

SECTION 27 05 33
CONDUITS AND BACKBOXES FOR COMMUNICATIONS

Part 1 General

1.1 SUMMARY

1.1.1 This section governs the products and installation of conduits, backboxes, and additional accessories, connections, fittings, and equipment required for in-building communications systems, otherwise known as "Electrical Rough-In".

1.2 RELATED DOCUMENTS

1.2.1 The latest versions of the following codes, standards, and guidelines shall be followed. Bring to the immediate attention of CCS if construction documents or conditions differ from requirements in codes, standards, guidelines and specifications.

1.2.2 The following codes, as required by law:
Ontario Electrical Safety Code (OESC)
Ontario Building Code (OBC)

1.2.3 The following standards:
TIA-569-C Commercial Building Standard for Telecommunications Pathways and Spaces
NECA/BICSI-568-2006, Standard for Installing Commercial Building Telecommunications Cabling

1.2.4 The following best practices:
BICSI, Telecommunications Distribution Methods Manual (TDMM)
BICSI, Information Transport Systems Installation Methods Manual (ITSIMM)

Part 2 Product

2.1 General

2.1.1 Refer to Electrical specifications for additional information.

2.2 Conduit

2.2.1 Refer to execution section for sizing and installation requirements.

2.2.2 Refer to Electrical specifications for list of approved manufacturers.

2.3 Backboxes

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- 2.3.1 Typical communications backbox shall have the following minimum dimensions:
4-11/16" x 4-11/16" x 2-1/2"
- 2.3.2 Refer to drawings for plaster ring size/opening
- 2.3.3 For outlets in stud wall, Manufacturer shall be:
 - a) RACO 259 with a minimum of 3/8" deep raised cover or plaster ring
 - b) Randl T-55017 with appropriate extension or plaster ring
 - c) Or approved equivalent
- 2.3.4 For outlets in CMU wall, submit appropriate backbox for application.
- 2.4 Pullboxes
 - 2.4.1 Material shall be aluminum or steel.
 - 2.4.2 The following manufacturers are conditionally-approved:
Hoffman
Or approved equivalent
 - 2.4.3 Refer to execution section for sizing and installation requirements.

Part 3 Execution

- 3.1 Installation
 - 3.1.1 Install the raceway system, including wire and cable, terminal cabinets, outlet boxes, pull boxes, cover plates, conduit, sleeves and caps, cabletroughs, miscellaneous and positioning material to constitute a complete system. Co-ordinate with other services.
 - 3.1.2 Conduits shall not have more than 2-90 degree or equivalent bends in each run, with the bending radii as detailed in 3.3.6.
 - 3.1.3 Pull boxes shall be provided in each conduit run of over 100' (30 m) at not less than 100' (30 m) intervals.
 - 3.1.4 All material raceways, terminal boards, etc. shall be to the size and number shown and shall also suit the telephone company requirements. Submit all plans to telephone and interconnect company for verification.
 - 3.1.5 No pull elbows or LB's are permitted. Only sweep or 90 degree elbows shall be utilized.
 - 3.1.6 All conduits ends shall be fitted with plastic bushings.
 - 3.1.7 Pull boxes shall be provided with screw type covers, not hinged. 24" x 24" access panels shall be provided where pull boxes are installed in inaccessible ceilings. Pull boxes for vertical conduits shall be installed to provide straight pass through for vertical cables. The size of pull boxes shall be 8 times the size of the inside diameter size of the largest conduit entering the pull box, except pull boxes for 4" conduits shall be 30" x 24" x 6" in size.
- 3.2 Hangers
 - 3.2.1 Anchors for hangers must not be drilled into post-tensioned beams under any circumstances.

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- 3.2.2 Hangers & supports shall be sized to accommodate the number of cables in each run. Other hardware such as hammer on clamps, screw on clamps and angled hanger brackets to support the backbone and/or horizontal cabling shall be included.
- 3.3 Conduit
- 3.3.1 Electrical Metallic Tubing (EMT) of the sizes indicated shall be installed.
- 3.3.2 Conduit extending from outlet to cable tray/raceway shall be a minimum of 3/4" (in) unless the cables exceed a 40% fill ratio.
- 3.3.3 No conduit shall be smaller than 3/4" (in) unless specifically detailed in this document.
- 3.3.4 Standard for workstation outlets shall be double gang box with minimum of 25 mm (1") conduit from outlet to raceway, unless stated otherwise.
- 3.3.5 No more than two - 90° bends, or a maximum of 180 degree bends in total, in conduit between pull points. Provide a pull box for every 30 m 100'(ft) of conduit. Pull boxes are not to be used as bends.
- 3.3.6 Conduits of 50mm 2"(in) or less to have a bend radius of six (6) times the conduit diameter. A conduit greater than 50mm 2" (in) to have a bend radius of ten (10) times the conduit diameter.
- 3.3.7 All conduits shall be labelled at each end indicating the destination.
- 3.3.8 Run all conduits parallel or perpendicular to building grid lines.
- 3.3.9 Slots and sleeves to extend a minimum of 50 mm 2"(in) above the finished floor.
- 3.3.10 Conduits shall protrude a minimum of 76 mm 3" (in) into rooms through walls.
- 3.3.11 Conduits shall not compromise HVAC ducting or sheet metal work.
- 3.3.12 Electro metallic tubing (EMT) shall conform to CSA C22.2 No.83.
- 3.3.13 Conduit and wall boxes to be supplied and installed by Division 16/26 unless expressly requested in this document.
- 3.3.14 Pull boxes should not be used as bends/turns
- 3.3.15 Bush, ream and remove any sharp projections on all conduits. Slots and sleeves to extend a minimum of 5 cm (2") above the finished floor. Firestop all floor and wall slots/sleeves to maintain floor/wall fire rating after installation of all cables.
- 3.3.16 Conduits should not compromise any other building systems.
- 3.3.17 All conduit should have 3mm polypropylene, minimum, fish cords installed. Cabling Contractor to restore any pull strings used by contractor for any part of installation of telecommunications cabling system included in this document.
- 3.4 Conduit Fastening
- 3.4.1 One hole malleable iron, hot dipped galvanized straps to secure surface mounted conduits.
- 3.4.2 Beam clamps to secure conduits to exposed steel members.
- 3.4.3 Provide 12 gauge galvanized steel channel type supports for two or more conduits on minimum 1500 mm centres. Use suitable conduit clamps in channel.

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- 3.4.4 Threaded rod with a minimum dia. of 6mm shall be used to support the suspended channels.
- 3.5 Conduit Fittings
- 3.5.1 Fittings manufactured for use with the conduit specified with the same coating as conduit.
- 3.5.2 Provide insulated steel Rain Tight connectors and couplings for all EMT conduits 50 mm 2" (in) and smaller.
- 3.5.3 All 4" (in) conduit shall have proper conduit waterfalls installed.
- 3.6 Execution
- 3.6.1 The Pathways for Communications Cabling shall be installed per instructions in this document and in accordance with prevailing standards and codes.
- 3.6.2 Identify to site supervisor, and resolve issues with any location where cable pathways fail to meet separation clearances as detailed in this document, prior to start of cable path installation.
- 3.6.3 Maintain the following clearances from electrical and heat sources when installing conduits for data/telephone cables.

Minimum Separation Distances			
Item	(<2kVA)	(2-5kVA)	(>5kVA)
Unshielded power lines or electrical equipment in proximity to open or non-metallic pathway.	127 mm (5"(in))	305 mm (12"(in))	610 mm (24"(in))
Unshielded power lines or electrical equipment in proximity to a grounded metal conduit pathway.	64 mm (2.5"(in))	152 mm (6"(in))	305 mm (12"(in))
Power lines enclosed in a grounded metal conduit (or equivalent shielding) in proximity to a grounded metal conduit pathway.	---	76 mm (3"(in))	152 mm (6"(in))
Motors	1.2 m (4'-0")		
Transformers	1.2 m (4'-0")		
Conduit and cables used for electrical distribution less than 1kV	0.3 m (1'-0")		
Conduit and cables used for electrical distribution greater than 1kV	1.0 m (3'-0")		
Fluorescent Luminaires	300 mm (12")		
Pipes (gas, oil, water, etc.)	120 mm (5")		
HVAC (equipment, ducts, etc.)	150 mm (6")		
Coax (CATV/CCTV)	Separate conduits or metallic divider in cable tray (do not run Cat6A and coax in same pathways)		

End of Section 27 05 33