DEPARTMENT OF GENERAL SERVICES
BUREAU OF CAPITAL OUTLAY MANAGEMENT
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BCOM Newsletter

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Firestopping Requirements for Through-Penetration Systems

The requirements for firestopping are addressed in Chapter 7 Fire and Smoke Protection Features of the *Virginia Construction Code* (VCC). Compartmentalization and confinement of fire are important passive methods which help "to safeguard against the spread of fire and smoke within a building" (VCC 701.1 Scope).

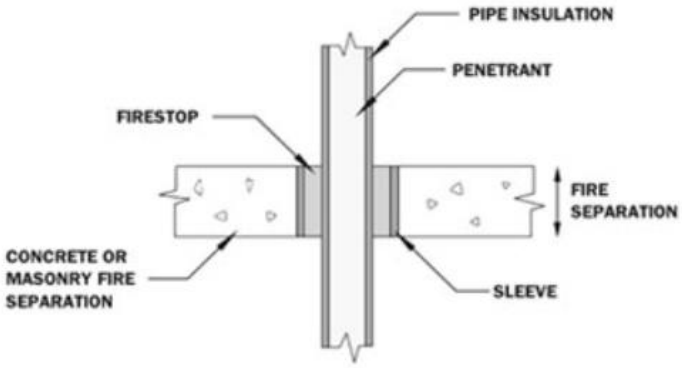
Properly installed firestopping is a critical component in maintaining the integrity of fire-resistance rated wall and floor/ceiling construction. *Virginia Construction Code* Section 714.3.1.2 for walls and Section 714.4.1.1.2 for horizontal assemblies (floors/ceiling assemblies) require that through-penetration firestop systems be tested per ASTM E 814 or UL 1479 with a minimum positive pressure differential of 0.01 inches of water. Such systems shall provide "F" (fire) ratings which are not less than the fire resistance rating of the assemblies penetrated. ASTM E 814 and UL 1479 require the test assembly to include all through-penetrating items, which shall be arranged as intended for the complete system listing. This also includes all "required supports" and any sleeves.

For floor/ceiling assembly penetrations, T (temperature) ratings which are not less than the fire resistance rating of the assemblies penetrated are also required in addition to F ratings for some conditions. VCC Section 714.4.1.1.2 describes where T ratings are required.

For testing agency listings which are provided in the construction documents as a "basis of design" (subject to the use of approved equals) or which are provided by the contractor in shop drawings, the listing documentation with drawings and instructions shall be copied from testing agency resources rather than from copies provided by the manufacturers. This is not only to comply with *Construction & Professional Services Manual* procurement requirements, but also because BCOM has had experiences where copies of test assemblies provided by the manufacturers deviate slightly from the testing agency copies, causing problems during reviews and construction inspections.

The through-penetrating items installed in the field shall comply with the tested through-penetration firestop systems in all respects, including penetrating materials, such as pipes, conduits, cables, insulation, etc., as well as percent fill and annular space limitations. The number of penetrating items is also limited by the tested assemblies. Many assemblies permit only one penetrating item.

Sleeves shall be permitted only as indicated in the tested assemblies. In addition to the test assembly documentation, VCC Section 714.2 also describes some limitations on the use of sleeves and insulation. For buildings with fire resistance rated walls and/or floors, the MEP specifications need to be edited so that the contractor knows under which conditions sleeves are permitted.



Most commercial specification writing systems include boilerplate requirements in the MEP specification sections which tell the contractor where and how sleeves for penetrations of various floor and wall types are to be provided. For example, in Part 3 of the specifications, items A, B, and C may include prescriptive requirements for sleeves which may be inconsistent with tested through-penetration systems. As a caveat to the contractor, one editing approach could be to add an item D which (1) says that items A, B, and C do not apply to penetrations of fire resistance rated floors and walls and (2) specifies penetrations of fire resistance rated floors and walls to comply with contract document requirements for such penetrations.

Regarding support, several tested through-penetration firestop systems have requirements that the penetrating items be "rigidly supported" on one or both sides of the penetrated wall or floor. For UL tested assemblies, UL Guide XHEZ indicates that "the support system should be designed based on the premise that the firestop system provides no support". For instance, the firestop system cannot be used to keep the penetrating items from moving within the assembly or maintaining the required annular space distances, both of which might cause unprotected conditions.

Most of the UL tested assemblies do not describe how to provide the rigid support. The construction document instructions for providing the rigid support could be part of the construction document design, or the construction documents could be written so that the contractor is required to submit shop drawings to the A/E showing how the rigid support will be provided for the various tested through-penetration firestop systems. To accommodate support, the A/E needs to be aware of the conditions on both sides of the penetrated assemblies.

The A/E also needs to be aware of the conditions on both sides of the penetrated assemblies for conditions where T ratings require a penetrating element to be wrapped with fire rated materials above or below the floor. Most T rated assemblies describe where the wrap is required to be located. Among the issues are conditions for example where conduits penetrate a floor and the wrap is required to extend for "X" inches above the floor. This means that the connected equipment, such as a circuit breaker panel, shall be located at least "X" inches above the floor. Wrapped penetrating items which are located in occupied spaces can also be problematic.

Finally, VCC Section 714 also describes prescriptive protection methods for some through-penetration conditions. If it is the A/E's intent to allow such methods, the construction documents shall provide instructions, details, etc. which comply with the language used in the VCC.

There are also firestopping requirements for nonfire-resistance-rated floor assemblies such as IIB, IIIB, and VB construction. In these conditions the code does not require rated or tested assemblies, but refers to approved materials that resist the passage of smoke and fire. An example of an approved material would be mineral wool installed in the openings.

A well detailed set of construction documents includes firestopping details for each type of material being penetrated and each type of geometry such as round/oval, rectangular, or multiple openings. ❑

The Importance of Project Codes

Depending on its cost, size, and scope, a project may be funded in an agency's operating or capital budget. Many factors affect how a capital outlay project is funded and administered.

Capital projects include, but are not limited to, the following:

- Acquisition of real property;
- New construction projects with a total project cost exceeding $1 million for state agencies or $2 million for institutions of higher education;
- Improvements, renovations, repairs, replacement, maintenance, or combination projects for a single building with a total project cost exceeding $1 million or $2 million for institutions of higher education; and
- Umbrella projects.

Projects funded in the capital budget may stand alone or may be grouped together (e.g., in a bond pool).

Capital Outlay projects are listed in the *Appropriations Act*, meaning that their funding is approved by the Virginia General Assembly. Non-capital outlay projects are projects funded by alternate sources, and are generally smaller in size and extent. Example "non-cap" projects could include building planning, small renovations, roof replacements, maintenance reserve repairs, etc.

Regardless of the type of project, every project is assigned a Project Code. All project codes are unique to a specific project – no two project codes are the same. This code stays with the project for its entire life – from its initiation as an approved project through its design, construction, use and occupancy, through project closeout. Every project has a name associated with the Project Code, but names can, and do, change through the life of the project. For example, on a large Capital Outlay project, an agency might change the name of a project to honor the generosity of a donor.

All Project Codes follow this basic 11-character format: aaa - ppppp - sss, where:

- "aaa" represents the 3-character **Agency Code**
- "ppppp" represents the 5-character **Project Number**, and
- "sss" represents the 3-character **Subproject Number**.

The complete 11-character code is referred to collectively as the **Project Code**.

Capital Outlay Project Codes

Capital Outlay projects are assigned a 5-digit Project Number within the *Appropriations Act*, or subsequent to the appropriation by DPB. The complete Project Code for a capital project contains 11 characters, for example: 236-16602-000. In this example:

236 is the Agency Code for Virginia Commonwealth University (VCU). Each agency has a unique Agency Code assigned by the Department of Accounts.

16602 was the Project Number assigned to the *Hibbs Building Renovation Project* in the Appropriation Act.

000 is the Subproject Number placeholder. Subproject "000" should always represent the complete project. Certain projects are divided into multiple Subprojects. The Hibbs Project was divided into two subprojects. Subproject 001 was for *Demolition and Asbestos Removal* and Subproject 002 was for the *Building Renovation*, proper. Subprojects are typically used when projects are phased, divided into multiple contracts, or have multiple locations.

Non-Capital Outlay Project Codes

Non-Capital Outlay projects are assigned a unique Project Code by the Bureau of Capital Outlay Management (BCOM). The complete Project Code for non-cap projects still follows the basic 11 character format, but with a key difference as explained below. Here are three recent examples of VCU non-cap Project Codes:

236-A7236-001 was assigned to the *VCU President's Forum Stage* for this one-day event
236-A7236-002 was assigned to the *Siegel Center Chiller Replacement* project
236-A7236-003 was assigned to the *Smith Building Cold Room* project

236 still represents the Agency Code for Virginia Commonwealth University.

A7236 is a base project number assigned by BCOM to VCU non-capital projects initiated in Calendar Year 2017. The "A7" merely substitutes for the year "17" so as to not conflict with capital project numbers which begin with the number "1", as all current capital projects do.

The non-cap subproject numbers such as 001, 002, and 003 are just assigned sequentially as the next project number is needed. For non-cap projects, each complete 11-character code represents a unique project, whereas for capital projects, the subproject codes identify subprojects funded within the same overall (5-digit + "000") master project code.

Why is this Identification Important

It is critical to include the complete Project Code on ALL documents and correspondence. This includes all drawings, project manuals, meeting minutes, emails and other correspondence, contract forms, shop drawings and all submittals made during design and construction. This is important for tracking the project from both the technical and financial perspectives from initiation through closeout. In the case of litigation or other types of legal proceedings, all documentation presented to a Virginia court must be identified by Project Code in order to be considered admissible. ❑