

PART 1 - GENERAL

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| <u>1.1 RELATED WORK</u> | .1 | Refer to specity "Communication" Sections for particular wiring systems and types. i.e. Fire Alarm, Security and Voice/Data |
| <u>1.2 RELATED SECTIONS</u> | .1 | Section 26 05 00 - Common Work Results - For Electrical |
| <u>1.3 REFERENCES</u> | .1 | Canadian Standards Association (CSA International)
.1 CSA C22.1-12, Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.
.2 CAN/CSA C22.2 No. 65-03(R2008), Wire Connectors (Tri-National standard with UL 486A-486B and NMX-J-543-ANCE-03). |
| | .2 | National Electrical Manufacturers Association (NEMA) |
| <u>1.4 PRODUCT DATA</u> | .1 | Provide product data in accordance with Section 01 33 00. |
| <u>1.5 WASTE MANAGEMENT AND DISPOSAL</u> | .1 | Separate and recycle waste materials in accordance with Section 01 74 20. |
| <u>1.6 TERMS OF REFERENCE</u> | .1 | Typically use insulated 98% conductivity copper conductor wiring enclosed in EMT (steel) conduit for indoor general wiring systems or enclosed in rigid PVC conduit for outdoor wiring systems unless otherwise indicated. |
| | .2 | Armoured cable (AC90) is permitted for branch circuits only; use of AC90 for feeders and home runs is not permitted. Where flexible connections are required provide wiring in flexible conduits. |
| | .3 | Aluminium conductors are not permitted. |
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1.6 TERMS OF
REFERENCE
(Cont'd)

- .4 Teck cable may only be used where specifically indicated on the drawings or in the specifications. Where permitted, Teck wiring up to 750 system volts to be PVC jacketed armoured cable, multi-copper conductor type Teck90 having a PVC jacket with FT-4 flame spread rating.
- .5 Provide all control wiring for equipment supplied under Division 26 except HVAC controls as specified in Mechanical Divisions. Refer to Equipment Schedule(s) for detailed responsibilities.
- .6 Provide power supply wiring and conduit for equipment by other Divisions. Control wiring shall be by the other Division (e.g., Division 28).
- .7 Non-metallic sheathed wiring is not to be used on this project.
- .8 Pressure type wire connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.
- .9 Fixture type splicing connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
- .10 Clamps, glanding connectors, or box connectors for armoured cable, and flexible conduit as required to: CAN/CSA-C22.2 No. 65.
- .11 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.

PART 2 - PRODUCTS

2.1 WIRING AND CABLES - GENERAL

- .1 Conductors: stranded for 12 AWG and larger. Minimum size: 12 AWG.
- .2 Insulation to be 600 volt RW90XLPE (X link) for the general building wiring in conduit.
- .3 Main feeders to be in conduit and insulated copper wiring unless otherwise noted on drawings. Provide ground wiring for all conduits in or below slabs. Increase conduit size as required to accommodate ground wire.
- .4 Conductors to be colour-coded. Conductors No.10 gauge and smaller shall have colour impregnated into insulation at time of manufacture. Conductors size No.8 gauge and larger may be colour-coded with adhesive colour coding tape, but only black insulated conductors shall be employed in this case, except for neutrals which shall be white wherever possible. Where colour-coding tape is utilized, it shall be applied for a minimum of 50 mm at terminations, junctions and pullboxes and conduit fittings. Conductors shall not be painted.

2.2 TECK CABLE

- .1 Conductors:
 - .1 Grounding conductor: copper.
 - .2 Circuit conductors: copper, size as indicated.
- .2 Insulation: Chemically cross linked thermosetting polyethylene, type RW90, rated 600 V.
- .3 Inner jacket: polyvinyl chloride material.
- .4 Armour: interlocking aluminum.
- .5 Overall covering: polyvinyl chloride material FT-4 flame test rated.
- .6 Connectors: Watertight, approved for TECK cable.

- 2.3 LOW VOLTAGE
CONTROL CABLES
- .1 Type: LVT: soft annealed copper conductors, with thermoplastic insulation, outer covering of thermoplastic jacket. Minimum size #18 AWG.
 - .2 Unless otherwise specified wiring to be multicore individually identified and colour coded with grey sheath enclosed in conduit.
 - .3 Bright green sheaths for all electronic security systems (CATV, Public Address, Portable Personel Alarm System and door access) cabling.
- 2.4 BUILDING WIRE
AND CABLE
- .1 Unless otherwise specified, building wire and cable shall be copper conductors, sized as indicated.
 - .2 All conductors within cable trays shall have FT4 type outer jacket to comply with all applicable regulations and bylaws.
- 2.5 WIRE AND BOX
CONNECTORS AND
MISCELLANEOUS
MATERIALS
- .1 Pressure type wire connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors as required.
 - .2 Fixture type splicing connectors to: CSA C22.2 No.65, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
 - .3 Clamps, glanding connectors, or box connectors for armoured cable, and flexible conduit as required to: CAN/CSA-C22.2 No. 65.
 - .4 Lugs, terminals, screws used for termination of wiring to be suitable for either copper or aluminum conductors.
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PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

- .1 Unless specifically indicated otherwise, all wiring shall be installed in conduit. Use flexible conduits for final connections to suspend light fixtures and vibrating equipment.
- .2 Use no wire smaller than #12 AWG, unless otherwise directed.
- .3 Control circuit conductors for motors and mechanical equipment controls shall be not less than #14 AWG except where specifically directed otherwise.
- .4 Before pulling wire, ensure conduit is dry and clean. If moisture is present, thoroughly dry out conduits; vacuum if necessary. To facilitate pulling, recognized specially manufactured wire pulling lubricants may be used. Do not use grease. Employ suitable techniques to prevent damage to wire when ambient temperature is below the minimum permitted for each insulation type. Do not pull wires into incomplete conduit runs.
- .5 Installation to be free of opens and grounds. Before energization, measure insulation resistance and comply with the Canadian Electrical Code. Submit data sheet with values measured.
- .6 The number of splices in any circuit shall be kept to an absolute minimum consistent with available coil length and installation conditions.
- .7 Conductors for lighting, receptacle, appliance and equipment branch circuits shall have ampacity not less than the rating of the over-current device protecting the branch circuit and shall be sized for a maximum voltage drop of 2% from panelboard to the last outlet of a circuit. The length of the branch circuit to be used in the determination of the required wire size shall be the combined vertical and horizontal distances from the panelboard to the last device in the circuit. In no case shall the wire sizes as determined above, be less than that indicated in the following.
 - .1 120 Volts, 1 Phase

3.1 INSTALLATION - GENERAL (Cont'd)	.7 (Cont'd)	
	.1 (Cont'd)	
	.1 15 Ampere Circuits	
	.1 0-25 m - min. #12 AWG	
	.2 Over 25 m - min. #10 AWG	
	.2 20 Ampere Circuits	
	.1 0-20 m - min. #12 AWG	
	.2 0-30 m - min. #10 AWG	
	.3 Over 30 m - min. #8 AWG	
	.2 347 Volts, 1 Phase	
	.1 15 Ampere Circuits	
	.1 0-75 m - min. #12 AWG	
	.2 Over 75 m - min. #10 AWG	
	.2 20 Ampere Circuits	
	.1 0-55 m - min. #12 AWG	
	.2 Over 55 m - min. #10 AWG	
	.8 Make final connections to heat-producing equipment with thermoplastic insulated, lacquered glass-braid-jacketed "equipment wire," except that where higher temperature rating of insulation or larger conductor size than #10 AWG is required, use wire specifically approved for the purpose.	
	.9 Exercise care in stripping insulation from wire. Do not nick conductors.	
3.2 INSTALLATION OF BUILDING WIRES	.1 Install wiring as follows:	
	.1 In conduit systems in accordance with Section 26 05 34.	
3.3 INSTALLATION OF ARMORED TECK CABLE (0-1000 V)	.1 Group cables wherever possible on channels.	
	.2 Lay cable in cabletroughs or cable trays.	
3.4 IDENTIFICATION CODING AND BALANCING	.1 For branch circuit wiring, follow identification system shown on the drawings and as specified in Section 26 05 00.	
	.2 Connect single phase equipment to minimize imbalance on feeders. Adjust branch circuiting shown as required for optimum balancing. Record all changes on the records drawings.	
	.3 Colour code all feeders at all terminations, at all points where taps are made, and at all panelboards, switchboards, motor control	

- 3.4 IDENTIFICATION .3 (Cont'd)
CODING AND
BALANCING
(Cont'd)
- .4 Conductors sized No. 10 and smaller are required to be factory coloured, not taped on site.
- 3.5 TESTING .1 All installed power wiring shall be tested for insulation resistance value with a 1000 volt megger. Resistance values shall be as recommended by the cable manufacturer.
- .2 All wire test results shall be properly tabulated, signed, dated, and submitted to the Departmental Representative.