The following information shall be included in specifications prepared for use on all University of Cincinnati construction and renovation projects. This information is supplemental and not intended to be a complete specification.

**GENERAL STANDARDS**

**General Criteria**

**PVC** (polyvinyl chloride, rigid nonmetallic conduit): Direct burial and concrete encased.

**EMT** (electrical metallic tubing): Interior locations where not subject to physical damage; homeruns where additional future circuits are anticipated.

**IMC** (intermediate metal conduit): Not for use in earth or embedded in concrete.

**RGS** (rigid metallic conduit): All raceways in the Power Plant, utility tunnels, and in areas subject to physical damage.

**FMC** (flexible metal conduit): Final connections to devices and equipment; use liquid-tight type for damp locations.

**IAC** (interlocked armored cable): Medium voltage cable rated for use in cable trays. Low-voltage service conductors to buildings.

**MC** (metal-clad) and **AC** (armored cable): Feeders and risers between busways, transformers, and distribution boards. Power and lighting feeders and branch circuits. The following are locations and conditions of concern where type MC or AC is restricted and allowed only with prior coordination and approval from University of Cincinnati Construction Management (CM):

- Homeruns
- In-slab wiring
- Underground wiring
- Within exposed hallway ceiling spaces
- In spaces above hard ceilings
- Wiring from surface metal raceways to panelboards
- Wiring in atriums and similar areas

**SMR** (surface metal raceway): Laboratory areas and similar applications.

**Wireways and Cable Trays**: Medium voltage and other special applications and special low-voltage applications approved by UC CM.

**Other Systems** - Other systems may be used with coordination and approval by UC CM. Supplement all raceways with equipment grounding conductors. Provide a raceway system for connection to campus distribution systems in the utility tunnels. This system may utilize either cable tray or conduit with large radius bends. If conduit is used, most buildings will require one 4-inch for telephone; one 3-inch for television systems; one 3-inch for fire alarm, clock, and program systems; and one 4-inch for computer communications.

**Design Evaluation**
The following information is required to evaluate the design:

**Schematic Design Phase**
- Description of raceway systems required
- Outline specifications

**Design Development Phase**
- Location of exterior duct banks, cable trays, SMR, and other special requirements
- Draft specifications

**Construction Documents Phase**
- Completed site plans showing exterior conduit layout
- Drawings showing cable tray and wireway locations
- Section cuts for underground conduit and duct banks
- Section cuts above corridors, hallways, and congested areas showing coordination with equipment from other trades
- Details for special applications, when required
- Completed specifications

**Product Coordination**
- Provide industry standard submittal requirements.
- Provide support information for cable trays and wireways.

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**PRODUCT STANDARDS**

**Material Requirements**
Use industry standards for raceway systems specified and comply with the following additional requirements:

- PVC: schedule 80 only.
- Rigid metallic conduit shall be shall be hot-dipped galvanized inside and outside.
- EMT: indenter fittings are not acceptable.
- Use insulated throat connectors or insulated bushings.
- SMR shall be formed steel type. Plastic composition is not acceptable.
- Cable trays for medium voltage applications shall be ventilated, trough type. Side rails shall be rolled, non-cutting edges.
- Rigid threaded aluminum conduit to be used when ran exposed on roofs or outside areas. Aluminum conduit should not be used to underground or have ground contact.

**A/V Requirements**
TV monitors and cameras use stiff coaxial cable, so outlets shall be 4-inch by 6 ¾-inch boxes, 2 ½ inches deep, with a two gang plaster ring raised ¾ inch. (Steel City #H2-BD-3/4 1 and #2-GC or equal.) A 1-inch conduit shall extend from the end of the box to the communications tray.
EXECUTION STANDARDS

Construction & Installation

Building Penetration - For raceways that penetrate the building exterior, the section of the raceway within the wall shall be sealed inside and around the raceway exterior using approved sealant. Where portions of an interior raceway system are exposed to widely different temperatures, as in cold rooms, circulation of air from a warmer to a colder section through the raceway shall be prohibited. This sealing must also be done at penetrations between normal and controlled-temperature laboratories.

Outlets - Outlets intended for use by portable equipment shall be 18 inches up from the floor. Where conduits feeding these outlets extend up into a false ceiling area and then run 20 feet or more to the cable tray, install a feed-through junction box immediately above the outlet in the false ceiling area.

Connections - RGS and IMC connections shall be watertight.

Conduit Installation - Generally, conceal raceway systems. Exposed conduits are permitted only in unfinished areas, SMR systems in laboratory areas, and where approved by the Engineer.

Roof Penetrations - Raceways through the roof shall be coordinated with the Engineer. Engineer to provide roof penetration details.

Expansion Joints - Provide expansion fittings for conduits passing through building construction expansion joints.

Suspension Systems - Ceiling suspension systems and mechanical ductwork or equipment shall not be used for raceway system support.

Cable Tray Installation

For medium-voltage systems, cable trays shall hold only one cable circuit each. Exceptions are allowed on a case-by-case basis and only with the approval of UC Construction Management. Tray-dividing barriers shall be provided when more than one cable circuit is installed in the same tray. This barrier shall be at least as tall as the medium-voltage cable diameter and securely fastened to the tray.

Cable trays shall be mounted with the bottom of the tray approximately 6 inches above suspended ceilings. Maintain 10 inches minimum vertical spacing between multiple cable trays.

Coordinate installation of cable trays with mechanical ductwork, piping, structural members, fireproofing, and sprinkler system piping so that the tray remains accessible after installation.

Cable trays shall not penetrate smoke- and fire-rated walls and floors. Use conduit sleeves for penetrations. Seal all openings in walls and floors around raceways with an approved product to maintain smoke and fire integrity and watertightness.

Provide an appropriately sized ground cable the length of the tray. Bond to every tray section.

Provide a low-voltage cable tray distribution system for use by all low-voltage systems except fire alarm and nurse call on each floor. In general, cable trays shall be installed in building corridors above suspended ceilings except in cases where the plenum space is used for air handling. In the latter case, consider installing the cable tray below the finished ceiling.

--- END OF SECTION ---