

SECTION 27 05 28

COMMON WORK - SLEEVES, PENETRATIONS, AND FIRESTOPPING

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes specific requirements for sleeves and penetrations common to the communications systems.

1.02 RELATED SECTIONS

- A. The firestopping requirements of this Section are additional to, different from, or otherwise supplement the Section(s) in Division 7 which pertain(s) to thermal protection systems, such as firestopping and fire-resistant materials. The applicable requirements of these Section(s) shall serve as the basis for the requirements of this Section, and are incorporated by reference into this Section.

1.03 SUBMITTALS

- A. Provide the following per the criteria set forth in Submittals in Division 27 Specification Section *Basic Communications Requirements*:
 - 1. Product Data
 - a. Submit locations where new penetrations are required in existing structural concrete walls, parapets, and suspended slabs.
 - b. Submit locations where new penetrations are required in existing roofs and roofing materials.

1.04 DEFINITIONS

- A. EMT: Electrical Metallic Tubing
- B. RMC: Rigid Metal Conduit

PART 2 - MATERIALS

2.01 GENERAL

- A. Part Numbers: Refer to the Equipment Schedule(s) for specific manufacturers and part numbers. If no part number is provided, then any part meeting the manufacturer and requirements specified is acceptable.

2.02 SLEEVES

- A. Provide sleeves for all locations where cable must pass-through building barriers such as walls, floors or foundations.
- B. Sleeves consist of Conduit Section(s), Cable Pathway Wall Penetration Sleeve Device(s), Cable Pathway Smoke and Acoustical Device(s), Cable Pathway Firestopping Device(s) or Fire Rated Floor Penetration Assemblies passing through a penetration/opening in a barrier or floor.
- C. Conduit sections used for sleeves shall be per the requirements of Division 27 Specification Section *Electrical Technology - Conduit and Boxes*.
- D. Conduit Sleeves shall be:
 - 1. Cast-in-place: Provide RMC conduit sections unless otherwise shown on the Drawings
 - 2. Cored: Provide EMT conduit sections unless otherwise shown on the Drawings

3. Non fire-rated, non-smoke-rated, non-acoustical-rated barriers:
 - a. Provide EMT conduit sections unless otherwise shown on the Drawings
- E. Cable Tray Wall Penetration Sleeve Devices shall be:
1. Where Cable Tray is shown passing through non fire-rated, non-smoke-rated, non-acoustical-rated barriers provide devices pre-manufactured and designed to allow cable tray to pass through them. The Contractor shall ensure that the devices provided are sized appropriately to and compatible with the cable tray served, in accordance with the device manufacturer's recommendations. The pathway shall be UL classified and use shall be per local codes. Sleeves shall be:
 - a. Superior
 - b. Cablofil - PW Industries
 - c. Or approved equal
- F. Conduit sleeves that route workstation cabling into a communications room (through walls, floors, or ceilings) shall be a minimum of 2" in (4" for floors) diameter and properly supported per standards cited in the Regulatory References section of this document. Any exceptions from this rule must be approved from DoTS PM.
- G. Smoke and Acoustic Pathway Devices/Sleeves shall be:
1. For non-fire-rated barriers/partitions that are smoke rated or where there is an acoustical transmission concern, other than floors: Cable Pathway Smoke and Acoustic Pathway Device/Sleeve.
 - a. Devices shall be pre-manufactured enclosed Smoke and Acoustic Pathway Devices/Sleeves with a built-in air leakage and sound transmission system sufficient to maintain the ratings of the barrier being penetrated. The self-contained system shall automatically adjust to the installed cable loading and shall permit cables to be installed, removed, or maintained without the need to remove or reinstall materials. The pathway shall be UL classified, shall be L Ratings Tested According to Air Leakage Test Procedure as outlined in UL1479 without a Fire Test, Plenum tested to UL2043 in Horizontal Installations Only and Sound Transmission Classification (STC) tested per ASTM E90. Use shall be per local codes. Sleeves shall be:
 - 1) Specified Technologies, Inc.: EZ-Path Smoke and Acoustic Pathway Device
 - 2) Or approved equal
 2. For non-fire-rated barriers/partitions that are smoke rated or where there is an acoustical transmission concern, other than floors:
 - a. Provide EMT conduit sections with firestopping material, unless otherwise shown on the drawings
- H. Fire-rated Sleeves shall be:
1. For barriers other than floors: Cable Pathway Firestopping Device
 - a. Devices shall be pre-manufactured enclosed fire rated pathway devices with a built-in fire sealing system sufficient to maintain the hourly rating of the barrier being penetrated. The self-contained sealing system shall automatically adjust to the installed cable loading and shall permit cables to be installed, removed, or maintained without the need to remove or reinstall firestop materials. The pathway shall be UL classified and FM/Systems approved, and shall be examined and tested to the requirements of ASTM E814 (UL1479). Use shall be per local codes. Sleeves shall be:
 - 1) Specified Technologies, Inc.: EZ-Path

- 2) Wiremold: Flame Stopper
 - 3) Or approved equal
- b. For Cable Pathway Firestopping Devices sizes 3-inch and larger provide a Radius Drop Guide, also known as a Radius Control Module, for each device.
2. For Floors: Fire Rated Floor Penetration Assembly
- a. Devices shall be pre-manufactured as a bolt-in solution for high volume riser cable applications through floors. Devices shall be manufactured in banks of four modules and be provided as complete kits (including panel clips, brackets, spacer bars, etc.). Devices shall be available with or without pathway firestop panels. Devices shall include pathway firestop panels where specified in Drawings. Devices without pathway firestop panels shall include blank firestop filler panels. Assemblies shall be:
 - 1) Specified Technologies, Inc.: EZ-Path Series 44+ Modular Floor Grid System

2.03 FIRESTOPPING

A. General:

1. Provide firestopping material for all through and membrane penetrations of fire-rated barriers.
2. Firestopping material used to seal open penetrations through which cable passes shall be re-usable/re-enterable.
3. Provide through-penetration firestop products that are compatible with one another, with the substrates forming openings, and with the penetrating items.
4. Provide firestop products that upon curing do not re-emulsify, dissolve, leach, breakdown or otherwise deteriorate over time from exposure to atmospheric moisture, sweating pipes, ponding water or other forms of moisture characteristic during and after construction.
5. Provide firestop sealants sufficiently flexible to accommodate motion such as pipe vibration, water hammer, thermal expansion and other normal building movement without damage to the seal.
6. Materials or sealants shall not contain flammable solvents or sodium silicate.
7. Products specified in this Section shall be UL Listed and Labeled.

B. Firestopping Materials

1. Material shall conform to both Flame (F) and Temperature (T) ratings as required by local building codes and as tested by nationally accepted test agencies per ASTM E814 or UL 1479 fire test in a configuration that is representative of the actual field conditions. Materials shall be complete with necessary accessory materials, as applicable, for complete UL listed and approved assemblies.
 - a. Firestopping materials shall be manufactured by:
 - 1) Specified Technologies. Inc.
 - 2) Hilti
 - 3) Or approved equal

PART 3 - EXECUTION

3.01 GENERAL

- A. Work shall comply with the Governing Requirements as defined in Division 27 Specification Section *Basic Communications Requirements*. Governing Requirements of particular relevance to this Section include, but are not limited to:
1. NEC: National Electrical Code (NFPA Article 70)
 2. TIA/EIA 569: Commercial Building Standard for Telecommunication Pathways and Spaces

B. Installation shall be such that communications circuits, when installed in the pathways and penetrations specified herein, are able to fully comply with the following:

1. TIA/EIA 568: Commercial Building Telecommunications Cabling Standard

3.02 SLEEVES

- A. Provide sleeves for all locations where free hung cable must pass through building barriers such as walls, floors or foundations.
- B. The Contractor shall provide all cutting, rough patching and finish patching as required for the installation of sleeves, and shall provide all penetrations, including core drilling, roto-hammering, etc. as required.
- C. Sleeves shall be sealed and firestopped (as appropriate to the fire rating of the barrier) between the conduit section (or cable pathway firestopping device) and the barrier penetration/opening.
- D. Sleeve size shown on the Drawings reflects the size of the conduit or device passing through, not the size of the penetration/opening.
- E. Conduit section sleeves:
1. Conduits shall be installed per the requirements of Division 27 Specification Section *Electrical Technology - Conduit and Boxes*.
 2. Conduit sections shall be installed complete with insulated throat bushings.
 3. Conduit Sleeve Sizing:
 - a. Unless otherwise noted on the Drawings, sleeve size through floors shall be 4-inch diameter.
 - b. Unless otherwise noted on the Drawings or specified herein, sleeves shall be sized as follows:
 - 1) Where cable trays must pass through a non-fire rated barrier. Transition from cable tray to Conduit Sleeve(s) at non-fire rated barriers.
 - a) Provide sufficient quantity of conduit sleeves such that the combined useable cross sectional area of the devices matches or exceeds the cross sectional area of cable tray to be served.
 - 2) Where free hung cables must pass through non-fire rated barriers.
 - a) Provide sufficient quantity of conduit sleeves according to the quantity and outside diameter of the cable(s) they are to support per NEC fill ratios and TIA/EIA 569 cable capacity standards, plus an additional 25 percent for future expansion.
- F. Smoke and Acoustic Pathway Device/Sleeve:
1. Provide Smoke and Acoustic Pathway Devices for locations where cable will penetrate through a non-fire rated barrier that is smoke rated or where there is an acoustical transmission concern such as in locations where adjacent rooms have no ceilings. Refer to architectural drawings for wall and ceiling type information.
 - a. Unless otherwise noted on the Drawings or specified herein, Pathway Device/Sleeve shall be sized as follows:
 - 1) Where cable trays must pass through a non-fire rated barrier that is smoke rated or where there is an acoustical transmission concern transition from cable tray to Smoke and Acoustic Pathway Device(s)/Sleeve(s).

- a) Provide sufficient quantity of Smoke and Acoustic Pathway Devices/Sleeves such that the combined useable cross sectional area of the devices matches or exceeds the cross sectional area of cable tray to be served.
 - 2) Where free hung cables must pass through a non-fire rated barrier that is smoke rated or where there is an acoustical transmission concern:
 - a) Provide sufficient quantity of Smoke and Acoustic Pathway Devices/Sleeves according to the quantity and outside diameter of the cable(s) they are to support per NEC fill ratios and TIA/EIA 569 cable capacity standards, plus an additional 25 percent for future expansion.
- G. Cable Pathway Firestopping Device:
- 1. Where cable trays must pass through fire rated barriers. Transition from cable tray to Cable Pathway Firestopping Devices at fire rated barriers.
 - a. Provide sufficient quantity of cable pathway firestopping devices such that the combined useable cross sectional area of the devices matches or exceeds the cross sectional area of cable tray to be served.
 - 2. Where free hung cables must pass through fire rated barriers.
 - a. Provide sufficient quantity of cable pathway firestopping devices such that the combined useable capacity of the devices is a minimum of 150% of the cable to be served.
- H. Fire Rated Floor Penetration Assembly:
- 1. Provide where shown on Drawings.
 - 2. Install strictly in accordance with Manufacturer's installation guide and applicable codes.

3.03 PENETRATIONS

- A. Properly size and locate penetrations required as construction progresses. For new concrete or masonry the Contractor shall coordinate, locate and provide required openings prior to the pouring of concrete or construction of masonry.
- B. Penetration of concrete and structural elements shall be avoided where possible. Where not possible, obtain written approval from the Structural Engineer/Architect prior to penetration. Such penetrations shall be performed in a manner that will not reduce structural element load-carrying capacity or load-deflection ratio.
- C. Penetrations shall be performed by workers qualified and skilled in the trades involved.
- D. Penetrations (through and membrane) of fire rated barriers shall be firestopped and sealed. The fire rating of the barrier shall be strictly maintained.
- E. Penetrations shall not be exposed on the exterior or in occupied spaces in a manner that would, in the Engineer's opinion, reduce the aesthetic qualities of the structure or result in visual evidence of penetration and patching.
- F. Penetrations shall be constructed using methods least likely to damage elements to be retained or adjoining construction.
 - 1. Provide temporary support for the work to be penetrated.
 - 2. In general, where cutting is required, use hand or small power tools designed for sawing or grinding, not for hammering or chopping. Cut holes and slots neatly to required size with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

- C. The fire rating of all penetrated fire barriers shall be strictly maintained. All through penetrations as well as membrane penetrations of fire rated barriers shall be firestopped and sealed.
- D. Installation shall be performed in strict accordance with manufacturer's detailed installation procedures. Prepare surfaces per manufacturer's instructions. After installation, clean all surfaces adjacent to sealed openings to be free of excess firestopping materials and soiling.
- E. Personnel installing firestopping products shall be certified by the Manufacturer to install such products.
- F. Install firestopping in open penetrations and in the annular space of penetrations for fire rated barriers.
- G. Seal all openings or voids made by penetrations to ensure an air and water resistant seal.
- H. Install firestopping such that the performance and effectiveness of other thermal and fire protective devices (such as fire/smoke dampers) in the area are fully maintained.
- I. Install putty pads in conjunction with metallic boxes where size or aggregate area of such boxes exceed limits established by the governing requirements.
- J. Protect materials from damage on surfaces subjected to traffic.
- K. Apply a suitable bond-breaker to prevent three-sided adhesion in applications where this condition might occur such as the intersection of a gypsum wallboard/steel stud wall to floor or roof assembly where the joint is backed by a steel ceiling runner or track.
- L. Where joint application is exposed to the elements, fire resistive joint sealant must be approved by the manufacturer for use in exterior applications and shall comply with ASTM C-920.
- M. Do not install firestop products when ambient or substrate temperatures are outside limitations recommended by the manufacturer.
- N. Do not install firestop products when substrates are wet due to rain, frost, condensation or other causes.
- O. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing openings.
- P. Firestopping devices shall not act as supports.

END OF SECTION 27 05 28