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 Products

.1 General

.1 Aluminum conductors are not permitted for any wiring.
.2 Non-metallic sheathed cable is not permitted.
.3 Minimum #12 AWG for branch circuit wiring although #14 shall be permitted for armoured cable drops to lighting fixtures. (This would preclude 20 amp circuits for lighting).
.4 Minimum #14 for fire alarm signalling systems. Follow manufacturer voltage drop guide to ensure acceptable operation of devices on circuit.

.2 Building Wires

.1 Copper conductors with insulation of chemically cross-linked thermosetting polyethylene material type RW90 rated 600 V.
.2 Copper conductors with thermoplastic insulation type T90 nylon rated at 600 V for circuits less than 480 V.
.3 Grounding conductors: bare copper.

.3 TECK Cable

.1 Copper conductors with insulation of chemically cross-linked thermosetting polyethylene (XLPE), type R90 rated 600V for applications 600V and below.
.2 PVC inner jacket.
.3 Interlocking aluminum armour.
.4 PVC outer jacket.
    .1 Fastenings:
        .1 One hole steel straps to secure surface cables 50 mm and smaller. Two hole steel straps for cables larger than 50 mm.
        .2 Channel type supports for two or more cables at 1500 mm centers.
    .2 Connectors:
        .1 Watertight approved for TECK cable.
        .2 Utilize watertight TECK cable connectors in the top of all sprinkler proof equipment.

.4 Armoured Cables

.1 Conductors: insulated, copper.
.2 Type: AC90
.3 Armour: interlocking type fabricated from aluminum strip.
.4 Type: ACWU90 flame retardant jacket over thermoplastic armour meeting requirements of Vertical Tray Fire Test of CSA C22.2 No.0.3 with maximum flame travel of 1.2 m.
.5 Connectors: as required.

.5 Fired Rated Cables for Emergency Power System

.1 Conductors: insulated, copper.
.2 Type: RC90
.3 Fire Rating: 2-hrs
.4 Acceptable product: Texcan Vitalink MC 2-Hour Fire Rated Cable, 600V, CWCA or approve equal.

.6 Control Cables

.1 Fiber optic: Corning multimode optical cable - 62.5/125 micron - TBII -OFNR (UL) OFN FT4 (CSA,) part number is 002K51-31141-24.
.2 Fire alarm cable: Solid annealed copper, 14 AWG, non-shielded, non twisted pair.
.3 Campus fire alarm cable: Solid annealed copper, 22 AWG, colour coded insulated twisted pair, quantity as indicated, with moisture-resistant filled core. Core covering shall be a non-hydroscopic wrap. The shield shall be electrically continuous 0.203 mm flat aluminum tape with polyolefin film on both sides and bonded to the outer jacket. The jacket shall be black polyethylene with manufacturer's identification and cable specifications.

.7 Wiring Terminations

.1 Lugs, terminals, screws used for termination of wiring to be suitable for copper conductors.

.8 Identification

.1 Colour code metallic sheathed cables.
.2 Code with paint at points where cable enters wall, ceiling, or floor, and at 15 m intervals.
.3 Colours: 25 mm wide prime colour and 20 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 15 kV	yellow	red
Emergency Power	orange	red
Telephone	green	
Computer	blue	
Other communication systems	green	blue
Fire alarm	red	
Emergency voice	red	blue

Other security systems	red	yellow
Uninterruptible power	orange	red
Controls (CCMS)	orange	

.4 Maintain phase sequence and colour coding throughout.
.5 Colour code to latest edition of CSA C22.1.
.6 Use colour coded wires in communication cables, matched throughout system.
.7 Colour coding of phase conductors: Red, black and blue for phase A, B and C respectively. Phase rotation shall be positive, counter-clockwise with motor rotation clockwise. Note the instrument used for testing rotation. Motor rotation meters will indicate a clockwise direction for counter-clockwise phase rotation,
.8 Identify wiring larger than #2 AWG with coloured plastic tape at both ends of conductor. Wiring #2 AWG and smaller shall be continuous in colour.
.9 Colour coding of non-phase wires shall be as follows:
  .1 Bonding and ground wires: green. Isolated ground wires: green with orange/yellow stripe.
  .2 Switch returns on lighting circuits: orange. Travellers on three-way and four-way lighting circuits: yellow.
  .3 Low voltage lighting wiring: red, blue, white and black.
  .4 Fire alarm circuits: red and black.
  .5 MCC control wiring: red, except (building) neutral shall be white.
.10 Label wiring at the end of every wire and at each splice with vinyl film, self laminating markers such as Panduit GMV3.

Part 2 Execution

.1 General

.1 Conductor length for parallel feeders to be identical.
.2 All feeders and branch circuits must contain a green bonding conductor, sized to code requirements.
.3 Maintain cables within 400 mm above suspended ceilings. The underside of the deck should only be for servicing the floor above.
.4 When changing the rotation for three phase devices, the change shall be made at the motor splice box.
.5 Circuits shall not share neutrals.
.6 All wiring shall be installed in raceway. Wiring shall not be permitted to be installed in the free air.
.7 Neutral conductors shall be the same ampacity as phase conductors.
.8 All wiring to be continuous from source device to load device. Splicing not permitted.

.2 Installation of Building Wires

.1 Install wiring in conduit systems, cable tray, underground ducts and trenches as indicated.

.3 Installation of TECK Cable

.1 Install cables as indicated.

.2 Group cables wherever possible on channels.

.4 Installation of Armoured Cables

.1 Use flexible metal conduit (BX) for connection to recessed lighting fixtures in T-bar ceilings and chain hung fluorescent fixtures. Each fixture is to be wired with three (3) metres (no more, no less) of cable dropped from a junction box with the exception of continuous row fixtures on one circuit, where one drop of cable is permitted.

.2 BX cables for lighting in T-bar ceiling are to be limited to two drops per junction box location.

.5 Installation of Control Cables

.1 Install building to Heating Plant central monitoring fire alarm cable free of splices except at designated fire alarm junction boxes.

.2 Ground control cable shield at supply end only.

END OF SECTION