

## PART 1 - GENERAL

- 1.1 WORK INCLUDED .1 Provide all conduits/duct work in accordance with the contract documents.
- 1.2 MEASUREMENT AND PAYMENT .1 Payment for provision of all items specified in this Section shall be by Lot Price. No separate payment will be made for work specified in the Contract Documents. All costs incurred by Contractor in meeting with the requirements of this Section shall be included in the bid price for the Work.
- 1.3 REFERENCES .1 Canadian Standards Association (CSA)
- .1 CAN/CSA C22.2 No. 18-06(R2011), Nonmetallic Outlet Boxes.
  - .2 CSA C22.2 No. 45-M1981(R2003), Rigid Metal Conduit.
  - .3 CSA C22.2 No. 56-04(R2009), Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
  - .4 CSA C22.2 No. 83.1-07(R2012), Electrical Metallic Tubing - Steel (Tri-National Standard, with UL797 and NMX-J-536-ANCE-2007).
  - .5 CSA C22.2 No. 211.2-06(R2011), Rigid PVC (Unplasticized) Conduit.
  - .6 CAN/CSA C22.2 No. 227.3-05(R2010), Nonmetallic Mechanical Protection Tubing (NMPT) (Bi-National Standard of Canada with UL 1696).
- 1.4 SUBMITTALS .1 Submittals, product data and shop drawings shall be in accordance with Specification Sections 01 33 00 and 26 05 00.

## PART 2 - PRODUCTS

- 2.1 CONDUITS .1 Rigid metal conduit: to CSA C22.2 No. 45, hot dipped galvanized steel threaded.
- .2 Epoxy coated conduit: to CSA C22.2 No. 45, with zinc coating and corrosion resistant epoxy finish inside and outside.
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<u>2.1 CONDUITS (Cont'd)</u>	.3	Electrical metallic tubing (EMT): to CSA C22.2 No. 83, with couplings.
	.4	Rigid pvc conduit: to CSA C22.2 No. 211.2.
	.5	Flexible metal conduit: to CSA C22.2 No. 56, aluminum liquid-tight flexible metal.
	.6	Flexible pvc conduit: to CAN/CSA-C22.2 No. 227.3.
<u>2.2 CONDUIT FASTENINGS</u>	.1	Provide all pull boxes, junction boxes, terminal boxes, fittings, seals, plugs, cover plates, bushing, clips, rods and accessories as required and as applicable.
	.2	Beam clamps to secure conduits to exposed steel work.
	.3	Channel type supports for two or more conduits at 1.5 m oc.
	.4	Threaded rods, 6 mm dia., to support suspended channels.
<u>2.3 CONDUIT FITTINGS</u>	.1	Fittings: manufactured for use with conduit specified. Coating: same as conduit.
	.2	Factory "ells" where 90° bends are required for 27 mm and larger conduits.
	.3	Watertight connectors and couplings for EMT. Set-screws are not acceptable.
<u>2.4 EXPANSION FITTINGS FOR RIGID CONDUIT</u>	.1	Weatherproof expansion fittings with internal bonding assembly suitable for 103 mm linear expansion.
	.2	Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 21 mm deflection in all directions.
	.3	Weatherproof expansion fittings for linear expansion at entry to panel.
	.4	Opening through fire rated walls shall be sealed with ULC listed fire proofing assembly
<u>2.5 FISH CORD</u>	.1	Polypropylene fish cord for empty conduits.

<u>2.6 SITE VERIFICATION</u>	.1	Verify all wall, partition and door locations, coordinate with other disciplines and then mark the conduit/device layouts prior to start of work.
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### PART 3 - EXECUTION

<u>3.1 MANUFACTURER'S WRITTEN INSTRUCTIONS</u>	.1	Compliance: comply with Manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.
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<u>3.2 INSTALLATION</u>	.1	Install all conduit, conduit fittings and accessories in accordance with the latest edition of the Ontario Electrical Safety Code in a manner that does not alter, change or violate any part of the installed system components or the CSA/UL certification of these components.
	.2	Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
	.3	Surface mount conduits except in finished areas or as indicated.
	.4	Use rigid hot dipped galvanized steel threaded conduit for exposed work below 2.4 m above finished floor.
	.5	Use epoxy coated conduit underground in corrosive areas and where exposed to exterior elements. (ie: pole mounted service entrance conduits)
	.6	Use electrical metallic tubing (EMT) except in cast concrete and above 2.4 m not subject to mechanical injury, as well as concealed work in masonry construction.
	.7	Use rigid pvc conduit underground and buried in or under concrete slab on grade.
	.8	Use flexible metal conduit for connection to motors in dry areas connection to recessed incandescent fixtures without a prewired outlet box connection to surface or recessed fluorescent fixtures work in movable metal partitions.

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### 3.2 INSTALLATION (Cont'd)

- .9 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment in damp, wet or corrosive locations.
- .10 Use explosion proof flexible connection for connection to explosion proof motors.
- .11 Install conduit sealing fittings in hazardous areas. Fill with compound.
- .12 Minimum conduit size for lighting and power circuits: 21 mm conduit is acceptable for switch leg drops only where one two-wire circuit and ground is required.
- .13 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .14 Mechanically bend steel conduit over 21 mm dia.
- .15 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
- .16 Install fish cord in empty conduits.
- .17 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
- .18 Dry conduits out before installing wire.
- .19 Coordinate with all trades to locate conduits.
- .20 Use PVC conduit in the Processing Area 3 m AFF and higher.

### 3.3 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
  - .2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.
  - .3 Run conduits in flanged portion of structural steel.
  - .4 Group conduits wherever possible on suspended channels.
  - .5 Do not pass conduits through structural members except as indicated.
  - .6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.
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### 3.4 CONCEALED CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Do not install horizontal runs in masonry walls.
- .3 Do not install conduits in terrazzo or concrete toppings.

### 3.5 CONDUITS IN CAST-IN-PLACE CONCRETE

- .1 Locate to suit reinforcing steel. Install in centre one third of slab. Use rigid PVC conduit.
- .2 Protect conduits from damage where they stub out of concrete. Use rigid steel conduit for stub-up and adapt to in floor rigid PVC conduit.
- .3 Install sleeves where conduits pass through slab or wall.
- .4 Provide oversized sleeve for conduits passing through waterproof membrane, before membrane is installed. Use cold mastic between sleeve and conduit.
- .5 Do not place conduits in slabs in which slab thickness is less than 4 times conduit diameter.
- .6 Encase conduits completely in concrete with minimum 25 mm concrete cover.
- .7 Organize conduits in slab to minimize cross-overs.

### 3.6 CONDUITS IN CAST-IN-PLACE SLABS ON GRADE

- .1 Run conduits 27 mm and larger below slab and encased in 75 mm concrete envelope. Provide 50 mm of sand over concrete envelope below floor slab.

### 3.7 CONDUITS UNDERGROUND

- .1 Slope conduits to provide drainage.
- .2 Waterproof joints (PVC excepted) with heavy coat of bituminous paint.

### 3.8 CLEANING

- .1 Proceed in accordance with Section 01 74 11.

3.8 CLEANING (Cont'd)	.2	On Completion and verification of performance of installation, remove surplus materials, excess materials rubbish, tools and equipment.
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