

USask Master Specification Directions: The master specifications are intended to be incorporated into the Consultant's final, project specific specification package. The project specific specifications are expected to include any and all sections or portions of sections (Part 1, Part 2, Part 3) that are required to create a fully executable project specification. USask Master Specs only provide information that USask **requires** be a part of the final specification package. Components or sections not included in the Master USask Specifications may still be required for a complete, well-designed project. **It is the consultant's responsibility to ensure all specifications match USask requirements. Any deviations or revisions to any section included in the master specifications requires written consent from the USask Engineering department. The consultant is liable for any omissions, errors, or incorrect equipment or components supplied to site.**

The Master Specifications shall be used in conjunction with USask's Design Guidelines. Any conflicts shall be brought to the attention of USask Engineering staff for clarification.

Part 1 General

.1 Location of Conduit

- .1 Drawings do not show all conduits. Those shown are in diagrammatic form only.

.2 Related Work

- .1 Section 26 05 29 - Fastenings and Supports.

Part 2 Products

.1 Conduits

- .1 Minimum $\frac{3}{4}$ (21) trade size except $\frac{1}{2}$ (16) trade size conduit may be used for lighting switch legs and thermostats.
- .2 Electrical metallic tubing EMT, with couplings.
- .3 Rigid PVC conduit, to CSA C22.2, No. 211.2.
- .4 Liquid-tight flexible metal conduit.
- .5 Rigid galvanised steel threaded conduit.
- .6 Flexible PVC conduit: TBC
- .7 FRE conduit: TBC
- .8 Epoxy coated conduit: with zinc coating and corrosion resistant epoxy finish inside and outside.

.2 Conduit Fastenings

- .1 One-hole galvanised steel straps to secure surface conduits of 2 (53) trade size and smaller. Two-hole galvanised steel straps for conduits larger than 2 (53) trade size.
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports Cantruss for two or more conduits.
- .4 Conduit clamps for conduit on channels.

.3 Conduit Fittings

- .1 Set-screws and watertight fittings for EMT.
- .2 Steel, double bevel sealing ring for liquid-tight flexible metal conduit. T & B 5200 series or equivalent.
- .3 All others as manufactured for use with conduit specified. Coating: same as conduit.
- .4 Factory "ells" where 90° bends are required and exposed.

.4 Expansion Fittings for Rigid Conduit

- .1 Expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection in all directions.

.5 Fish Cord

- .1 Polypropylene.

.6 Identification

- .1 Colour code conduits at points where conduit penetrates wall, ceiling, or floor at 15m intervals and at all box connections.
- .2 Colours: 25 mm wide prime colour and 25 mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	yellow	
up to 600 V	yellow	green
up to 5 kV	yellow	blue
up to 25 kV	yellow	red
Emergency Power	orange	red
Telephone	green	
Computer	blue	
Other communications	green	blue
Fire alarm	red	
Emergency voice	red	blue
Other security systems	red	yellow

Part 3 Execution

.1 Installation

- .1 Conceal conduits except in mechanical and electrical service rooms and in unfinished areas, unless otherwise noted.
- .2 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

- .3 Install separate conduit(s) for power, lighting and each equipment circuit except where receptacles and lighting are fed from the same panel then circuits may be in the same conduit.
- .4 Install separate conduits from each telephone and computer outlet box to cable tray.
- .5 Install separate conduits from each receptacle to ceiling space. Receptacles shall not be loop fed horizontally in walls.
- .6 Install conduits parallel with building lines.
- .7 Group conduits wherever possible on channels.
- .8 Conduits for 15-amp receptacles shall be filled with the maximum number of conductors as follows:

Size of Conduit	T90	R90, RW90 Without a Jacket
¾	8	6
1	13	10

- .9 Conduits for computer outlets shall be filled with the maximum number of conductors as specified in Section 16743, Computer Network Cabling.
- .10 Use electrical metallic tubing (EMT) except where specified otherwise.
- .11 Use liquid tight flexible metal conduit for connection to motors, instruments and sensors and for fishing into block walls and for fishing into existing walls.
- .12 Use rigid galvanised steel threaded conduit in hazardous areas and where specified otherwise.
- .13 Use rigid PVC conduit underground and in corrosive areas.
- .14 Use explosion proof flexible connection for connection to explosion proof motors.
- .15 Install conduit sealing fittings in hazardous areas. Fill with compound.
- .16 Install EMT conduit from computer room branch circuit panel to outlet boxes located in sub floor.
- .17 Install EMT conduit from computer room branch circuit panel to junction box in sub-floor immediately below panel. Run liquid-tight flexible conduit from junction box to outlet boxes for each computer in sub-floor.
- .18 Bend conduit cold. Replace conduit if chinked or flattened more than 1/10th of its original diameter.
- .19 Mechanically bend steel conduit over ¾ (21) trade size.
- .20 Where elbows 45° and larger are required to pass through a wall provide a pull box.
- .21 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
- .22 Install fish cord in empty conduits.
- .23 For each flush mounted panelboard, run 2 spare conduits of 1 (27) trade size up to ceiling space and 2 spare conduits of 1 (27) trade size down to ceiling space. Terminate these conduits in 300 x 300 x 100 mm junction boxes in ceiling space or in the case of an exposed concrete slab, terminate each conduit in a surface type box.
- .24 Where conduits become blocked, remove and replace blocked section. Do not use liquids to clean out conduits.

- .25 Dry conduits out before installing wire.
- .26 Install expansion fittings between two devices in a straight line run of PVC conduit.
- .27 Seal conduits where they enter/exit areas other than room temperature. This includes, but not limited to, outdoors, freezers, coolers and environmental chambers. Place seal such that condensation will not gather and stand in pipe.
- .27 Utilize watertight connectors when entering drip proof equipment on the top.

.2 Surface Conduits

- .1 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.
- .2 Run conduits in flanged portion of structural steel.
- .3 Do not pass conduits through structural members except as indicated.
- .4 Do not locate conduits less than 75 mm parallel to steam or hot water lines with a minimum of 25 mm at crossovers.

.3 Concealed Conduits

- .1 Do not install horizontal runs in masonry walls.
- .2 Except for controls conduits, maintain conduits within 400 mm above suspended ceilings. The underside of the deck should only be for servicing the floor above.
- .3 Install conduits and fittings to be embedded or plastered over neatly and close to building structure so furring can be kept to minimum.

.4 Conduit Sleeves In Cast-In-Place Concrete

- .1 Install conduits in concrete slabs only where specified. Conduits shall only be installed in concrete where no other method of installation exists.
- .2 Locate to suit reinforcing steel. Install in centre one third of slab. Encase conduits completely in concrete.
- .3 Install sleeves where conduits pass through slab or wall using schedule 40 rigid PVC, sized for free passage of conduit, and protruding 50 mm.
- .4 Protect conduits from damage where they stub out of concrete.
- .5 Where conduits pass through waterproof membrane provide oversized sleeve before membrane is installed. Use cold mastic between sleeve and conduit.
- .6 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.

.5 Conduits Underground

- .1 Slope conduits 0.3% or 1:400, to provide drainage.
- .2 Waterproof joints with heavy coat of bituminous paint (PVC excepted).

.6 Rigid PVC Conduit

- .1 Cut ducts square using a mitre box or equivalent and handsaw, power saw or rotary cutter. Remove burrs with a knife or file. Break all sharp edges on both the inside and outside of the duct with a knife, file or other bevelling tool.

- .2 Joint surfaces shall be clean and free from dirt, foreign materials and moisture. Clean the outside surface of the duct (for the depth of the socket) and the inside surface of the socket with pipe cleaner and wipe with a clean dry rag.
- .3 Examine solvent cements prior to usage. Solvent cement that exhibits an appreciable change from the original viscosity or shows signs of gelation (lumpy and stringy appearance after stirring) shall be discarded.
- .4 Cements shall not be thinned. Restoration of the original viscosity or removal of gelation by adding solvents or thinners is not acceptable.
- .5 Apply cements with a natural bristle or nylon brush or applicator. A brush width at least half the nominal duct size shall be used.
- .6 Apply solvent cements as quickly as possible consistent with good workmanship.
- .7 Apply a heavy, even coating of cement to the duct outer surface, equal to the length of the duct socket.
- .8 Insert the duct with a light twisting motion into the socket until it bottoms at the socket shoulder. Do not twist or turn the duct after it has bottomed on the shoulder.
- .9 Complete the assembly of a cemented joint within 15 seconds after application of cement. Recoat the duct with fresh cement if there is any sign of the cement drying prior to assembly.
- .10 Wipe excess cement from the duct after assembly.
- .11 Encase direct buried bends of radius 1500 mm or less in concrete to protect against winch line cutting when pulling conductors.
- .12 Independently support all bends and ducts to be concrete-encased by duct spacers of such type to maintain the designed separation between adjacent ducts, both horizontally and vertically.

END OF SECTION