

# ELECTRICAL SPECIFICATION (PART 1)

## GENERAL SPECIFICATION

### REFERENCE STANDARDS

1. COMPLETE THE INSTALLATION OF THE WORK IN ACCORDANCE WITH LATEST EDITIONS OF THE ONTARIO BUILDING CODE, PROVINCIAL ELECTRICAL SAFETY CODE, C.S.A. STANDARDS, U.L.C., N.F.P.A., AND OTHER CODES, AS REQUIRED. ALL ELECTRICAL WORK SHALL BE PERFORMED IN COMPLIANCE WITH BASE BUILDING STANDARDS AND CLIENT'S REQUIREMENTS.

### WORK COVERED UNDER THIS CONTRACT

1. WORK OF THIS CONTRACT INCLUDES FURNISHING LABOUR, MATERIALS, EQUIPMENT, SERVICES, AND OTHER RELATED EXPENSES TO EXECUTE COMPLETE CONSTRUCTION OF FACILITY SPECIFIED UNDER CONTRACT DOCUMENTS. PROVIDE ALL PRODUCTS AND METHODS SPECIFIED OR SHOWN IN THE CONTRACT DOCUMENTS COMPLETE WITH INCIDENTALS NECESSARY FOR A COMPLETE OPERATING INSTALLATION.

### DEFINITIONS

1. **SUPPLY:** MEANS TO ACQUIRE OR PURCHASE, SHIP OR TRANSPORT TO THE SITE, UNLOAD, REMOVE PACKAGING TO PERMIT INSPECTION FOR DAMAGE, RE-PACKAGE, REPLACE DAMAGED ITEMS, AND SAFELY STORE ON MEANS TO REMOVE FROM SITE STORAGE, MOVE OR TRANSPORT TO INTENDED LOCATION, INSTALL IN POSITION, CONNECT TO UTILITIES, REPAIR SITE CAUSED DAMAGE OR REPLACE, AND MAKE READY FOR USE.
3. **PROVIDE:** MEANS TO SUPPLY AND INSTALL.

### PERMITS AND FEES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL PERMITS, LICENSES, INSPECTIONS AND RELATED FEES. SUBMIT TO THE LOCAL ELECTRICAL SAFETY AUTHORITY, THE NECESSARY NUMBER OF DOCUMENTS FOR EXAMINATION, SPECIAL INSPECTION AND APPROVAL, PRIOR TO THE COMMENCEMENT OF THE WORK, AND PAY ALL COSTS AND ASSOCIATED FEES.

### PRODUCTS

1. PROVIDE ALL NEW PRODUCTS, WHERE MANUFACTURER IS NOT SPECIFIED PROVIDE PRODUCTS OF HIGH COMMERCIAL STANDARD AND QUALITY CONSISTENT WITH THE STANDARDS OF THESE SPECIFICATIONS.
2. ALL PRODUCTS MUST BEAR THE APPROVAL OF THE CSA OR HAVE SPECIAL APPROVAL OF THE INSPECTION AUTHORITY HAVING JURISDICTION FOR THEIR RESPECTIVE FUNCTIONS AND ENVIRONMENTS. APPROVAL FROM THE LOCAL ELECTRICAL SAFETY AUTHORITY TO BE OBTAINED BY THE CONTRACTOR WHERE THERE IS NO ALTERNATIVE TO SUPPLYING EQUIPMENT WHICH IS NOT C.S.A. CERTIFIED.
3. PROVIDE PRODUCTS OF SAME MANUFACTURE FOR LIKE APPLICATIONS UNLESS NOTED OTHERWISE.
4. PRODUCTS SHALL BE DESIGNED AND MANUFACTURED TO APPLICABLE IEMAC AND NEMA SPECIFICATIONS.

### CONTRACT DOCUMENTS

1. DRAWINGS, SPECIFICATIONS, AND SCHEDULES ARE COMPLEMENTARY EACH TO THE OTHER AND WHAT IS CALLED FOR BY ONE TO BE BINDING AS IF CALLED FOR BY ALL. REPORT ANY DISCREPANCIES BETWEEN DRAWINGS AND/OR SPECIFICATIONS AND EXISTING CONDITIONS OR DESIGNER'S DRAWINGS PRIOR TO THE COMMENCEMENT OF THE WORK.
2. THE DRAWINGS FOR THE ELECTRICAL WORK ARE DIAGRAMMATIC PERFORMANCE DRAWINGS ONLY, INTENDED TO CONVEY THE SCOPE OF WORK AND INDICATE THE GENERAL ARRANGEMENT AND APPROXIMATE LOCATION OF ELECTRICAL EQUIPMENT. THE DRAWINGS DO NOT INTEND TO SHOW ARCHITECTURAL, INTERIOR DESIGN, MECHANICAL, STRUCTURAL OR BASE BUILDING DETAILS. BE RESPONSIBLE FOR A THOROUGH KNOWLEDGE OF SAME BEFORE PROCEEDING WITH THE WORK. DO NOT SCALE OR MEASURE DRAWINGS. OBTAIN INFORMATION REGARDING ACCURATE DIMENSIONS FROM DESIGNER/ARCHITECT'S DRAWINGS.
3. COOPERATE AND COORDINATE WITH OTHER TRADES IN LAYING OUT OF WORK SO AS NOT TO CONFLICT WITH THE WORK OF OTHER TRADES. CARRY OUT WORK PROMPTLY AS PER CONSTRUCTION SCHEDULE AND COORDINATE WITH WORK OF OTHER TRADES. MAKE, AT NO ADDITIONAL COST, ANY CHANGES OR ADDITIONS TO MATERIALS AND EQUIPMENT NECESSARY TO ACCOMMODATE STRUCTURAL CONDITIONS (OFFSETS AROUND BEAMS/SCHEMATA) TO TENDER AND VERIFY ALL CONDITIONS AND DIMENSIONS. ALLOW FOR ANY REROUTING OF EXISTING SERVICES AND EQUIPMENT IN THE TENDER PRICE. FAILURE TO DO SO DOES NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY.
5. MAKE CHANGES WHERE REQUIRED TO ACCOMMODATE STRUCTURAL CONDITIONS, (BEAMS, COLUMNS CAPS, ETC.), OBTAIN CONSULTANT'S APPROVAL BEFORE PROCEEDING.

### SHOP DRAWINGS

1. SUBMIT ELECTRONIC SHOP DRAWINGS STAMPED BY ELECTRICAL AND GENERAL CONTRACTOR OF ALL SPECIFIED EQUIPMENT FOR REVIEW AND RECORDS TO THE ENGINEER FOR REVIEW BEFORE COMMENCEMENT OF WORK. ALLOW 5 DAYS FOR CONSULTANT'S REVIEW OF EACH SUBMISSION.

### IDENTIFICATION

1. EQUIPMENT ELECTRICAL EQUIPMENT WITH NAMEPLATES AND LABELS MECHANICALLY ATTACHED TO EQUIPMENT (ALL PANELS, DISCONNECT SWITCHES, SPLITTERS, TERMINAL CABINETS ETC.) TO MATCH BASE BUILDING. NAMEPLATES SHALL IDENTIFY EQUIPMENT NAME, VOLTAGE, PHASE, CURRENT RATING, AND USE.
2. PROVIDE TYPEWRITTEN DIRECTORIES FOR NEW AND EXISTING PANELS. CONFIRM EXISTING IDENTIFYING MARKINGS, ON BOTH ENDS OF PHASE CONDUCTORS OF FEEDERS AND BRANCH CIRCUIT WIRING.
3. COLOUR CODE CONDUITS, BOXES AND METALLIC SHEATHED CABLES.

### LOCATION OF OUTLETS/EQUIPMENT

1. COORDINATE WITH THE DESIGNER/ARCHITECT'S DRAWINGS FOR EXACT LOCATIONS OF ALL OUTLETS.
2. DO NOT INSTALL OUTLETS BACK-TO-BACK IN WALL; ALLOW MINIMUM 150mm HORIZONTAL CLEARANCE BETWEEN BOXES. LOCATION OF OUTLETS SHALL BE GENERALLY SUBJECT TO CHANGE WITHOUT EXTRA COST TO OWNER PROVIDED INFORMATION IS GIVEN PRIOR TO INSTALLATION. NO EXTRA AMOUNT WILL BE PAID FOR OUTLETS RELOCATED REQUIRING EXTRA LABOUR AND MATERIAL UP TO 3000mm (10'-0") FROM ORIGINAL LOCATION, NOR WILL A CREDIT BE EXPECTED WHERE RELOCATION UP TO 3000mm (10'-0") REDUCES MATERIALS AND LABOUR.
3. LIGHTING PANELS, SPLITTER TROUGHS, PULL BOXES, AND OTHER BOXES AND CABINETS INDICATED TO BE INSTALLED IN AREAS WITH FINISHED WALLS SHALL BE FLUSH MOUNTED AND FITTED WITH SUITABLE FLUSH TRIM AND DOORS. PANELS, BOXES, SPLITTER TROUGHS AND CABINETS INSTALLED IN PIPE SPACES OR OTHER AREAS WHERE AN EXPOSED TYPE OF WIRING IS SPECIFIED SHALL BE SURFACE MOUNTED.

### MOUNTING HEIGHTS

1. MOUNTING HEIGHT OF EQUIPMENT IS FROM FINISHED FLOOR TO CENTERLINE OF EQUIPMENT UNLESS SPECIFIED OR INDICATED OTHERWISE. IF MOUNTING HEIGHT OF EQUIPMENT IS NOT SPECIFIED OR INDICATED, VERIFY BEFORE PROCEEDING WITH INSTALLATION.

INSTALL ELECTRICAL EQUIPMENT AT FOLLOWING HEIGHTS UNLESS INDICATED OTHERWISE:

1. WALL SWITCHES: 1200mm A.F.F.
2. LOCAL RECEPTACLES: GENERAL: 300mm A.F.F.
3. PANELBOARDS: AS REQUIRED BY CODE OR AS INDICATED.
4. PHONE/DATA OUTLETS: 300mm A.F.F.
5. FIRE ALARM DEVICES: AS REQUIRED BY CAN/ULC -5524 OR AS INDICATED ON DRAWINGS.
6. ALL MANUAL CONTROLS MUST BE LOCATED BETWEEN 900mm MIN. AND 1200mm MAX. ABOVE THE FLOOR WITH A CLEAR FLOOR SPACE OF AT LEAST 750mmx1200mm.

### INTERRUPTION OF SERVICES

1. CO-ORDINATE ALL WORK WITH THE OWNER'S USE OF THE BUILDING.
2. MAINTAIN ALL ELECTRICAL SERVICES TO ALL PARTS OF THE BUILDING WHICH ARE IN USE. PROVIDE TEMPORARY SERVICES AND WIRING AS NECESSARY.
3. OBTAIN OWNER'S WRITTEN APPROVAL BEFORE INTERRUPTING ANY SERVICE.
4. REQUEST PERMISSION TO INTERRUPT SERVICES IN WRITING NOT LESS THAN TWO (2) WEEKS IN ADVANCE AND STATE TIME(S) AND DURATION(S) OF INTERRUPTIONS.

### SITE CONCERNS

1. CONTRACTOR TO ENSURE TO MAINTAIN ACCESS TO THE SERVICE/UTILITY ROOMS.
2. CONTRACTOR TO MAINTAIN ROUTE USAGE FOR PEDESTRIAN DURING CONSTRUCTION.
3. CONTRACTOR TO PROTECT LIFE AND SAFETY SYSTEM AND OTHER BUILDING SYSTEMS AT ALL TIMES. IN CASE OF ANY DAMAGE AND / OR BYPASS SYSTEM, CONTRACTOR TO CONTACT PM AND ENSURE ALTERNATIVE MEASURES ARE IN PLACE AS PER THE SITES FIRE SAFETY PLAN.
4. CONTRACTOR TO REVIEW THE DESIGNATED SUBSTANCES SURVEY AND SOIL SAMPLING REPORT INCLUDING ALL REQUIREMENTS FOR ABATEMENT AND DISPOSAL.

### ALTERNATES AND SUBSTITUTIONS DURING PROGRESS OF WORK

1. SUBSTITUTE PRODUCTS WILL ONLY BE CONSIDERED WHEN TENDERED PRODUCTS BECOME UNOBTAINABLE. WRITTEN PROOF IS REQUIRED.
2. PROVIDE DETAILED SPECIFICATIONS AND SHOP DRAWINGS WITH COMPLETE PERFORMANCE CHARACTERISTICS OF THE PROPOSED ALTERNATE WITH THE SUBMISSION TO THE CONSULTANT. SUBMIT PROOF THAT SUBSTITUTE PRODUCT IS EQUAL TO THAT SPECIFIED.
3. ASSUME RESPONSIBILITY AND PAY FOR ANY ADDITIONAL INSTALLATION COST INCURRED BY ALL DIVISIONS RESULTING FROM THE SUBSTITUTION. MAKE REVISIONS TO RECORD DRAWINGS INCORPORATING ALL SUBSTITUTIONS AND CHANGES.
4. SUBMIT THE PRICE VARIATION FROM THE TOTAL CONTRACT PRICE FOR EACH SUBSTITUTED PRODUCT.

### VALUATION OF CHANGES

1. CONTRACT CHANGES MUST BE IMPLEMENTED THROUGH A WRITTEN NOTICE FROM CONTRACTOR TO CONSULTANT IDENTIFYING CHANGES TO BOTH CONTRACT VALUE AND TIME. FOR EACH CHANGE, SUBMIT A COMPLETE ITEMIZED BREAKDOWN OF LABOR AND MATERIAL. CONTRACT CHANGES MUST OBTAIN WRITTEN APPROVAL FROM CONSULTANT PRIOR TO WORK COMMENCING. FOLLOWING WRITTEN APPROVAL, A FORMAL CHANGE ORDER WILL BE ISSUED BY PM.
2. ONLY THE NET DIFFERENCE BETWEEN AN EXTRA AND A CREDIT WILL BE SUBJECT TO OVERHEAD AND PROFIT MARK-UP.
3. MATERIAL TO BE VALUED AT CURRENT TRADE PRICES. THE LABOR HOURS SHALL BE BASED ON THE LATEST ISSUE OF THE NATIONAL ELECTRICAL CONTRACTORS ASSOCIATION (NECA) LABOUR UNITS. THE MATERIAL PRICES SHALL BE BASED ON THE CURRENT NATIONAL PRICES SYSTEM (NFS) CATALOGUE LESS APPLICABLE TRADE DISCOUNTS.

### COMPLETION OF CONTRACT

1. ALL EQUIPMENT MUST BE INSTALLED AS PER MANUFACTURER RECOMMENDATION, CLEANED AND TESTED BEFORE FINAL ACCEPTANCE BY CONSULTANT.
2. THE CONTRACTOR MUST CORRECT ALL DEFICIENCIES AS SPECIFIED ON THE DEFICIENCY LIST ISSUED BY THE CONSULTANT/CLIENT.
3. WHERE APPLICABLE, AFTER COMPLETION OF WORK CONTRACTOR TO PROVIDE COPIES OF: ESA INSPECTION CERTIFICATE; FIRE ALARM VERIFICATION CERTIFICATE (AS PER STANDARD ULC 537); EMERGENCY LIGHTING LEVEL TEST RESULTS (READINGS OF THE EMERGENCY LIGHTING LEVEL COMPLYING WITH THE ONTARIO BUILDING CODE), BATTERY UNIT SYSTEM TEST RESULTS.
4. PROVIDE A WRITTEN WARRANTY FOR ONE YEAR COVERING ALL EQUIPMENT, MATERIALS AND WORKMANSHIP FROM THE DATE OF ACCEPTANCE OF THE INSTALLATION BY THE OWNER. INCLUDE IN THE OPERATIONS AND MAINTENANCE MANUAL. ANY DEFECTS OR DEFICIENCIES WHICH ORIGINATE OR BECOME EVIDENT DURING THE WARRANTY PERIOD MUST BE REPAIRED OR CORRECTED AT NO EXTRA COST TO THE OWNER. ALL WORK RELATING TO THE REPLACEMENT OF DEFECTIVE ITEMS, MUST BE CARRIED OUT AFTER NORMAL WORKING HOURS AND AT A TIME WHICH IS ACCEPTABLE TO THE TENANT.

### GENERAL NOTES:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE JOB AND THE ENGINEER'S DRAWINGS AND CONDITIONS SHALL BE THE BASIS FOR ALL DIMENSIONS AND CONDITIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS PRIOR TO THE COMMENCEMENT OF THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS PRIOR TO THE COMMENCEMENT OF THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS PRIOR TO THE COMMENCEMENT OF THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS PRIOR TO THE COMMENCEMENT OF THE WORK.

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### Client

STEEL CANADA ROOFING & SIDING  
16X16' SHIPPING CONTAINER  
MODULAR UNIT  
TORONTO, ONTARIO

### Scale: N.T.S.

Proj. No. P01024\_301  
Date: APRIL 08 2021  
Drawn By: S.M.  
Designed By: S.S.  
Checked By: M.R.

### Drawing Title:

**ELECTRICAL SPECIFICATION**  
**PART 1**  
Drawing No: **AE-21059A-DRAW-E002-RP2**

### Scale: N.T.S.

Proj. No. P01024\_301  
Date: APRIL 08 2021  
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**PART 1**  
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## ELECTRICAL SPECIFICATION (PART 2)

### AS-BUILT DRAWINGS

1. AT THE COMPLETION OF WORK AND BEFORE FINAL ACCEPTANCE, PROVIDE AS-BUILT DRAWINGS OF THE INSTALLATION ELECTRONIC FILES OR HARD COPIES RED LINE FORMAT. INDICATE THE WORDS "AS-BUILT" IN THE TITLE BLOCK COLUMN OF THE DRAWINGS AS WELL AS THE ELECTRICAL CONTRACTOR'S NAME AND ADDRESS. PREPARE RECORD DRAWINGS SHOWING THE FOLLOWING:

1. INVERTS OF ALL SERVICES ENTERING AND LEAVING THE BUILDING AND AT PROPERTY LINES.
2. DIMENSIONS OF UNDERGROUND SERVICES IN RELATION TO BUILDING LINES AT KEY POINTS OF EVERY RUN.
3. ELEVATIONS OF UNDERGROUND SERVICES IN RELATION TO GROUND FLOOR LEVEL OF THE BUILDING.
4. DIMENSIONED LOCATION OF ALL SERVICES EMBEDDED IN THE STRUCTURE.
5. ALL CHANGES TO ALL SERVICES LEFT FOR FUTURE WORK.
6. ALL CHANGES TO THE WORK DUE TO CHANGE ORDERS.
7. ALL ADDENDUM CHANGES.
8. ALL CHANGES TO THE WORK DURING CONSTRUCTION.
9. MAIN BRANCH CONDUIT RUNS, JUNCTION BOX LOCATIONS, CONDUIT RUNS FOR ALL FLOOR OUTLETS, ETC., MUST BE REFLECTED ON THE DRAWINGS.
10. LOCATION AND DESIGNATION OF ALL ITEMS REQUIRING ACCESS OR SERVICE IN A HIDDEN LOCATION. SUBMIT A COPY/PRINT TO CONSULTANT FOR REVIEW, WHEN FOUND ACCEPTABLE, THE CONSULTANT PREPARE THE AUTOCAD -AS BUILTS AS PER IO STANDARDS AND SUBMIT TO THE CLIENT.

### OPERATION AND MAINTENANCE MANUALS

1. ASSEMBLE THREE (3) MANUALS, EACH CONTAINING DATA SHEETS, BROCHURES, OPERATING, MAINTENANCE, RECOMMENDED SPARE PARTS, AND LUBRICATING INSTRUCTIONS AND A COMPLETE SET OF REWIND SHOP DRAWINGS AND BIND IN HARD COVER. IDENTIFY COVER "OPERATION AND MAINTENANCE MANUAL FOR ....". MANUALS SHALL BE SEPARATED WITH DIVIDERS IN LOGICAL SECTIONS AND VOLUMES.

2. PRESENT ONE (1) COPY FOR REVIEW BY CONSULTANT. MAKE ALL CORRECTIONS REQUESTED BY THE CONSULTANT AND FORWARD THE CORRECTED REVIEW COPY PLUS A DUPLICATE TO THE OWNER WITH A COPY OF TRANSMITTAL TO CONSULTANT FOR HIS RECORDS. INCLUDE THE FOLLOWING INFORMATION IN EACH MANUAL:

- WRITTEN WARRANTY - 1 YEAR FOR LABOR AND MATERIALS
- AS BUILT DRAWINGS
- CERTIFICATE(S) OF ACCEPTANCE FROM AUTHORITIES HAVING JURISDICTION
- VERIFICATION REPORTS AND CERTIFICATE(S) FOR ANY NEW FIRE ALARM COMPONENTS OR TI-INS AND ANY BASE BUILDING TI-INS FOR AFFECTED SYSTEMS
- THE CONSULTANTS REVIEWED SHOP DRAWINGS - TECHNICAL DATA, PRODUCT DATA, TECHNICAL DESCRIPTIONS OF ITEMS, AND PARTS LISTS.

### MATERIALS AND INSTALLATION

ALL MATERIALS, WORKMANSHIP AND/OR INSTALLATION PRACTICES AND ACTIVITY SHALL MEET OR EXCEED THE FOLLOWING REFERENCE STANDARDS: CANADIAN ELECTRICAL CODE, ONTARIO BUILDING CODE, NEMA-NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION. CONTRACTOR TO PROVIDE AND INCLUDE AS PART OF THE BID ALL THE MISCELLANEOUS ITEMS: HARDWARE, DEVICES, WIRING, ETC., NOT SPECIFICALLY DESCRIBED, BUT REQUIRED FOR THE OPERATION OF THE SYSTEM.

### CONDUITS, CONDUIT FASTENINGS AND CONDUIT FITTINGS

1. ALL WIRING SHALL BE INSTALLED IN METALLIC RACEWAYS, ELECTRICAL METALLIC TUBING (EMT), ARMORED MULTI-CONDUCTOR FIRE ALARM CABLE (WITH FT-4 RED OUTER JACKET) IS ACCEPTABLE FOR CONDUCTORS DRAWN IN RACEWAYS.

WHERE A NET OR CORROSIVE ENVIRONMENT EXISTS, SUBMIT THE LOCATION AND PROPOSED RACEWAY TO BE USED TO THE CONSULTANT FOR APPROVAL.

RACEWAYS ARE TO BE CONCEALED IN THE INTERSTITIAL SPACE BETWEEN THE CEILING AND THE FINISHED CEILING WHERE SUSPENDED T-BAR OR DRYWALL/PLASTURE CEILINGS EXIST.

3. DROPS TO DEVICES MOUNTED ON VERTICAL SURFACES SHALL BE LOCATED CONCEALED WITHIN THE VERTICAL ASSEMBLY. EXPOSED RACEWAYS SHALL ONLY BE INSTALLED UPON APPROVAL OF THE CLIENT.

4. PROVIDE RIGID CONDUIT WITH THREADED FITTINGS AND WATERTIGHT GASKETS, WITH MOISTURE PROOF JACKET) FOR WATERTIGHT ARMORED MULTI-CONDUCTOR FIRE ALARM CABLE (WITH FT-4 RED OUTER SUPPLY AND INSTALL ADDITIONAL OR SPECIAL FASTENING WHERE, IN THE OPINION OF THE CONSULTANT, IT IS NECESSARY TO PROVIDE A SAFE AND PERMANENT INSTALLATION.

6. EXISTING RACEWAY MAY BE REUSED PROVIDED IT MEETS THE REQUIREMENTS OF THIS SECTION, AS WELL AS CURRENT REQUIREMENTS OF THE ONTARIO ELECTRICAL SAFETY CODE.

7. NO MORE THAN TWO (2) - 90 DEG. BENDS SHALL BE INSTALLED BETWEEN ANY TWO ADJACENT PULL BOXES. SIZE ALL CONDUITS BASED ON 90X1PE WIRING ONLY.

8. SIZE ALL CONDUITS FOR MAX. 40% FILL, TO INCLUDE DEDICATED INSULATED GROUND WRE.

### OUTLET BOXES, PULL AND JUNCTION BOXES

1. SHEET METAL BOXES TO MEET CSA C22.1 N0.18 GALVANIZES STEEL.
2. BOXES SHALL BE OF A SIZE AND TYPE REQUIRED BY CSA C22.1 OR THE ONTARIO ELECTRICAL SAFETY CODE.
3. BOXES SHALL BE INSTALLED AND MOUNTED AS REQUIRED BY CSA C22.1 OR THE ONTARIO ELECTRICAL SAFETY CODE.

4. MOISTURE PROOF BOXES REQUIRED FOR AREAS SUSCEPTIBLE TO MOISTURE. ANY OPENINGS THAT MAY PERMIT MOISTURE INTO THE BOX ARE REQUIRED TO BE PROTECTED WITH SILICONE AN/D/ OR RUBBER GASKETS.

5. NO KNOCKOUTS PERMITTED OTHER THAN REQUIRED FOR RACEWAYS AND FITTINGS.

6. WHERE EXISTING DEVICES ARE REMOVED THE BOX MUST BE REMOVED. IF THE BOX IS NOT REMOVED, FINISHED BLANK COVER PLATES SHALL BE INSTALLED. BLANK COVER PLATE SHALL BE STAINLESS STEEL OR PAINTED, AS REQUIRED AND APPROVED BY CONSULTANT.

7. WHERE EXISTING DEVICES ARE REMOVED AND REQUIRED FIRE ALARM WIRING IS MAINTAINED WITHIN THE BOX, BLANK COVER PLATE IS TO BE PAINTED RED.

8. INSTALL BOXES TO CSA C22.1 OR OESC. INSTALL IN LOCATIONS REQUIRED FOR SPLICES, TAPS, WIRE PULLING, EQUIPMENT CONNECTIONS AND COMPLIANCE WITH REGULATORY REQUIREMENTS. ENSURE BOXES AND RACEWAYS ARE INSTALLED TO CLEAR MECHANICAL, ELECTRICAL, ARCHITECTURAL, OR SIMILAR INSTALLATIONS.

9. THE OWNER AND/OR CONSULTANT RESERVE THE RIGHT TO RELOCATE THE LOCATION OF ANY BOX UP TO 1.5m PRIOR TO INSTALLATION, WITHOUT INCREASE TO THE CONTRACT PRICE.

10. INSTALL BOXES SQUARE WITH ADJACENT CEILING, FLOOR, OR WALL LINES. KEEP UNUSED KNOCKOUTS INSTALLED. UNUSED NAILING/SCREW HOLES WILL NOT BE PERMITTED. ORIENT BOXES TO ACCOMMODATE WIRING DEVICES ORIENTED AS SPECIFIED.

11. INACCESSIBLE CEILING AREAS: INSTALL OUTLET AND JUNCTION BOXES NO MORE THAN 150MM FROM CEILING ACCESS PANEL OR FROM REMOVABLE RECESSED LUMINARIES.

12. INSTALL PULL BOXES A MINIMUM 30mm BETWEEN TERMINATION POINTS. INSTALL PULL BOXES SUCH THAT NOT MORE THAN FOUR BENDS ARE LOCATED IN THE RACEWAY BETWEEN PULL BOXES.

13. PROVIDE BLANK COVER PLATES FOR BOXES WITHOUT WIRING DEVICES. DO NOT INSTALL OUTLET BOXES BACK TO BACK IN PARTITIONS. STAGGER TO PREVENT SOUND TRANSFER.

14. STALL FLUSH MOUNTING BOX BACK TO BACK IN WALLS; PROVIDE MINIMUM 450mm SEPARATION, PROVIDE MINIMUM 600mm SEPARATION IN ACOUSTIC OR FIRE RATED WALLS.

15. SECURE FLUSH MOUNTING BOX TO INTERIOR WALL AND PARTITION STUDS. ADAPT ALL OUTLET BOXES TO THEIR RESPECTIVE LOCATIONS AND SUPPORT INDEPENDENTLY OF THE CONDUIT USE GANG BOX WHERE MORE THAN ONE DEVICE IS MOUNTED TOGETHER. DO NOT USE SECTIONAL BOX.

USE APPROPRIATE OUTLET BOX IN EXTERIOR LOCATIONS AND WET LOCATIONS.

### WIRES AND CABLES

1. WIRING FOR LIGHTING, POWER AND FEEDERS: COPPER CONDUCTORS TYPE "R90", 600V INSULATION, EXCEPT AS OTHERWISE NOTED OR SCHEDULED ON DRAWINGS.

2. WIRING SMALLER THAN 8.3mm<sup>2</sup> (NO. 8) SHALL BE SOLID. CONDUCTORS OF 8.3mm<sup>2</sup> (NO. 8) AND LARGER SHALL BE STRANDED.

3. DO NOT USE WIRING SMALLER THAN 3.3mm<sup>2</sup> (NO. 12) EXCEPT FOR CONTROL WIRING SPECIFIED UNDER DIVISION 28.

4. SIZE BRANCH CIRCUITS AND FEEDERS FOR MAXIMUM 2% VOLTAGE DROP FROM PANELBOARD TO FARTHEST OUTLET IN CIRCUIT AND LARGE ENOUGH TO BE PROTECTED BY FUSE OR BREAKER OF WHICH THEY FORM A PART.

5. FEEDERS, CIRCUIT WIRING AND ANCILLARY ITEMS SHALL BE COLOUR-CODED FOR PHASE IDENTIFICATION.

6. CABLES FOR OTHER SYSTEMS: OF TYPE SPECIFIED IN RESPECTIVE SECTIONS. NUMBER OF WIRES FOR VARIOUS CONTROL, ALARM AND OTHER SYSTEMS ARE INTENDED TO SHOW GENERAL CONTROL SCHEME. ACTUAL NUMBER OF WIRES SHALL BE INSTALLED UNDER APPLICABLE SECTIONS (AND THIS SECTION IF SO SPECIFIED HEREIN) IN ACCORDANCE WITH EQUIPMENT MANUFACTURER'S DIAGRAMS AND REQUIREMENTS AS REVIEWED BY OWNER'S DESIGNER.

### WIRING DEVICES

1. WIRING DEVICES FOR GENERAL PURPOSE SHALL BE OF STANDARD QUALITY "SPECIFICATION GRADE" MANUFACTURED AND TESTED IN ACCORDANCE WITH CSA AND NEMA STANDARDS.

2. GENERAL USE SWITCHES CSA C22.2 NO.111 FOR CONTROLLING LIGHTING LOADS. 20A, 120/277V, QUIET TOGGLE, PASS & SEMOUR CATALOGUE NO. 20AC1, HUBBELL CATALOGUE NO. 1221.

3. THREE-WAY SWITCHES: 20A, 120/277V, QUIET TOGGLE, PASS & SEMOUR CATALOGUE NO. 20AC3, HUBBELL CATALOGUE NO. 1223.

4. GENERAL USE RECEPTACLES: CSA C22.2 NO. 42; SINGLE OR DOUBLE AS DESIGNATED BY SYMBOLS, 15A, 125V, "J"-GROUND, SCREW TERMINALS, SIDE AND BACK WIRING.

5. DUPLEX RECEPTACLES: SIDE OR BACK WIRE, RATED 15A, 125V, "J" GROUND, HUBBELL CATALOGUE NO. 5262, PASS & SEMOUR CATALOGUE NO. 5262, SPLIT RECEPTACLES, SAME AS DUPLEX RECEPTACLES, EXCEPT WITH BREAK-OFF LINKS REMOVED.

6. WEATHERPROOF RECEPTACLES: SAME AS DUPLEX RECEPTACLES, EXCEPT WITH SPRING-LOADED COVER PLATES AND GASKETS; STANDARD DEPTH 57mm (2.25") TO ACCOMMODATE #12 - #4 CORD, FLAME RETARDANT POLYCARBONATE IN GREY FINISH, TAYMAC CATALOGUE NO. 10310 OR APPROVED EQUIVALENT.

7. PROVIDE HANGERS, INSERTS, SLEEVES AND SUPPORTS AS REQUIRED. DO NOT USE ANY BASE BUILDING SUPPORTS OR EQUIPMENT.

### PANELBOARDS

1. INSTALL PANELBOARDS AT LOCATION AS INDICATED ON DRAWINGS. PROVIDE RESPECTIVE PANELBOARD IDENTIFICATION IN ACCORDANCE WITH DESIGNATIONS INDICATED ON DRAWINGS. COMPLETE DIRECTORY CARD PROVIDED WITH PANELBOARD TO CONFORM WITH CIRCUIT IDENTIFICATION.

2. ALL NEW PANELBOARDS, DISCONNECT SWITCHES, METERS, TRANSFORMERS, ETC., TO BE SAME MANUFACTURER, I.C. RATING AND TYPE AS BASE BUILDING EQUIPMENT UNLESS OTHERWISE NOTED.

3. MOLDED CASE CIRCUIT BREAKERS TO BE BOLT-ON AND SAME MANUFACTURER, RATING AND TYPE AS BASE BUILDING BREAKERS.

### SERVICE EQUIPMENT

1. INSTALL SERVICE EQUIPMENT. CONNECT TO INCOMING SERVICE. CONNECT TO OUTGOING LOAD CIRCUITS.

2. DRY TYPE TRANSFORMERS - PROVIDE DOUBLE LUGS ON TRANSFORMER NEUTRALS FOR CONNECTION OF CABLES. USE FLEXIBLE CONDUIT FOR CONNECTIONS TO TRANSFORMER CASE. MAKE CONDUIT CONNECTIONS TO SIDE PANEL OF ENCLOSURE, CEILING MOUNT TRANSFORMERS UP TO 45KVA WITH SUSPENSION RODS AND SPRING ISOLATORS. TRANSFORMERS, 75KVA AND LARGER SHALL BE FLOOR MOUNTED ON VIBRATION ISOLATING PADS SUITABLE FOR ISOLATING THE TRANSFORMER NOISE FROM THE BUILDING STRUCTURE.

3. ALL DISTRIBUTION EQUIPMENT INSTALLED IN SPRINKLERED AREAS SHALL BE EQUIPPED WITH SPRINKLER DRIP SHIELDS.

### MEGGERING AND BALANCING

1. MEGGER ALL POWER CIRCUIT FEEDERS. IF GROUND RESISTANCE ON ANY CIRCUIT IS LESS THAN THAT REQUIRED BY CSA OR OTHER GOVERNING REGULATIONS, SUCH CIRCUITS ARE TO BE CONSIDERED DEFECTIVE AND MUST BE REPAIRED.

2. MEASURE PHASE CURRENT TO PANELBOARDS WITH NORMAL LOADS OPERATING AT TIME OF ACCEPTANCE. ADJUST BRANCH CIRCUIT CONNECTIONS AS REQUIRED TO OBTAIN BEST BALANCE OF CURRENT BETWEEN PHASES AND SUBMIT A REPORT FOR INSERTION INTO MANUALS.

### GENERAL NOTES:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE JOB AND THE OWNER'S DIMENSIONS AND CONDITIONS SHALL PREVAIL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS.

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Client:	STEEL CANADA ROOFING & SIDING 15'X16' SHIPPING CONTAINER MODULAR UNIT
Location:	TORONTO, ONTARIO
Issue Date:	2021.04.26
Issue By:	YY.MM.DD
Revision:	RP2 ISSUED FOR CLIENT REVIEW
Issue No.:	NO. ISSUED

Scale:	N.T.S.
Proj. No.:	PO1024_301
Date:	APRIL 08 2021
Drawn By:	S.M.
Designed By:	S.S.
Checked By:	M.R.
Drawing Title:	<b>ELECTRICAL SPECIFICATION</b> <b>PART 2</b>
Drawing No.:	<b>AE-21059A-DRAW-E003-RP2</b>

# ELECTRICAL SPECIFICATION (PART 3)

## GROUNDING

- GROUND ALL EQUIPMENT IN ACCORDANCE WITH LATEST EDITION OF THE ELECTRICAL SAFETY CODE. PROVIDE SEPARATE GREEN INSULATED GROUND CONDUCTOR IN EVERY CONDUIT TO ALL DEVICES.
- INSTALL GROUNDING CONNECTIONS FOR TELEPHONE, SOUND, FIRE ALARM, INTERCOMMUNICATION SYSTEMS.

## GENERAL LIGHTING

- LOCATE AND INSTALL NEW LIGHTING FIXTURES AS SHOWN ON LIGHTING LAYOUT AND AS INDICATED IN THE LUMINAIRE SCHEDULE. ALL LUMINAIRES TO BE CSA APPROVED. INSTALL ACCESSORIES PROVIDED WITH EACH LUMINAIRE.

## MECHANICAL TRADES WIRING

- ALL STARTERS AND CONTROL WIRING ARE PROVIDED BY DIVISION 23. ELECTRICAL CONTRACTOR WILL INSTALL ALL STARTERS AND THERMOSTATS SUPPLIED BY MECHANICAL TRADE AND PROVIDE ALL POWER WIRING.
- CONFIRM ELECTRICAL REQUIREMENTS AND EXACT LOCATIONS OF ALL MECHANICAL EQUIPMENT WITH DIVISION 23 PRIOR TO INSTALLATION. COORDINATE WITH MECHANICAL DRAWINGS, AS REQUIRED.
- SUPPLY, INSTALL AND CONNECT ALL REQUIRED DISCONNECT SWITCHES.

## COMMISSIONING, START-UP AND TESTING

### COMMISSIONING

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SCHEDULING, COORDINATING, PERFORMING AND DOCUMENTING THE COMMISSIONING PROCESS DETAILED HEREIN, OPERATING EQUIPMENT AND SYSTEMS, TROUBLESHOOTING AND MAKING ADJUSTMENTS AS REQUIRED.
- SYSTEMS TO BE OPERATED AT FULL CAPACITY UNDER VARIOUS MODES TO DETERMINE IF THEY FUNCTION CORRECTLY AND CONSISTENTLY AT PEAK EFFICIENCY AND FULL CAPACITY. SYSTEMS TO BE INTERACTIVELY WITH EACH OTHER AS INTENDED IN ACCORDANCE WITH CONTRACT DOCUMENTS AND DESIGN CRITERIA.
  - DURING THESE CHECKS, ADJUSTMENTS TO BE MADE TO ENHANCE PERFORMANCE TO MEET ENVIRONMENTAL OR USER REQUIREMENTS.
- CONTRACTOR TO VERIFY THAT THE INSTALLED EQUIPMENT, SYSTEMS AND INTEGRATED SYSTEMS OPERATE IN ACCORDANCE WITH CONTRACT DOCUMENTS AND DESIGN CRITERIA AND INTENT. ENSURE APPROPRIATE DOCUMENTATION IS COMPILED INTO THE BUILDING MANAGEMENT MANUAL. EFFECTIVELY TRAIN OPERATION AND MAINTENANCE STAFF.
- CONTRACTOR TO ASSUME LIABILITIES AND COSTS FOR INSPECTIONS, INCLUDING DISASSEMBLY AND RE-ASSEMBLY AFTER APPROVAL. STARTING, TESTING AND ADJUSTING, INCLUDING SUPPLY OF TESTING EQUIPMENT.
- CONTRACTOR TO SUBMIT THE COMMISSIONING FORMS: INSTALLATION CHECK LISTS AND PRODUCT INFORMATION / PERFORMANCE VERIFICATION FORMS FOR REQUIREMENTS AND INSTRUCTIONS FOR USE.

### TESTING

- WHEN THE SYSTEM HAS BEEN COMPLETED, THE CONTRACTOR SHALL PERFORM TESTS AND COMPLETE THE ASSOCIATED DATA FORMS. ENSURE THAT ALL DEVICES ARE COMMISSIONED AND OPERABLE.
- THE CONTRACTOR AND MANUFACTURERS SHALL FILL OUT THE TEST FORMS AND DATA SHEETS. THE FORMS MUST BE APPROVED BY THE CONSULTANT BEFORE THEY ARE USED.
- THE TESTING FORMS REQUIRED ARE AS FOLLOWS: COMMISSIONING INDEX; EQUIPMENT VERIFICATION FORM; EQUIPMENT TEST FORM; TESTING AND START-UP SCHEDULE.
- TESTING TO BE PERFORMED IN ACCORDANCE WITH NETA – INTERNATIONAL ELECTRICAL TESTING ASSOCIATION STANDARDS.
- CONTRACTOR TO CONFIRM AND MAINTAIN THE PHASE ROTATION OF ALL EXISTING EQUIPMENT.

### START-UP

- CONTRACTOR TO VERIFY THE FUNCTIONS OF COMPONENTS PRIOR TO SYSTEM ENERGIZING. INSTALLATION CHECK SHEETS SIGNED OFF. MEGGER RESULTS OF FEEDERS AVAILABLE, COMMISSIONING REPORT COMPLETED, POINT TO POINT CHECKS COMPLETED, SEQUENCE OF OPERATION VERIFIED, EQUIPMENT LABELING COMPLETED.

## EXECUTION

- EXECUTE CUTTING, FITTING, AND PATCHING TO COMPLETE WORK. REMOVE AND REPLACE DEFECTIVE AND NON-CONFORMING WORK. X-RAY SLAB OR WALLS BEFORE CORE DRILLING FLOOR SLAB OR STRUCTURAL WALLS. OBTAIN THE CLIENT APPROVAL FOR THE PROPOSED LOCATIONS.
- PROVIDE OPENINGS IN NON-STRUCTURAL ELEMENTS OF WORK FOR PENETRATIONS OF MECHANICAL AND ELECTRICAL WORK. WHERE CONDUITS PASS THROUGH FIRE RATED WALLS OR FLOORS, COMPLETELY SEAL VOIDS WITH FIRE STOPPING MATERIAL CSA APPROVED OR ULC LISTED AND MAINTAIN SAME FIRE RATING OF BUILDING ELEMENTS.
- EXECUTE WORK BY METHODS TO AVOID DAMAGE TO OTHER WORK, AND WHICH WILL PROVIDE PROPER SURFACES TO RECEIVE PATCHING AND FINISHING. ANY EXISTING BUILDING SERVICE DAMAGED CAUSED BY CONTRACTOR MUST BE REPAIRED IMMEDIATELY AT NO COST TO THE CLIENT.
- PROVIDE ALL EXPOSED FERROUS METAL WORK, AND PRODUCTS, EXCEPT CONDUIT, WITH AT LEAST ONE (1) FACTORY PRIME COAT OR PAINT ONE PRIME COAT ON SITE. CLEAN UP OR WIRE BRUSH ALL EQUIPMENT BEFORE PAINTING.
- BEFORE ENERGIZING ANY SYSTEMS, INSPECT AND CLEAN THE INSIDE OF ALL PANELBOARDS, SWITCHGEAR AND CABINETS TO ENSURE THAT THEY ARE COMPLETELY FREE FROM DUST AND DEBRIS.
- CARRY OUT ALL TESTS SPECIFIED AND TESTS REQUIRED BY AUTHORITIES HAVING JURISDICTION. TEST EQUIPMENT TO THE REQUIREMENTS OF AND, WHERE NECESSARY, IN THE PRESENCE OF THE EQUIPMENT MANUFACTURER.
- INSTALL ALL PRODUCTS AND SERVICES IN ACCORDANCE WITH THE MANUFACTURER'S REQUIREMENTS AND/OR RECOMMENDATIONS.
- PROVIDE ALL SUPPORTS, HANGERS AND FASTENERS. SECURE ALL PRODUCTS AND SERVICES SO AS NOT TO IMPOSE UNDUE STRESSES ON THE STRUCTURE AND SYSTEMS.
- ALL EXISTING ELECTRICAL EQUIPMENT WHICH IS NO LONGER REQUIRED SHALL BE REMOVED AND DISPOSED OF, OFF SITE. MAKE SAFE ALL CIRCUIT WIRING LEFT FOR FUTURE USE.
- REMOVE FROM THE SITE ALL MATERIALS IN RENOVATED AREAS OF THE EXISTING BUILDING WHICH ARE NOT TO REMAIN OR BE REUSED, UNLESS NOTED AS REMAINING THE PROPERTY OF THE OWNER. DISCONNECT AND REMOVE ALL EXISTING SERVICES WHICH ARE ABANDONED. DISCONNECT AND REMOVE ALL WIRING MATERIALS AND DEVICES WHICH ARE ABANDONED. REMOVE ALL CONDUIT WORK WHICH IS ABANDONED EXCEPT CUT FLUSH WHERE EMBEDDED IN STRUCTURE.
- PROVIDE DAILY CLEAN UP AND PROPER DISPOSAL OF DEBRIS GENERATED BY DAILY OPERATIONS. ALL CONTRACTOR TOOLS, EXTRA MATERIALS AND WASTE MATERIALS SHALL BE REMOVED AND THE SITE AT THE COMPLETION OF THE WORK.
- CARRY OUT THE WORK WITH A MINIMUM OF NOISE, DUST AND DISTURBANCE. CHANGES, ALTERATIONS, RELOCATION, ADDITIONS AND CONNECTIONS TO EXISTING ELECTRICAL WORK INDICATED ON DRAWINGS SHALL BE EXECUTED AS REQUIRED FOR PROPER COMPLETION OF WORK. WHERE CONNECTIONS ARE MADE TO EXISTING ELECTRICALLY OPERATED EQUIPMENT, SUPPLY AND INSTALL ALL NECESSARY WIRING AND CONNECT UP COMPLETE TO EQUIPMENT AS REQUIRED FOR PROPER OPERATION. ALL SUCH EXISTING EQUIPMENT TO BE RECONNECTED AND RE-USED, SHALL BE PUT IN SATISFACTORY OPERATING CONDITION.

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### Client:

STEEL CANADA ROOFING & SIDING  
15'X42' SHIPPING CONTAINER  
MODULAR UNIT

TORONTO, ONTARIO

2021.04.26  
YY.MM.DD

Scale: N.T.S.

Proj. No. P001024\_301

Date: APRIL 08 2021

Drawn By: S.M.

Designed By: S.S.

Checked By: M.R.

Drawing Title:

**ELECTRICAL SPECIFICATION  
PART 3**

Drawing No:

**AE-21059A-DRAW-E004-RP2**