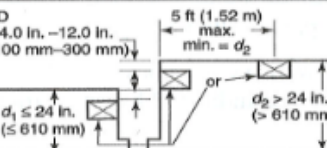
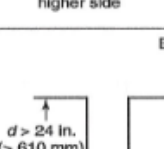
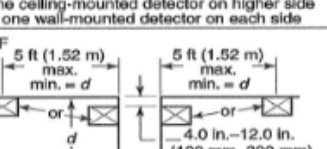
### Closing of Fire Doors

The premise of **VCC 716.5.9** is that fire doors shall automatically move from the open to the closed position with no external force exerted upon it by a person. In order for this to be accomplished, fire doors must either be equipped with a power-operated door closer or a mechanical self-closing device. There are many situations where building owners prefer to have fire doors fixed in the open position during normal operation. This is permissible as long as the doors are arranged to release and close upon the activation of smoke detectors located in accordance with **NFPA 72 – National Fire Alarm and Signaling Code**.

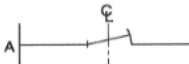
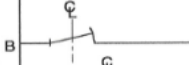
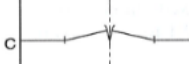
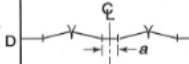
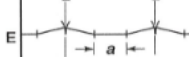


**NFPA 72 17.7.5.6** – Smoke Detectors for Door Release Service – indicates that smoke detectors used for the release of fire doors must fall into one of two categories. The first option is where the building is already equipped with open area smoke detection. General requirements for locating smoke detectors are found in **NFPA 72 17.7.3**. When the open area smoke detectors have been installed in a compliant manner on each side of the door in question, **NFPA 72 17.7.5.6.1** permits their activation to release the doors.

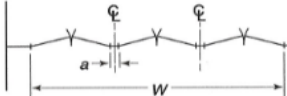
However, in many cases, area smoke detection is not required by code and a second option is needed. **NFPA 72 17.7.5.6.2** permits the installation of dedicated smoke detectors solely for the release of the fire doors when no other open area smoke detection is present. Provisions for locating these dedicated smoke detectors are found in **Figures 17.7.5.6.5.1(A)** and **17.7.5.6.5.3(A)(B)(C)**, which are shown on Page 3 for reference.

Depth of wall section above door	Door frame mounted	Ceiling or wall mounted
$d$	Smoke detector listed for frame mounting or as part of closer assembly	Smoke detector ceiling or wall mounted
0–24 in. (0–610 mm) on both sides of doorway	 <p>Detector or detector closer mounted on either side</p>	 <p>One ceiling-mounted detector on either side or one wall-mounted detector on each side</p>
Over 24 in. (610 mm) on one side only	 <p>Detector or detector closer mounted on higher side</p>	 <p>One ceiling-mounted detector on higher side or one wall-mounted detector on each side</p>
Over 24 in. (610 mm) on both sides	 <p>Detector or detector closer mounted on either side</p>	 <p>Two detectors required</p>
Over 60 in. (1.52 m)	Might require additional detectors	

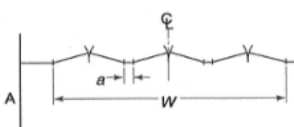
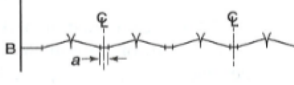
**FIGURE 17.7.5.6.5.1(A) Detector Location Requirements for Wall Sections.**

	Detector(s) location
 <p>Single door</p>	On centerline of doorway
 <p>Door offset from centerline of hall</p>	On centerline of doorway
 <p>Double door</p>	On centerline of doorway
 <p><math>a = 24</math> in. (610 mm) or less</p>	On centerline of separation
 <p><math>a =</math> More than 24 in. (6.1 m)</p>	On centerline of each doorway

**FIGURE 17.7.5.6.5.3(A) Detector Location Requirements for Single and Double Doors.**

	Detector(s) location
 <p><math>a = 24</math> in. (610 mm) or less; <math>W =</math> more than 20 ft (6.1 m)</p>	Treat as two or more groups

**FIGURE 17.7.5.6.5.3(C) Detector Location Requirements for Group Doorways over 20 ft (6.1 m) in Width.**

	Detector(s) location
 <p><math>a = 24</math> in. (610 mm) or less; 3 openings; <math>W = 20</math> ft (6.1 m) or less</p>	On centerline of center opening
 <p><math>a = 24</math> in. (610 mm) or less; more than 3 openings</p>	Treat as two or more groups

**FIGURE 17.7.5.6.5.3(B) Detector Location Requirements for Group Doorways.**

In both options described earlier for smoke detector release of fire doors, only the fire door immediately adjacent to the activated smoke detector is required to close. The logic is that, when smoke reaches the vicinity of a particular fire door, it is time for that door to close and perform its intended function. Other fire doors in the building are permitted to remain open until such time that their corresponding smoke detectors are activated. That said, many designers choose to program the fire alarm system to release all door hold-open devices throughout the building upon activation of any fire alarm initiating device. While this may be considered good practice, it is not a code requirement.

There are cases, however, that do not exactly fit into this mold. Consider a smokeproof (pressurized) enclosure such as would be required for stairways that serve floors more than 75 feet above the lowest level of fire department vehicle access per **VCC 403.5.4**. In accordance with **VCC 909.20.2.1**, one smoke detector is required to be located at the floor-side of each entrance into the pressurized enclosure. This includes the stairway itself as well as any connected exit passageways that are also pressurized. Furthermore, this section also states that the activation of any one of these dedicated smoke detectors shall cause all other doors in the enclosure at each level to release and close simultaneously. Coupled with these unique door release requirements is the additional responsibility of the dedicated smoke detectors to activate the stairwell pressurization fans associated with that particular smokeproof enclosure.

### **Final Thoughts**

Much more could be written about this topic, but the goal of this article has been to provide a basic starting point for understanding and applying the code requirements related to the effective closing and latching of fire doors. Once the overall requirements for a given building are established, such as the applicable occupancy classifications and the corresponding requirements for a fire alarm system or a smoke detection system, the solution for the release and closure of fire doors on hold-open devices may be more readily apparent. To discuss unique conditions that are not so cut and dry, contact DEB.

### **☒ VCCO Update**



Congratulations to **Juan Rodriguez** with the College of William & Mary who recently passed the Virginia Construction Contracting Officer (VCCO) certification examination.

**Virginia Construction Contracting Officers** are state and local government employees who have completed the necessary training and successfully passed a multi-part examination focused on state procurement law, policy and procedures. VCCOs perform several key functions in delivering projects including the procurement of professional services; the receipt, opening and review of bids; and in some cases the approval of CO-8 forms for recommending the award of construction contracts.



## ☑ DEB Forms Update

The following revised DEB forms are now available on the [DGS Forms Center](#):

Form #	Form Name	Rev. Date (mm/yy)
<a href="#">DGS-30-000</a>	DEB Forms Master List	11/19

The following forms have been removed from the Forms Center as "self bonding" is a limited use program. If these forms are needed, send a request to [capout@dgs.virginia.gov](mailto:capout@dgs.virginia.gov) for copies:



Form #	Form Name
DGS-30-166	Transmittal for the Commonwealth's Self-Bonding Program
DGS-30-174	Additional Financial and Insurance Requirements for Self-Bonding

## ☑ New Services for CWM and VIMS

DEB recently met with representatives from the College of William & Mary (CWM) and the Virginia Institute of Marine Science (VIMS) to discuss DEB's building official, code review and inspection services for upcoming projects. DEB is now serving as the Building Official for these two institutions' projects which do not yet have a Building Permit.

The DEB Lead Reviewer assigned to coordinate CWM project reviews and inspections is Mary Hom; the DEB Lead Reviewer for VIMS projects is Patrick McDonough.



## ☑ DEB Welcomes Electrical Reviewer, Troy R. Knapp, PE



DEB welcomes Troy R. Knapp, PE, who recently joined DEB as a State Review Electrical Engineer. Troy is a self-proclaimed "Michigander" from Greenville Michigan, near Grand Rapids. He earned his Bachelor of Science degree in Electrical Engineering from Michigan Technological University located in the Upper Peninsula (UP) of Michigan. Troy has 20 years of consulting experience with several firms in the Tidewater Virginia area and 13 years of experience as the Electrical Plans Reviewer for the College of William and Mary. He enjoys riding motorcycles, photography, and travel.

## ☑ CPSM Update

The planned November release of Revision 1 of the 2019 Edition of the **Construction and Professional Services Manual (CPSM)** has been deferred until December to incorporate provisions related to the implementation of Executive Order 45 (EO-45).

**EO-45, Floodplain Management Requirements and Planning Standards for State Agencies, Institutions and Property** became effective November 15, 2019.

The complete text (9 pages) of EO-45 is available on the Governor of Virginia's website: [EO-45](#)

