

PWGSC Ontario	CONDUITS, CONDUIT	Section 26 05 34
Region Project	FASTENINGS AND CONDUIT	Page 1
Number R.045087.001	FITTINGS	2012-07-04

PART 1 - GENERAL

<u>1.1 RELATED SECTIONS</u>	.1	Section 26 05 00 - Common Work Results - for Electrical.
<u>1.2 REFERENCES</u>	.1	<p>Canadian Standards Association (CSA International)</p> <p>.1 CSA C22.1-12, Canadian Electrical Code Part 1 (22nd Edition), Safety Standard for Electrical Installations.</p> <p>.2 CAN/CSA-C22.2 No. 18.3-04(R2009), Conduit, Tubing, and Cable Fittings (Tri-national standard with NMX-J-017-ANCE and UL514B).</p> <p>.3 CAN/CSA-C22.2 No. 18.1-04(R2009), Metallic Outlet Boxes (Tri-national standard with NMX-J-023-ANCE and UL 514A).</p> <p>.4 CAN/CSA-C22.2 No. 18.2-06, Nonmetallic Outlet Boxes.</p> <p>.5 CAN/CSA-C22.2 No. 18.4-04(R2009), Hardware for the Support of Conduits, Tubing and Cable (bi-national standard with UL 2239).</p> <p>.6 CSA C22.2 No. 45.1-07, Electrical Rigid Metal Conduit - Steel (Tri-National standard with UL 6 and NMX-J-534_ANCE-2007).</p> <p>.7 CSA C22.2 No. 56-04(R2009), Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.</p> <p>.8 CSA C22.2 No. 83-M1985(R2008), Electrical Metallic Tubing.</p> <p>.9 CSA C22.2 No. 211.2-06(R2011), Rigid PVC (Unplasticized) Conduit.</p> <p>.10 CAN/CSA-C22.2 No. 227.3-05(R2010), Nonmetallic Mechanical Protection Tubing (NMPT) (Bi-National standard with UL 1696).</p>
<u>1.3 PRODUCT DATA</u>	.1	Submit product data in accordance with Section 01 33 00.
<u>1.4 WASTE MANAGEMENT AND DISPOSAL</u>	.1	Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

- 1.5 SCOPE OF WORK
- .1 Drawings do not show all conduits. Those shown are in diagrammatic form only.
 - .2 Conceal all conduits in finished areas. Conduits may be surface mounted either only where indicated or in service areas accessible only to authorized personnel.
 - .3 Note particular requirements for routing of conduits where detailed.
 - .4 Provide polypropylene pull cord in all "empty" conduits.

PART 2 - PRODUCTS

- 2.1 CONDUITS
- .1 Rigid metal conduit: to CSA C22.2 No. 45.1, galvanized steel.
 - .2 Electrical metallic tubing (EMT): to CSA C22.2 No. 83.
 - .3 Flexible metal conduit: to CSA C22.2 No. 56.
 - .4 Minimum conduit size in the project to be 21 mm (3/4") diameter (for power as well as low tension services).

- 2.2 CONDUIT FASTENINGS
- .1 One hole steel straps to secure surface conduits 27 mm and smaller. Use two hole steel straps for conduits larger than 27 mm.
 - .2 Beam clamps to secure conduits to exposed steel work.
 - .3 Channel type supports for two or more conduits.
 - .4 Threaded rods, 6 mm (1/4") diameter, to support suspended channels.
 - .5 Bright green conduit clips for security electronics conduits in non-inmate areas.
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2.3 CONDUIT FITTINGS

- .1 Fittings manufactured for use with conduit specified. Coating: same as conduit.
- .2 Ensure factory "ells" where 90 degrees bends are required for 35 mm (1.25") and larger conduits.
- .3 EMT couplings and connectors shall be steel, or Regal Die-cast zinc alloy. Couplings used on conduit containing fire-rated cable shall be steel. Regular die-cast alloy fittings and couplings are not acceptable. Provide plastic bushings (insulated throat) for all connectors unless there is no chance of burrs. Provide water-tight connectors in damp or wet locations and for surface equipment (e.g. Panelboards, transformers, etc) in rooms that are fire sprinkler protected.

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

- .1 Weatherproof expansion fittings with internal bonding assembly suitable for linear expansion.
- .2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection in all directions.
- .3 Weatherproof expansion fittings for linear expansion at entry to panel as required.

2.5 RIGID PVC CONDUIT

- .1 Conduit: rigid non metallic conduit of unplasticized polyvinyl chloride Schedule 40.
 - .2 Fittings: threaded male or female solvent weld connectors and solvent weld couplings, as supplied by conduit manufacturer.
 - .3 Solvent: as recommended by conduit manufacturer.
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PART 3 - EXECUTION

3.1 CONDUIT - GENERAL

- .1 Generally use electrical metallic tubing (EMT) in the building interior and in above grade slabs except where subject to mechanical injury or where otherwise indicated.
- .2 Install all conduit and wiring concealed, unless otherwise shown on the drawings. Do not recess conduit in columns, except as noted, without permission.
- .3 Lay out conduit to avoid interference with other work. Maintain a minimum clearance of 150 mm from steam or hot water piping, vents, etc.
- .4 At all recessed panels cap 2 - 27 mm empty conduits from panel into ceiling above for future use.
- .5 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass. Set out the work and coordinate with other services prior to installation. Maintain access to junction and pull boxes.
- .6 Any conduit shown exposed in finished areas is to be free of unnecessary labels and trade marks.
- .7 All conduit ends to be reamed to ensure a smooth interior finish that will not damage the insulation of the wiring.
- .8 Ensure grounding continuity in all conduit systems.
- .9 Use rigid galvanized steel (RGS) threaded conduit where the installation is subject to mechanical injury. In any event, use RGS conduit for surface installations up to 1.5 m (5') above the finished floor.
- .10 Field threads on rigid conduit shall be sufficient length to draw conduits ends together.
- .11 Unless otherwise noted and where practical, all conduits to be routed through the ceiling space

3.1 CONDUIT -
GENERAL
(Cont'd)

- .11 (Cont'd)
rather than in, or below, slabs or floor
structures to facilitate future changes.
- .12 Conduits in walls should typically drop (or
loop) vertically from above to better facilitate
future renovations. Generally conduits from
below and horizontal conduits in walls and
concrete structures should be avoided unless
indicated.
- .13 Generally use Rigid PVC conduits in or below
ground level slab unless otherwise noted.
Transition to RGS conduit in exposed locations:
e.g. where conduits emerge from ground level
slab.
- .14 Conduits are not permitted in terrazo or
concrete toppings.
- .15 Cap turned up conduits to prevent the entrance
of dirt or moisture during construction.
- .16 Locate conduits more than 75 mm (3") parallel
to steam or hot water lines with a minimum of
25 mm (1") at crossovers.
- .17 Bend conduits cold, so that conduit at any
point is not flattened more than 1/10th of its
original diameter. Conduits bent more than this
or kinked to be replaced.
- .18 Provide polypropylene pull cord in empty
conduits to facilitate pulling wiring in future.
- .19 Where conduits become blocked, the use of
corrosive agents is prohibited. Remove and
replace blocked section.
- .20 Damaged conduits to be repaired or replaced.
- .21 Dry conduits out thoroughly before installing
wiring. Swab out conduit and thoroughly clean
internally before wires and cables are pulled.
- .22 Conduits shall not pass through structural
members except as indicated.
- .23 Conduit sizes indicated on drawings are minimum
only. Increase sizes as required to suit
alternative wiring types or to comply with Code.

3.1 CONDUIT - GENERAL (Cont'd)

- .24 Conduits and ducts crossing building expansion joints shall have approved conduit expansion fittings to suit the type of conduit used.
- .25 Seal conduits with approved sealant where conduits are run between heated and unheated areas.
- .26 Seal openings with approved sealant where conduits, cables, or cable trays pierce fire separations.
- .27 Where conduits pass through walls, they shall be grouped and installed through openings. After all conduits shown on the drawings are installed, wall openings shall be closed with material compatible with the wall construction and/or to meet any fire separation integrity.
- .28 Where drawings show conduit designations, these conduits shall be identified at each point of termination with labels.
- .29 Use "Condulet" fittings for power and telephone type conduit terminations in lieu of standard boxes where box support is not provided.
- .30 Provide necessary roof jacks or flashing where conduits pass through roof or watertight membranes. Apply approved sealant to maintain membrane integrity.
- .31 Use flexible metal conduit for connection to recessed incandescent fixtures without a prewired outlet box and connection to recessed fluorescent fixtures.
- .32 Use liquid tight flexible metal conduit for connection to motors, and other vibrating equipment and transformers.

3.2 SURFACE CONDUITS

- .1 Surface conduits are acceptable in mechanical and electrical service rooms and in unfinished areas or where indicated.
- .2 Run parallel or perpendicular to building lines.
- .3 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.

3.2 SURFACE
CONDUITS
(Cont'd)

- .4 Run conduits in flanged portion of structural steel.
- .5 Group conduits wherever possible on suspended and/or surface channels.
- .6 Surface conduits will not be accepted in finished areas unless detailed.

3.3 SPARE CONDUITS

- .1 Provide spare conduits as indicated.
- .2 Provide 2 x 27 mm (1") spare conduits up to ceiling space and 2 x 27 mm (1") spare conduits down to ceiling space below from each flush panel. Terminate the conduits in 150 x 150 x 100 mm (6" x 6" x 4") junction boxes in ceiling spaces or in case of an exposed concrete slab, terminate each conduit in a flush concrete box. Provide coverplates for all junction boxes.