

# 260533S01 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

## Conduit and Raceway

### 1. CONDUIT AND RACEWAY

1. All EMT fittings used on conduit sizes 2 1/2" and smaller shall be compression type. No set screw type on 2 1/2" conduit and smaller.
2. All conduits in slab, under slab and in areas subject to abuse shall be rigid galvanized steel with threaded fittings or rigid PVC Conduit encased in 3" (minimum) and steel reinforced concrete with dye identification..
3. Intermediate grade conduit will not be acceptable in place of rigid conduit, however, it may be used in lieu of EMT if used throughout the project.
4. Rigid conduit shall be used in all exterior locations. Exception: with written permission from UK to install in exterior dry locations.
5. EMT, rigid conduit or surface metal raceway shall be used for all interior wiring. Aluminum or P.V.C. conduit will not be acceptable. Exception: PVC shall be used in caustic environments around chlorinated swimming pools, etc, with written exception from UK. Conduit run exposed below switch height shall be rigid steel.
6. Installed conduit and wiremold shall be left with pull wires.
7. Unbroken conduit runs shall not exceed 100 feet.
8. Size main trunk conduits and raceway for 90% fill, 100% fill being defined as the maximum allowable number of conductors per the National Electric Code (NEC).
9. Flexible conduit may be used for connection of equipment as permitted by the National Electrical Code. Flexible conduit may not be used in telephone, fire alarm, intercom, security and other communications systems.
10. Liquid tight flexible conduit shall be used instead of flexible conduit in locations where moisture is or could be present and in areas where there is a concern for air contamination from one area to an adjacent area.
11. Half inch (1/2") flexible may be used as drop to equipment connections.

### 2. CONDUIT LOCATION AND APPEARANCE

All raceway runs are shown diagrammatically to outline the general routing of the raceway. The installation shall be made to avoid interference with pipes, ducts, structural members, or other equipment. Should structural or other interferences prevent the installation of the raceways, or setting of boxes, cabinets, or the electrical equipment, as indicated on the drawings, deviations must be approved by the designated UK Project Manager prior to installation.

All conduit shall be concealed except in University of Kentucky designated mechanical rooms or unless otherwise noted or shown on drawings and approved by the UK CPMD Project Manager. Conduits which are not concealed must have written approval of the UK CPMD Project Manager prior to installation and shall be surface metal raceway (wiremold) unless otherwise noted in the approval. Do not install any conduits in elevator shafts, vertically or horizontally, unless this conduit is for use on elevator equipment only and is permitted by elevator codes.

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Exposed and concealed conduit shall be installed with runs parallel or perpendicular to walls, structural members on intersections of vertical planes and ceilings of the building structure, with right angle turns consisting of cast metal fittings or symmetrical bends.

Bends or offsets shall be avoided where possible but where necessary shall be made with approved conduit bending equipment manufactured especially for this purpose. Conduit or tubing which has been crushed or deformed in any way will not be accepted. Bends in metallic conduit shall be made while "cold" and in no case shall the conduits be heated. Conduits shall not be bent through more than 90 degrees. Any conduit which has been deformed, crushed, crimped, cracked, chipped, deformed or otherwise damaged will not be accepted.

All conduit shall be run continuous (up to 100 foot max.) between equipment with a minimum number of bends. Back-to-back 90 degree bends (180 degree change of direction) will not be acceptable.

Where conduits cross building expansion joints, the Contractor shall furnish and install a sliding expansion joint. Expansion joints shall be installed with bonding straps and clamps.

Conduits and wiremolds shall not be installed on the surface of ceiling tile without written approval of the UK CPMD Project Manager.

Do not use existing wall or floor penetrations for new installations unless it is clearly indicated that the existing penetration was intended to be used as a conduit, wire or cable penetration. Interpretation as to whether the penetration used is an acceptable wire or conduit chase is the Universities and when the structural integrity of the building is not in question, each installer should make their own penetration.

Do not alter the route of a conduit or wire run to utilize an existing penetration through any floor or wall.

All conduit joints shall be made tight and no running threads shall be permitted on threaded connections. Where metallic conduits are cut, the inside edge shall be reamed smooth to prevent injury to conductors. No kinked, clogged or deformed conduits shall be permitted on the job. During construction, all installed conduits shall be temporarily capped or corked.

All moisture proofing or other material for thread protection shall be removed from conduit threads prior to installation. No material of an insulating quality shall be used on the conduit threads on other fittings which will reduce the overall conductivity of the conduit system.

### 3. CONDUIT AND RACEWAY SUPPORT

Use conduit support devices as follows:

Area	Type of Conduit Support
Occupied Areas	One hole straps with no clamp bolt
Storage Room	One hole straps with no clamp bolt
Corridors	One hole straps with no clamp bolt
Unoccupied Areas	One hole clamp with clamp bolt
Above Ceilings	One hole clamp with clamp bolt or locking clamp
Mechanical Rooms	One hole clamp with clamp bolt

## **260533S01 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS**

### **Conduit and Raceway**

Raceways shall be securely and rigidly fastened in place at intervals specified here-in-before with wall brackets, conduit clamps, approved conduit hangers, or beam clamps. Fastenings shall be made by wood screws or screw type nails to wood; by toggle bolts on hollow masonry units; by expansion bolts on concrete or brick; by machine screws, welded threaded studs, heat treated or spring steel tension clamps on steel work. Bolts, screws, etc. used in securing the work shall be galvanized and of ample size for the service. Assembly bolts, nuts, washers, etc., shall be zinc or cadmium coated. Raceways shall NOT be welded to steel structures. Holes cut to a depth of more than 1 1/2 inches in reinforced concrete beams or to a depth of more than 3/4 inch in concrete joists shall avoid cutting the main reinforcing bars. In any case, no holes shall be cut or drilled in structural members for the passage of conduit without written permission from the University of Kentucky Physical Plant Manager of Utilities.

The use of perforated iron straps or wire for supporting conduits will not be permitted.

Where conduits are installed in groups on a common steel channel type support, each conduit shall be secured by Korn's, Unistrut, Kindorf clamps or equal.

Rigid conduits, where they enter panelboards, cabinets or pull boxes shall be secured in place by galvanized, double locknuts (one inside and one outside) and non-metallic bushings. All bushings shall have insulating material which has been permanently fastened to the fittings. Bushings for conduit 1 1/2 inches trade size and larger, which are used for power distribution, shall be complete with grounding lug and shall be bonded to the box by means of bare copper wire.

#### **4. CONDENSATION TRAPS**

All conduit, tubing, raceways, ducts and duct banks shall be installed in such manner as to insure against collection of trapped condensation and raceway runs shall be arranged so as to be devoid of traps.

Where conduits pass through exterior concrete walls of facilities, the entrance shall be made watertight. This shall be done by providing pipe sleeves in the concrete with 1/2" minimum entrance seal.

#### **5. BLOCKAGES**

All necessary precautions to prevent the lodgment of dirt, plaster, or trash in all conduit or tubing, fittings and boxes during construction shall be taken. All conduit in floors, concrete or below grade shall be swabbed free of debris or moisture before wires are pulled.