

**ELECTRICAL SPECIFICATIONS**

**PART 1 - ELECTRICAL GENERAL CONDITIONS**

- 1.1 GENERAL**
- A. THE SPECIFICATION COVERING THE GENERAL CONDITIONS OF THE CONTRACT, GENERAL SPECIFICATIONS, INSTRUCTIONS TO SUB-CONTRACTORS AND ALL ASSOCIATED SECTIONS FORM AN INTEGRAL PART OF THIS SPECIFICATION AND SHALL BE READ IN CONJUNCTION HEREWITH.
- 1.2 SCOPE**
- A. PROVIDE ALL MATERIALS, LABOUR, PLANT AND EQUIPMENT REQUIRED FOR A COMPLETE AND WORKING INSTALLATION AS HEREIN SPECIFIED AND AS SHOWN ON THE DRAWINGS.
- B. THE ELECTRICAL INSTALLATION SHALL BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE CANADIAN ELECTRICAL CODE, AND ALL PROVINCIAL AND MUNICIPAL CODES AND REGULATIONS.
- C. SUBMIT TO THE ELECTRICAL INSPECTION DEPARTMENT AND SUPPLY AUTHORITY NECESSARY NUMBER OF DRAWINGS AND SPECIFICATIONS FOR EXAMINATION AND APPROVAL PRIOR TO THE COMMENCEMENT OF WORK.
- D. OBTAIN ALL NECESSARY PERMITS AND APPROVALS AND PAY ALL RELATED FEES REQUIRED FOR THIS INSTALLATION.
- E. ALL EQUIPMENT SUPPLIED UNDER THIS CONTRACT SHALL BE NEW AND SHALL BE C.S.A. APPROVED.
- 1.3 COORDINATION WITH OTHER TRADES**
- A. REFER TO MECHANICAL, STRUCTURAL AND ARCHITECTURAL SPECIFICATIONS FOR ADDITIONAL ELECTRICAL WORK IN CONNECTION WITH OTHER DIVISIONS WHERE SUCH WORK IS INCLUDED IN OTHER SECTIONS OF THE SPECIFICATIONS. PROVIDE LABOUR, EQUIPMENT, CONDUIT, WIRING, ETC. AS REQUIRED FOR OPERATION OF THE SPECIFIED EQUIPMENT.
- B. SCHEDULE EXECUTION OF ELECTRICAL WORK WITH ASSOCIATED WORK SPECIFIED IN OTHER DIVISIONS.
- C. COORDINATE ELECTRICAL WORK WITH WORK OF OTHER TRADES TO AVOID CONFLICTS WITH PIPES, AIR DUCTS OR OTHER EQUIPMENT. PROVIDE ADDITIONAL SUPPORTS, WIRING, ETC. TO RELOCATE ELECTRICAL EQUIPMENT AS REQUIRED WHERE STRUCTURAL MEMBERS, AIR DUCTS, PIPING OR OTHER EQUIPMENT INTERFERES WITH ELECTRICAL INSTALLATION.
- 1.4 EXAMINATION OF SITE AND CONSTRUCTION DOCUMENTS**
- A. EXAMINE THE SITE AND LOCAL CONDITIONS WHICH WILL AFFECT THE WORK. REPORT ANY DISCREPANCIES TO THE CITY PRIOR TO COMMENCING ANY WORK. EXTRA PAYMENTS RESULTING FROM CONDITIONS WHICH COULD REASONABLY BE FORESEEN FROM EXAMINATION OF THE DOCUMENTS AND/OR SITE WILL BE BORNE BY THE SUB-CONTRACTOR.
- 1.5 SUPERVISION**
- A. SUPERVISE THE WORK AT ALL TIMES THROUGH A RESPONSIBLE AND COMPETENT SUPERVISOR
- B. FULL COOPERATION SHALL BE SHOWN WITH OTHER TRADES TO FACILITATE INSTALLATIONS AND AVOID DELAYS IN CARRYING OUT THE WORK.
- 1.6 ACCURACY OF DATA**
- A. DRAWINGS ARE SCHEMATIC. EXACT LOCATIONS, DISTANCES, LEVELS AND OTHER DIMENSIONS SHALL BE GOVERNED BY THE BUILDING AS CONSTRUCTED.
- B. OUTLETS OR EQUIPMENT SHALL BE MOVED TO ANY POINT WITHIN A 10' RADIUS WHEN RELOCATION IS REQUESTED BY THE CITY BEFORE THE WORK HAS BEEN SUBSTANTIALLY COMPLETED, WITHOUT ADDITIONAL COST.
- 1.7 APPROVAL OF MATERIAL**
- A. REQUEST FOR APPROVAL OF MATERIAL AS EQUALS OR ALTERNATES TO THAT SPECIFIED SHALL BE SUBMITTED TO THE CONTRACT ADMINISTRATOR A MINIMUM OF (5) WORKING DAYS PRIOR TO THE BID SUBMITTAL, IN ACCORDANCE WITH B6 OF THE SPECIFICATION.
- 1.8 SHOP DRAWINGS**
- A. SUBMIT SHOP DRAWINGS OF ELECTRICAL EQUIPMENT TO THE CITY FOR REVIEW. FABRICATION OF THE EQUIPMENT SHALL NOT COMMENCE UNTIL SHOP DRAWINGS HAVE BEEN REVIEWED AND APPROVED BY THE CONTRACT ADMINISTRATOR. FIVE (5) SETS SHALL BE SUBMITTED WITH LOCAL INSPECTION DEPARTMENT FOR APPROVAL.
- 1.9 RECORD DRAWINGS**
- A. KEEP A RECORD SET OF DRAWINGS ON THE SITE AT ALL TIMES RECORDING ALL CHANGES THAT MAY OCCUR. SUBMIT THESE DRAWINGS TO THE CITY, UPON COMPLETION OF THE WORK.
- B. SUBMIT A CERTIFICATE OF INSPECTION FROM THE LOCAL INSPECTION AUTHORITY UPON COMPLETION OF THE WORK.
- C. ELECTRICAL SUBCONTRACTOR TO PAY FOR AND BE RESPONSIBLE FOR THE REPRODUCTION OF RECORD DRAWINGS.
- D. WHERE ORIGINAL DRAWINGS HAVE BEEN PRODUCED ON ACAD, RECORD DRAWINGS ARE TO BE ON CAD. THE CAD SYSTEM MUST BE COMPATIBLE WITH THAT USED TO PRODUCE ORIGINAL DRAWINGS. ELECTRICAL CONTRACTOR TO PROVIDE CITY WITH ELECTRONIC COPY OF COMPLETED RECORD DRAWINGS, OR PAY THE CITY TO PRODUCE CAD DRAWINGS.
- 1.10 TEST**
- THE ELECTRICAL INSTALLATION SHALL BE COMPLETELY TESTED DEMONSTRATING THAT THE EQUIPMENT AND SYSTEMS INSTALLED PERFORMED IN MANNER INTENDED.
- 1.11 NOT APPLICABLE**
- 1.12 GROUNDING**
- A. THE ENTIRE INSTALLATION SHALL BE GROUNDED IN ACCORDANCE WITH THE CANADIAN ELECTRICAL CODE.
- 1.13 WORKMANSHIP**
- A. INSTALL EQUIPMENT, CONDUIT AND CABLES IN A MANNER TO PRESENT A NEAT APPEARANCE TO THE SATISFACTION OF THE CONTRACT ADMINISTRATOR.
- B. INSTALL CONDUIT AND CABLE RUNS PARALLEL AND PERPENDICULAR IN CHASES BEHIND FURRING OR CEILINGS WHERE SUCH CONCEALMENT IS POSSIBLE. IN AREAS WHERE SYSTEMS ARE TO BE EXPOSED, INSTALL NEATLY AND GROUP TO PRESENT A TIDY APPEARANCE.
- C. INSTALL EQUIPMENT REQUIRING MAINTENANCE, ADJUSTMENT OR EVENTUAL REPLACEMENT WITH ADEQUATE CLEARANCES AND ACCESSIBILITY FOR SAME. INCLUDE, IN THE WORK, ALL REQUIREMENTS SHOWN ON THE SHOP DRAWINGS OR MANUFACTURES INSTALLATION INSTRUCTIONS.
- D. REPLACE WORK UNSATISFACTORY TO THE CITY WITHOUT EXTRA COST. REPLACEMENT WITH ADEQUATE CLEARANCES AND ACCESSIBILITY FOR SAME. INCLUDE, IN THE WORK, ALL REQUIREMENTS SHOWN ON THE SHOP DRAWINGS OR MANUFACTURES INSTALLATION INSTRUCTIONS.
- 1.14 WORK IN EXISTING BUILDING**
- A. THE BUILDING SHALL REMAIN OPEN AND IN NORMAL OPERATION DURING THE CONSTRUCTION PERIOD OF THIS CONTRACT.
- B. WHERE EXISTING SERVICES SUCH AS ELECTRICAL POWER, FIRE, ALARM SYSTEM, TELEPHONE SYSTEM, ETC. ARE REQUIRED TO BE DISRUPTED AND/OR SHUTDOWN CO-ORDINATE THE SHUTDOWNS WITH THE OWNER AND CARRY OUT THE WORK AT A TIME AND IN A MANNER ACCEPTABLE TO THEM. SCHEDULE ALL DISRUPTIONS AND/OR SHUTDOWNS AND ENSURE THAT THE DURATION OF SAME IS KEPT TO A MINIMUM. SUBMIT FOR APPROVAL A WRITTEN SCHEDULE OF EACH DISRUPTION AT LEAST 72 HOURS IN ADVANCE OF PREFORMING WORK AND OBTAIN OWNER'S WRITTEN CONSENT PRIOR TO IMPLEMENTING.
- C. SHOULD ANY CONNECTIONS BE REQUIRED TO MAINTAIN SERVICES DURING WORK IN THE EXISTING BUILDING, SUPPLY AND INSTALL ALL NECESSARY MATERIAL AND EQUIPMENT AND PROVIDE ALL LABOUR AT NO EXTRA COST. SHOULD ANY EXISTING SYSTEM BE DAMAGED, MAKE FULL REPAIRS WITHOUT EXTRA COST, AND TO THE SATISFACTION OF THE OWNER.

- D. THE DRAWINGS INDICATE MAJOR ITEMS OF EQUIPMENT TO BE DELETED OR RELOCATED BUT MAY NOT INDICATE EVERY ITEM OF EQUIPMENT OR CONDUIT TO BE DELETED OR RELOCATED.
- BE RESPONSIBLE FOR DETERMINING WHICH EXISTING EQUIPMENT IS TO BE DELETED OR RELOCATED BY EXAMINING THE SITE AND CONSTRUCTION DOCUMENTS.
- 1.15 CUTTING AND PATCHING**
- A. PAY THE COSTS OF ALL CUTTING AND PATCHING FOR INSTALLATION OF ELECTRICAL WORK.
- B. CUTTING AND PATCHING REQUIRED FOR INSTALLATION OF ELECTRICAL WORK SHALL BE DONE BY THE PARTICULAR TRADE WHOSE WORK IS INVOLVED. NO CUTTING OR PATCHING SHALL BE CARRIED OUT BY THE TRADESMAN EMPLOYED ON THE ELECTRICAL WORK.
- C. OBTAIN THE APPROVAL OF THE OWNER BEFORE ARRANGING FOR ANY CUTTING. PATCHING SHALL RESTORE THE AFFECTED AREA TO THE ORIGINAL CONDITION. MATERIALS AND METHODS USED FOR PATCHING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CORRESPONDING DIVISIONS.
- 1.16 ACCESS DOORS**
- A. PROVIDE ACCESS DOORS IN INACCESSIBLE CONSTRUCTION TO GIVE ACCESS TO ALL CONCEALED JUNCTION BOXES, PULL BOXES, CONDUCTOR JOINTS AND OTHER SIMILAR ELECTRICAL WORK WHICH MAY REQUIRE MAINTENANCE OR REPAIR. BE COMPLETE WITH FLUSH FRAME AND ANCHOR, CONCEALED HINGES, POSITIVE LOCKING SCREWDRIVER LOCK, AND MOUNTING AND FINISHING PROVISIONS TO SUIT THE FINISH MATERIAL FOR WHICH THEY ARE SUPPLIED. ACCESS DOORS TO BE INSTALLED BY THE DIVISION RESPONSIBLE FOR THE PARTICULAR TYPE OF CONSTRUCTION IN WHICH ACCESS DOORS ARE REQUIRED. SUPPLY THE ACCESS DOORS TO THE DIVISION INSTALLING SAME AT THE PROPER TIME TO AVOID CONSTRUCTION DELAYS.

**PART 2 - MATERIALS, INSTALLATION & POWER**

- 2.1 OUTLET BOXES**
- A. OUTLET, JUNCTION AND SWITCH BOXES SHALL BE GALVANIZED PRESSED STEEL OF SIZE AND TYPE TO SUIT EACH INDIVIDUAL APPLICATION.
- 2.2 WIRING METHODS**
- A. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, ALL WIRE SHALL BE COPPER, MINIMUM #12 WITH 90 DEGREES CELSIUS X-LINK INSULATION.
- B. ALL WIRING IN FINISHED AREAS SHALL BE CONCEALED. CONDUITS SHALL BE RUN AT RIGHT ANGLES TO THE BUILDING LINES.
- C. CABLES SHALL BE GROUPED WHERE POSSIBLE AND CLIPPED IN A NEAT AND WORKMANSHIP MANNER.
- 2.3 CONDUIT**
- A. USE ELECTRICAL METALLIC TUBING (EMT) EXCEPT WHERE NOTED OTHERWISE. WIRING HOMERUNS TO PANELS AND MAIN BRANCH WIRING IN CEILING SPACES TO BE RUN IN CONDUIT.
- B. USE FLEXIBLE METAL CONDUIT FOR CONNECTION TO MOTORS, TRANSFORMERS, AND EQUIPMENT SUBJECT TO MOVEMENT OR VIBRATION. PROVIDE A SEPARATE INSULATED GROUND CONDUCTOR WITHIN FLEXIBLE CONDUIT.
- C. USE LIQUID TIGHT FLEXIBLE METAL CONDUIT FOR CONNECTION TO EQUIPMENT DESCRIBED ABOVE WHERE EXPOSED TO WET OR CORROSIVE CONDITIONS.
- 2.4 FASTENING AND SUPPORTS**
- A. PROVIDE METAL BRACKETS, FRAMES, HANGERS, CLAMPS AND RELATED TYPE OF SUPPORT STRUCTURES WHERE INDICATED OR AS REQUIRED TO SUPPORT CONDUIT AND CABLE RUNS.
- 2.5 MECHANICAL EQUIPMENT WIRING**
- A. PROVIDE STARTERS, DISCONNECTS AND WIRING FOR ALL HEATING AND VENTILATING EQUIPMENT UNLESS SPECIFIED OTHERWISE. POWER AND CONTROL WIRING FOR THE MECHANICAL EQUIPMENT 50V OR OVER SHALL BE PERFORMED BY THE ELECTRICAL SUB-CONTRACTOR. CONTROL WIRING UNDER 50V SHALL BE PERFORMED BY THE MECHANICAL SUB-CONTRACTOR. IN ALL CASES WHERE ELECTRICAL SUB-CONTRACTOR IS TO PERFORM CONTROL WIRING, A WIRING DIAGRAM IS TO BE OBTAINED FROM THE MECHANICAL SUB-CONTRACTOR.
- B. ENSURE MOTOR ROTATION IS AS REQUIRED.
- C. REFER TO THE MECHANICAL DRAWINGS FOR THE EXACT LOCATION OF MECHANICAL EQUIPMENT REQUIRING AN ELECTRICAL CONNECTION.

**CATEGORY 6 CABLING SPECIFICATIONS**

**SUB-CONTRACTOR QUALIFICATIONS**

THE SUB-CONTRACTOR PERFORMING THE DATA CABLING INSTALLATION SHALL HAVE A STRUCTURED CABLING INDUSTRY AFFILIATION SUCH AS BICSI (BUILDING INDUSTRY CONSULTANTS INTERNATIONAL) MEMBERSHIP, RCDD (REGISTERED COMMUNICATIONS DISTRIBUTOR DESIGNER) AND/OR A STRUCTURED CABLING VENDOR CERTIFICATION.

ALL DATA CABLING INSTALLERS SHALL BE LICENSED AND INSURED.

THE DATA CABLING SUB-CONTRACTOR SHALL PROVIDE REFERENCES OF SIMILAR PROJECTS.

**HORIZONTAL CABLING**

1.1 CATEGORY 6 CABLING SHALL BE CERTIFIED AND TESTED TO A MINIMUM OF 250 MHZ. THE CATEGORY 6 HORIZONTAL CABLING SHALL MEET THE MINIMUM TECHNICAL SPECIFICATIONS IN (TELECOMMUNICATIONS INDUSTRY ASSOCIATION) TIA 568A.

1.2 ALL DATA TELECOMMUNICATIONS JACKS SHALL BE OF CATEGORY 6 CONNECTORS AND SHALL BE TIA CERTIFIED CATEGORY 6.

1.3 NO INSTALLED CABLING MAY BE EXPOSED TO VIEW OUTSIDE OF THE LAN ROOM. IT SHALL BE WITHIN A RACEWAY, BEHIND A SUSPENDED CEILING OR CONCEALED WITH WIRE MOULDING.

1.4 ALL HORIZONTAL CABLING RUNS SHALL RUN FROM EACH WORK AREA IN A STAR TOPOLOGY TO A LAN ROOM. THERE SHALL BE NO CONNECTOR IN THE CABLE RUN BETWEEN THE OUTLET IN THE WORK AREA AND THE LAN ROOM.

1.5 NO CABLING RUN MAY EXCEED A LENGTH OF 90 METERS.

1.6 ALL CATEGORY 6 CABLING SHALL BE TERMINATED IN THE TELECOMMUNICATIONS CLOSET ON RACK MOUNT CATEGORY 6 PATCH PANELS (MAXIMUM OF 48 JACKS PER PANEL).

1.7 THE CATEGORY 6 CABLING IN THE RACKS SHALL BE INSTALLED WITH SUFFICIENT AND APPROPRIATE MOUNTING CLIPS, BRACKETS, AND CABLE MANAGEMENT TO PROVIDE A SECURE AND MAINTAINABLE SYSTEM. CARE SHALL BE TAKEN TO NOT CAUSE THE CABLES TO BE OVERLY CRIMPED.

1.8 THE UTP CATEGORY 6 CABLE TAIL SHALL BE TERMINATED WITH A MINIMUM OF 14" OF SLACK BUT NOT TO EXCEED 18".

1.9 AFTER DRESSING CABLE TO THE FINAL LOCATION, THE SHEATH SHALL BE REMOVED TO A POINT THAT ALLOWS THE CONDUCTORS TO BE SPLAYED AND TERMINATED IN A NEAT AND UNIFORM FASHION. EVERY EFFORT MUST BE MADE TO MAINTAIN SHEATH INTEGRITY BY REMOVING ONLY AS MUCH AS IS PRACTICAL TO ACCOMPLISH TERMINATION. CABLE PAIR TWIST SHALL BE MAINTAINED UP TO THE POINT OF TERMINATION. AS STATED IN 568A, THE PAIRS IN A CABLE SHOULD NEVER BE UNTWISTED MORE THAN 0.5 INCH FROM THE POINT OF TERMINATION. UNDER NO CIRCUMSTANCES SHALL CABLE PAIRS BE UNTWISTED OR OTHERWISE ALTERED PRIOR TO TERMINATION.

1.10 ANY UNUSED HORIZONTAL CABLING SHALL BE LABELED AND LOOSELY COILED.

1.11 SUB-CONTRACTOR SHALL SPECIFY CABLES PROPOSED FOR USE AND SUBMIT DOCUMENTATION PROVING THAT THE PROPOSED CABLES MEET THESE SPECIFICATIONS.

**LABELLING**

2.1 ALL CABLES SHALL BE LABELLED WITH TAG WRAPS OR SOME OTHER PERMANENT MARKER CAPABLE OF WITHSTANDING MULTIPLE PULLING OF CABLE THROUGH RACEWAYS. LABELS SHALL BE LOCATED 0.5 METER FROM THE WORK AREA END.

2.2 ALL TERMINATIONS SHALL BE CLEARLY IDENTIFIED ON PATCH PANEL IN TELECOMMUNICATIONS CLOSET. ALL JACKS IN THE PATCH PANEL MUST BE IN SEQUENTIAL ORDER.

2.3 AT EACH WORK AREA, FACEPLATE OUTLET SHALL BE PROFESSIONALLY PRINTED WITH JACK NUMBERS CLEARLY VISIBLE WITHOUT REMOVING OUTLET FACEPLATE. THE LABELING SHALL BE METAL OR VINYL ADHESIVE TAPE WITH EMBOSSED OR INDELIBLE PRINTING FOR EACH OUTLET.

2.4 THE ALPHA-NUMERIC NUMBERING SCHEME IS AS SHOWN:

XX-YY-ZZZ

XX LEVEL/FLOOR DESIGNATOR

YY ZONE NUMBER ON FLOOR

ZZZ WORKSTATION JACK NUMBER

**FIELD TEST QUALITY**

3.1 THE SUB-CONTRACTOR SHALL VISUALLY INSPECT ALL CABLES, CABLE REELS, AND SHIPPING CARTONS TO DETECT CABLE DAMAGE INCURRED DURING SHIPPING AND TRANSPORT. VISIBLY DAMAGED ITEMS SHALL NOT BE INSTALLED.

3.2 CONDUCT CABLE TESTING ONLY UPON COMPLETION OF INSTALLATION.

3.3 A MINIMUM OF A LEVEL II-E FIELD TESTER SHALL BE USED TO VERIFY CABLING PERFORMANCE.

3.4 IN ADDITION TO HARD COPY TEST RESULTS, ACCEPTABLE ELECTRONIC FORMAT FOR TEST RESULTS ARE MICROSOFT EXCEL FOR EACH LINK.


3.5 THE SUB-CONTRACTOR SHALL DESCRIBE IN DETAIL ITS PROPOSED TEST PLAN TO DETECT ANY DEFECTIVE COMPONENTS AND TO DEMONSTRATE THAT THE INSTALLATION COMPLIES WITH THE SPECIFICATION.

NOTES :

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Date: 2005.05.30

NO.	REVISION/DESCRIPTION	BY	DATE
SEALS			

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DATE	2005.05.30	USER	APPROVAL


**CITY OF WINNIPEG  
 PLANNING, PROPERTY &  
 DEVELOPMENT DEPARTMENT  
 CIVIC ACCOMMODATIONS DIVISION  
 300 - 65 GARRY ST. R3C 4K4**

**PROJECT  
 ADMINISTRATION BUILDING  
 2nd FLOOR RENOVATIONS  
 CONFERENCE ROOM RENOVATIONS  
 510 MAIN STREET**

**SHEET TITLE  
 SECOND FLOOR PLAN  
 ELECTRICAL & DATA  
 SPECIFICATIONS**

SCALE	PROJECT NO.	SHEET NO.
AS SHOWN	2004-180	<b>E4</b>