SECTION 16110 (26 05 33)

RACEWAYS

Part 1 -Design Directives

All raceways shall be installed in a neat and workmanlike manner. This implies that the raceways shall be plumb and square with all building surfaces and finishes. Keep raceways at least 12 inches away from parallel runs of flues and steam or hot water piping. Raceways shall be securely fastened to the building structure in accordance with section 16190 (26 05 29). It shall be the responsibility of the architect and engineer to advocate for the College so that adequate space is allotted for the installation of raceways both vertically and horizontally throughout the building. All raceways must be coordinated with other equipment especially ductwork, sprinkler piping and major mechanical components. Specification statements to the effect that the contractor is responsible for the coordination of all electrical equipment with that of the other trades are unacceptable. The engineer and architect must resolve the adequate space issues during the design phase so that unacceptable compromises with respect to equipment access and space for future expansion do not arise during construction. The owner will closely monitor this process and expects a report from the engineer that details the steps taken to insure adequate coordination of MEP systems. Cross sections of congested areas shall be prepared to show that coordination issues have been addressed.

- No raceways shall be installed in poured floor slabs except under the base slab where rigid nonmetallic conduit may be used.
- When PVC is installed under the base slab all sweeps and through slab extensions shall be rigid metal conduit (ferrous) only with a non-corrosive painted coating where the conduit emerges from concrete.
- The minimum size of conduit raceway shall be 3/4". Special permission is sometimes granted by Dartmouth Engineering Services for the use of 1/2" in control or security system wiring. This type of request may only be made in the design phase of the project. The Dartmouth College Variance Request form shall be used for this type of request.
- In offices, lounges, conference rooms, and classrooms exposed raceways, when required, shall be conduit. ". Special permission is sometimes granted by Dartmouth Engineering Services for the use of Surface Metal Raceways. This type of request may only be made in the design phase of the project. The Dartmouth College Variance Request form shall be used for this type of request.
- The total number of bends between any two pull-points of a raceway system shall not exceed 270 degrees.
- Panelboards installed in recessed walls and/or where conduits rise through inaccessible ceilings, shall have spare conduits stubbed out to an accessible location.

Part 2 -Products

Permissible types of raceways for use at Dartmouth College

- Rigid Metal Conduit (ferrous)
- Rigid Non Metallic Conduit (PVC)
- Electrical Metallic Tubing (EMT)
- Flexible Metal Conduit
- Liquid-Tite Flexible Conduit
- Non-Metallic Liquid-Tite Flexible Conduit
- Surface Metal Raceways
- Over-Floor Raceway

Part 3 -Execution

Rigid Metal Conduit (ferrous)
Aluminum rigid metal conduit shall not be used.

Rigid metal conduit (ferrous) is required in mechanical rooms up to four feet above the finished floor. These raceways may be converted to EMT at elevations above four feet.

Exception - EMT is allowed in small electrical and mechanical rooms
Exception – EMT is allowed for larger conduit sizes (over 2").

Conduits that pass though drilled holes in walls or foundations of a building below grade shall be rigid and include segmented link seals at exterior building penetrations. Conduits that penetrate poured or block walls above grade shall be sleeved with galvanized sheet metal and fire sealed in accordance with standard fire sealing practices.

The rigid metal sweeps and riser extensions of under-slab raceways shall be PVC coated or protected by corrosion tape such as 3M Scotchrap 50 or approved equal.

Rigid metal conduit (ferrous) shall be used to enclose all medium voltage conductors within buildings. Exception - Medium voltage cable may be installed in cable tray and wrapped with fire-wrap in medium voltage electrical rooms.

Rigid Non Metallic Conduit (PVC)

Rigid Non-metallic conduit (schedule 40) shall be used for enclosing all grounding electrode conductors throughout the building.

Rigid Non-metallic conduit (schedule 40) shall be used for all duct banks and raceways installed under the base slab of buildings.

Rigid Non-metallic conduit (schedule 80) shall be used when direct buried to serve walkway and parking lot lighting or where exposed to physical damage. The minimum size of these raceways shall be 1 inch. Minimum depth below finished grade shall be 24 inches.

Rigid Non-metallic conduit shall be assembled using cleaner, primer and cement.

Electrical Metallic Tubing (EMT)

EMT shall be used for all feeder and branch circuit wiring in power, data, phone, fire alarm and security systems throughout all buildings. MC Cable with stranded conductors shall only be allowed for use as fixture whips in lengths not to exceed 6 feet.

EMT fittings shall be constructed of steel and be either set screw or compression type. Die cast fittings are not allowed under any circumstances.

One-hole straps shall be of heavy-duty construction.

Flexible Metal Conduit

Flexible metal conduit shall be used in lengths up to 6 feet where flexibility is required.

Flexible metal conduit may be used for connection of fixtures above suspended ceilings. Each fixture shall be served by a junction box from the EMT raceway system. Daisy chaining from fixture to fixture is allowed only when no more than two cables are entered into a single fixture.

Anti-short bushings shall be installed in all flexible metal conduits at each connector.

A separate equipment-grounding conductor shall be installed with the phase or control conductors in all flexible metal conduits regardless of the rating of the circuit.

Liquid-tight Flexible Metal and Non-Metallic Conduit

Liquid-tight flexible metal and non-metallic conduit shall be used in lengths up to 6 feet where moisture resistance and flexibility are required. Motors, motor operated valves, transformers and other electrical apparatus installed in mechanical spaces shall be connected with liquid-tight.

Non-Metallic Liquid-Tite Flexible Conduit shall be used in corrosive environments.

A separate equipment-grounding conductor shall be installed with the phase conductors in all liquid-tight flexible metal and non-metallic conduits regardless of the rating of the circuit.

Surface Metal Raceways

Wiremold and Hubbell brand surface metal raceway are the only approved product of this type.

Wiremold surface metal raceway may be used when no other alternative is available for recessing electric, data and telephone circuits and equipment. When power and data/telephone are installed in the same surface metal raceway UL approved separation barriers shall be used.

Wiremold shall be installed neatly with all runs being square and plumb with building finishes.

Size 700 wiremold shall be the smallest surface metal raceway permissible.

Wiremold may be converted to other wiring systems only when connectors approved for the purpose are used.

Larger sizes may be used to enclose home runs for data and telephone cabling when the situation requires.

Wiremold 3000 and larger shall be used to provide power, data and phone to lab benches. All covers for size 3000 and larger Wiremold shall be cut to size using a tool manufactured for the purpose.