MECHANICAL SPECIFICATION

- .1 CONTRACTOR TO VISIT JOBSITE DURING TENDER. DRAWINGS INDICATE APPROXIMATE LOCATION OF EXISTING MECHANICAL EQUIPMENT AND SERVICES. VERIFY EXACT LOCATIONS OF EXISTING MECHANICAL EQUIPMENT AND SERVICES AND ALLOW FOR NECESSARY RELOCATING OF NOTED SERVICES (OR RECONNECTION TO EXISTING SERVICES) TO SUIT NEW CONSTRUCTION.
- .2 ALL WORK SHALL CONFORM TO MANITOBA BUILDING CODE AND LOCAL AUTHORITIES. APPLY FOR, OBTAIN AND PAY FOR ALL NECESSARY PERMITS. .3 INSTALLATION OF WORK SHALL BE SCHEDULED SO AS NOT TO ENDANGER OR DISTURB THE CITY OR USERS OF THE BUILDING. SHUTDOWN OF EXISTING BUILDING SYSTEMS SHALL BE COORDINATED WITH THE CITY REPRESENTATIVE. .4 MECHANICAL CONTRACTOR SHALL PERFORM COORDINATION OF MECHANICAL DIVISION INSTALLATION WITH ALL RELATED CONTRACTORS. VERIFY ALL DIMENSIONS AND LOCATIONS OF EXISTING EQUIPMENT AND SERVICES PRIOR TO PROCEEDING WITH WORK.
- COORDINATED WITH THE CITY PRIOR TO ROUGH-IN. .6 TENDER SHALL BE BASED ON THE USE OF SPECIFIED EQUIPMENT, UNLESS ACCEPTANCE FOR THE USE OF EQUAL MANUFACTURERS IS IN ACCORDANCE WITH B7 AND OBTAINED FROM THE CONTRACT ADMINISTRATOR PRIOR TO BID SUBMISSION. ALTERNATE MANUFACTURERS MAY BE QUOTED AS AN INCREASE OR DECREASE AMOUNT TO THE BID SUBMISSION, WITHOUT PRIOR ACCEPTANCE OF THE CONTRACT ADMINISTRATOR. .7 SUBMIT SHOP DRAWINGS FOR ALL EQUIPMENT TO CONTRACT ADMINISTRATOR. FOR SHOP DRAWING'S SUBMITTED ELECTRONICALLY, INCLUDE CONTRACT ADMINISTRATOR PROJECT NAME AND NUMBER IN SUBJECT LINE OF E-MAIL TO <u>CONTRACTADMIN@SMSENG.COM</u>. ALLOW 10 BUSINESS FOR THE REVIEW
- AND PROCESSING OF SHOP DRAWINGS. .8 REQUEST FOR INTERPRETATION (RFI): .1 FOR RFI'S SUBMITTED ELECTRONICALLY, INCLUDE CONTRACT ADMINISTRATOR PROJECT NAME AND NUMBER IN THE SUBJECT LINE OF E-MAIL TO CONTRACTADMIN@SMSENG.COM

 .2 CONTENT OF THE RFI: INCLUDE A DETAILED DESCRIPTION OF THE ITEM NEEDING
- INTERPRETATION AND PROPOSED SOLUTION. 3 ALLOW 10 BUSINESS DAYS FOR THE REVIEW AND PROCESSING OF RFI'S.

.5 ALL INTERIOR SPACE POWER HAMMERING, DRILLING AND OTHER NOISY WORK SHALL BE

- .9 UNLESS NOTED OTHERWISE PROVIDE ONE YEAR GUARANTEE (FROM PROJECT SUBSTANTIAL COMPLETION) FOR ALL EQUIPMENT AND WORKMANSHIP. .10 ALL CONNECTIONS TO EXISTING BUILDING MECHANICAL SERVICES SHALL BE COORDINATED WITH THE
- CITY REPRESENTATIVE. .11 ALL NECESSARY CUTTING AND PATCHING SHALL BE PERFORMED BY COMPETENT CONTRACTOR EMPLOYED BY MECHANICAL CONTRACTOR TO SATISFACTION OF THE CITY REPRESENTATIVE. .12 ALL DUCTWORK AND PIPING TO BE INSTALLED STRAIGHT, PARALLEL TO THE BUILDING WALLS.
- .13 WHERE PIPES OR DUCTS GO THROUGH AN EXTERIOR ROOF OR WALL, THEY SHOULD BE BOXED-IN, FLASHED AND WATERPROOFED. ALLOW FOR EXPANSION AND CONTRACTION OF PIPE. .14 PIPE HANGERS SHALL BE ANVIL FIG. 65 FOR STEEL PIPE AND FIG. CT65 FOR COPPER PIPE. ALL WITH FIG. 140 THREADED ROD ATTACHED TO FIG. 117 EXPANSION CASE SET IN HOLES DRILLED IN CONCRETE, OR ATTACHED TO FIG. 225 OR 227 CLAMP ATTACHED TO JOISTS OR BEAMS.
- .15 PRIOR TO DRILLING HOLES AND/OR OPENINGS IN EXISTING STRUCTURE, CONTRACTOR SHALL RETAIN SERVICES OF NATIONAL TESTING LABORATORIES LIMITED TO LOCATE AND MARK ALL STRUCTURAL REINFORCING STEEL LOCATED IN AREA WHERE CUTTING OR DRILLING IS PROPOSED. AT NO TIME SHALL REINFORCING STEEL BE CUT WITHOUT PRIOR WRITTEN APPROVAL FROM STRUCTURAL ENGINEER QUALIFIED AND LICENSED TO PRACTICE IN PROVINCE OF MANITOBA, NO HOLES OR OPENINGS WILL BE PERMITTED WITHIN AREA OF STRUCTURAL DROP PANELS LOCATED AT COLUMNS.
- .16 FURNISH TO THE CITY THREE (3) COMPLETE SETS OF MANUFACTURER'S OPERATING AND MAINTENANCE INSTRUCTIONS FOR ALL EQUIPMENT REQUIRING MAINTENANCE. REVIEW INSTRUCTIONS WITH THE CITY REPRESENTATIVE TO ENSURE A THOROUGH UNDERSTANDING OF THE EQUIPMENT AND ITS OPERATION. .17 PROVIDE A MARK-UP OF THE CONTRACT DRAWINGS FOR RECORD "RECORD DRAWINGS". REVISED AS REQUIRED TO SHOW ANY CHANGES FROM THAT ORIGINALLY SHOWN. RECORD DRAWINGS TO BE
- KEPT ON SITE AND UPDATED WEEKLY. CONTRACT ADMINISTRATOR WILL REVIEW PROGRESS DURING SITE OBSERVATIONS. .18 AT COMPLETION OF PROJECT PROVIDE RECORD DRAWINGS IN AUTOCAD 2013 FORMAT, COMPLETE WITH DISK PAID FOR BY MECHANICAL CONTRACTOR. .19 ALL EXTRANEOUS MATERIAL IN CEILING SPACE UNRELATED TO NEW AND REVISED WORK SHOWN. INCLUDING PIPING, CONTROL TUBING, DUCTWORK, ETC, SHALL BE REMOVED.
- .20 PROVIDE FIRESTOPPING FOR ALL OPENINGS IN FIRE SEPARATIONS FOR PASSAGE OF PIPES, DUCTS, ETC. TO MAINTAIN INTEGRITY OF FIRE SEPARATIONS AS PER MANUFACTURER'S PRINTED .21 ALL WIRING FOR EQUIPMENT SPECIFIED HEREIN SHALL BE BY THE ELECTRICAL SUBCONTRACTOR,
- UNLESS OTHERWISE NOTED. .22 MECHANICAL CONTRACTOR SHALL REVIEW ALL EQUIPMENT REQUIRING ELECTRICAL CONNECTION WITH ELECTRICAL SUBCONTRACTOR AND DIVISION 26 DRAWINGS PRIOR TO ORDERING EQUIPMENT ENSURE PROPER ELECTRICAL CHARACTERISTICS ARE DETERMINED FOR ALL AFFECTED AND .23 WHERE MECHANICAL SERVICES ARE CONCEALED WITHIN WALLS, FLOORS OR CEILINGS AND CANNOT BE VISUALLY IDENTIFIED, PROVIDE ELECTRONIC SCANNING DEVICES OR OTHER APPROVED MEANS TO LOCATE AND IDENTIFY CONCEALED SERVICES PRIOR TO WORK START. MAKE GOOD ANY DAMAGE TO EXISTING MECHANICAL SERVICES AT NO COST TO THE CONTRACT.
- .1 PROVIDE LABOUR, MATERIAL, EQUIPMENT AND SERVICES NECESSARY FOR AND INCIDENTAL TO SUPPLY AND INSTALLATION OF SYSTEMS SHOWN ON DRAWINGS. GENERALLY THIS SHALL INCLUDE: NATURAL GAS PIPING SYSTEMS
- 2 NATURAL GAS PIPING 1 ALL WORK SHALL COMPLY WITH CAN/CSA, A NATIONAL STANDARD OF CANADA. NATURAL GAS AND PROPANE INSTALLATION CODE B149.1 (LATEST REVISION), COMPLETE WITH MANITOBA OFFICE OF THE FIRE COMMISSION GAS NOTICES, AND SHALL BE PERFORMED BY FULLY QUALIFIED AS FITTERS AND/OR WELDERS LICENSED TO PRACTICE IN THE PROVINCE OF MANITOBA ALL PIPING AND FITTINGS TO BE MANUFACTURED IN EITHER CANADA OR THE USA.
- .3 NATURAL GAS PIPING 1 PIPE SHALL BE SCHEDULE 40 BLACK STEEL PIPE EQUAL TO ASTM A-53 GRADE B. .4 FITTINGS
- .1 UP TO 2" NPS SCREWED FITTINGS - 150 PSI STANDARD BLACK MALLEABLE IRON, BANDED. .2 SOCKET WELD FITTINGS - 2,000 PSI FORGED STEEL. 3 UNIONS - 150 PSI BRASS TO IRON SEAT.
- .3 CLEANING AND FLUSHING .1 ON SYSTEM INSTALLATION COMPLETION, FLUSH OUT PIPING SYSTEM TO REMOVE ANY FOREIGN
- .1 PRESSURE TEST ALL PIPING SYSTEMS AS FOLLOWS: .1 NATURAL GAS SYSTEMS - IN ACCORDANCE WITH LOCAL REGULATIONS. .5 EQUIPMENT
- DIRECT-OPERATED, SPRING LOADED. .2 20 PSI TO 7-14"W.C .3 FISHER CS400 SERIES.

.1 NATURAL GAS PRV

- .2 GAS-FIRED RADIANT HEATERS 1 SUPPLY AND INSTALL SUPERIOR RADIANT SRP U SERIES INFRARED RADIANT HEATERS. .2 CONSTRUCT AND CERTIFY GAS FIRED RADIANT HEATERS IN ACCORDANCE WITH LATEST EDITION Z83.6 "GAS-FIRED INFRARED HEATERS", INCLUDING ALL CURRENT SUPPLEMENTS. .3 INSTALL SYSTEM IN ACCORDANCE WITH Z223.1 FUEL GAS CODE.
- .1 REFLECTOR DESIGN: REFLECTOR SHALL BE 10-SIDED REFLECTOR DESIGN REFLECTING VIRTUALLY 100% OF THE INFRARED ENERGY OUT AND AWAY FROM THE EMITTER TUBES. REFLECTOR SHALL BE "DEEP DISH: DESIGN WITH EMITTER TUBES FULLY RECESSED WITHIN REFLECTOR. REFLECTORS SHALL HAVE A MINIMUM 10 REFLECTIVE SURFACES. REFLECTORS WITH FEWER SURFACES ALLOW ENERGY TO BOUNCE BACK TO THE MAIN HEAT EXCHANGER TUBING, AND SHALL NOT BE ALLOWED. REFLECTOR END CAPS SHALL BE FACTORY PROVIDED AS STANDARD AND SHALL BE FITTED TO THE END OF EACH REFLECTOR RUN TO MINIMIZE CONVECTIVE HEAT LOSS, REFLECTORS SHALL PROVIDE A DISTRIBUTION PATTERN OF 90 DEGREES INCLUSIVE BENEATH THE HEATER. WHEN CALLED FOR IN THE CONTRACT DOCUMENTS AND SPECIFICATIONS, DIRECTING OF RADIANT PATTERN OUTSIDE THE STANDARD DISTRIBUTION PATTERN SHALL BE
- ACCOMPLISHED THROUGH USE OF SIDE SHIELDS OR BOTTOM SHIELDS PREFERABLY. 45 DEGREE, TIPPED REFLECTORS INCREASE THE CONVECTIVE LOSS OF THE HEATER AND SHALL NOT BE ALLOWED, UNLESS CALLED FOR IN THE CONTRACT DOCUMENTS. .2 HEAT UNIFORMITY: BURNER SHALL DISTRIBUTE HOT GASES EVENLY ALONG THE LENGTH
- OF THE EMITTER TUBES. .3 SERVICEABILITY: BURNER CONTROLS SHALL BE LOCATED OUTSIDE OF THE AIR SUPPLY .4 SERVICE AND DIAGNOSTIC CONTROL CHECKS SHALL BE POSSIBLE WITH THE BLOWER FAN RUNNING. CONTROLS SHALL BE PROVEN, NAME BRAND SUPPORTED
- MANUFACTURER. .1 CONTROL BOX: HEAVY-DUTY POWDER COATED GALVANIZED STEEL. .2 EMITTER TUBE: SHALL BE 4 INCH (102 MM) DIAMETER, MINIMUM 16 GAUGE THICKNESS AND SHALL BE ONE OF, OR A COMBINATION OF, THE FOLLOWING ALLOWED MATERIALS AS CALLED FOR IN THE CONTRACT DOCUMENTS
- 1) HOT ROLLED STEEL TUBE 2) HEAT-TREATED TYPE 1 ALUMINIZED STEEL TUBE (REQUIRED ON MODEL UXR). TYPE 409 STAINLESS STEEL TUBE. 4) HIGH TEMPERATURE EPOXY COATED STEEL TUBE .3 COMBUSTION TUBE: 4 INCHES (102 MM) DIAMETER, 16 GAUGE, HEAT TREATED TYPE 1
- ALUMINIZED STEEL TUBING SHALL BE REQUIRED FOR ALL FIRING RATES. HOT ROLLED STEEL SHALL NOT BE ALLOWED. COMBUSTION TUBING SHALL INCORPORATE A WELDED, 11 GAUGE STEEL, 4 BOLT FLANGE TO ORIENT THE BURNER TO THE TUBE AS DESIGNED. .4 COUPLINGS: SHALL BE 16 GAUGE ALUMINIZED STEEL, MINIMUM 12 INCHES IN LENGTH
- AND BE OF HEAVY DUTY DESIGN INCORPORATING TWO 1-INCH WIDE DRAW BANDS. REFLECTOR: DEEP DISH, 100% EFFICIENT, MILL-FINISHED ALUMINUM, ASTM 1100, .024 INCH THICKNESS ALUMINUM SHEET METAL WITH TWO REFLECTOR SUPPORT BRACKETS FOR EACH 10 FEET (3048 MM) REFLECTOR SECTION. REFLECTORS SHALL EXTEND BELOW THE LOWEST POSITION OF THE TUBING AT ALL TIMES, AND INCLUDE STANDARD END CAPS.
- .6 REFLECTOR EXTENSION SHIELDS: WHEN CALLED FOR IN THE CONTRACT DOCUMENTS, REFLECTOR EXTENSIONS SHALL BE THE SAME MATERIAL AS REFLECTORS, ARRANGED FOR FIXED CONNECTION TO LOWER REFLECTOR LIP AND INCORPORATE RIGID SUPPORT TO PROVIDE 100 PERCENT CUTOFF OF DIRECT

RADIATION FROM TUBING AT ANGLES GREATER THAN 30 DEGREES FROM VERTICAL

- .7 REFLECTOR END CAPS: SHALL BE FITTED TO THE END OF EACH REFLECTOR RUN TO REDUCE CONVECTIVE HEAT LOSS, AND SHALL BE STANDARD EQUIPMENT. .8 HANGERS: HEAVY DUTY (MINIMUM 0.3125 INCH), CHROME PLATED, WIRE-FORMED HANGERS SHALL BE INCLUDED AS STANDARD. STAINLESS STEEL HANGERS SHALL BE AN APPROVED ALTERNATE. HANGERS SHALL ALLOW FOR TIPPING THE REFLECTOR UP TO 45 DEGREES FROM HORIZONTAL CENTERLINE OF THE HEAT
- .9 BURNER: SHALL BE A POSITIVE PRESSURE BURNER SYSTEM, WHERE EXHAUST GASES AND OTHER PRODUCTS OF COMBUSTION ARE NOT ROUTED THROUGH THE BLOWER. THE BURNER SHALL OPERATE AT A MINIMUM GAS INLET PRESSURE OF 5.0 INCHES W.C. (NATURAL GAS) OR 11.5 INCHES W.C. (PROPANE) AND DRAW NO MORE THAN 1 AMP AT 120VAC. 60HZ.
- 10 BURNER HEAD SHALL BE CHROME PLATED STEEL. .11 BURNER OPERATION CONTROLS: SHALL BE FACTORY ASSEMBLED, PIPED, AND WIRED. GAS AND ELECTRIC CONTROLS SHALL BE SEPARATED FROM THE COMBUSTION AIR STREAM .12 BURNER SAFETY CONTROLS
- 1) GAS CONTROL VALVE SHALL BE A PROPORTIONAL, REGULATED, REDUNDANT 24VAC ELECTRIC GAS VALVE, INCORPORATING A PRESSURE REGULATOR AND MANUAL SHUTOFF ALL IN ONE BODY 2) CONTROL PANEL INTERLOCK: BURNER SHALL BE SERVICEABLE WHILE SYSTEM IS RUNNING WITH NO REQUIREMENTS FOR SAFETY INTERLOCK. 3) INTEGRAL AIR PRESSURE SWITCHES SHALL PROVIDE FOR AIR PROVING AND
- SHALL MONITOR ADEQUATE INLET AIR AND VENT FLOW. 4) INDICATOR LIGHTS: BURNER ON AND RUN INDICATOR LIGHTS SHALL BE STANDARD FOUIPMENT. .13 BURNER IGNITION SYSTEM: SHALL BE DIRECT SPARK (DSI) WITH GAS IGNITION AND ELAME PROVING TAKING PLACE WITHIN THE MAIN BURNER CUP FOR RELIABILITY IGNITERS THAT TRAVERSE THE GAS STREAM ADD TURBULENCE TO THE BURNER
- FLAME AND SHALL NOT BE ALLOWED. DSI IGNITION CONTROL SHALL: 1) PROVIDE FOR 3 TRIALS FOR IGNITION BEFORE LOCKOUT. 2) RECYCLE AGAIN IN ONE HOUR AFTER LOCKOUT. WITH 3 SUBSEQUENT TRIALS FOR IGNITION
- 3) PROVIDED A LIGHTED DIAGNOSTIC DISPLAY CAPABILITY. 4) PROVIDE OPENLY ACCESSIBLE SENSE CURRENT MEASUREMENT CONTACTS 5) PROVIDE A STANDARD BLOWER POST PURGE FUNCTION WHEN CALLED FOR IN THE CONTRACT DOCUMENTS.
- 6) ACCEPT 24V THERMOSTAT WIRING 7) FOR MODEL UXR, THE IGNITION CONTROL SHALL BE POTTED TO SEAL AGAINST MOISTURE AND CONTAMINATION. .14 AIR BLOWER MOTOR SHALL BE PERMANENT SPLIT CAPACITOR (PSC) TYPE, TOTALLY ENCLOSED REQUIRING NO OILING AND SHALL BE EQUIPPED WITH A THERMAL
- OVERLOAD SWITCH ELECTRICAL SUPPLY: 120V, 60HZ, 35W, 0.3A .15 SECURE BURNER FASTENING: HANGER SHALL INCORPORATE CHROME PLATER FASTENING MEANS TO SECURE BURNER AND PREVENT ROTATION ABOUT THE
- CENTERLINE AXIS OF THE HEAT EXCHANGER OVER TIME. .16 COMBUSTION-AIR CONNECTION: DUCT CONNECTION TO BURNER FOR COMBUSTION AIR TO BE DRAWN DIRECTLY FROM OUTSIDE OR INSIDE SHALL BE PROVIDED AS FACTORY STANDARD.

- .17 HEATERS SHALL BE FACTORY DESIGNED AND APPROVED TO OPERATE ON EITHER NATURAL GAS (NG) OR LIQUID PROPANE GAS (LPG) AS CALLED FOR IN THE
- .18 PRODUCTS. a. LOW INTENSITY SINGLE STAGE INFRARED TUBE HEATERS: HEAVY DUTY INDUSTRIAL/COMMERCIAL INFRARED HEATER FEATURING THE BEST OVERALL PERFORMANCE IN THE INDUSTRY. FIRING RATES AS CALLED FOR IN THE CONTRACT DOCUMENTS WITHIN THE RANGE OF 40 MBH TO 220 MBH. 100% EFFICIENT REFLECTOR DESIGN WITH MINIMUM 65% RADIANT FACTOR AS DETERMINED BY INDEPENDENT LAB TESTING TO EN416-2 STANDARD. BAFFLES REQUIRED AS PER MANUFACTURER'S INSTRUCTIONS.

CONTRACT DOCUMENTS.

- 19 PRODUCT SHALL BE LOW INTENSITY INFRARED HEATER: MODEL UA (SEALED BLOWER DESIGN), MODEL UX (ENCLOSED BURNER DESIGN), OR MODEL UXR (ENCLOSED, MOISTURE SEALED BURNER DESIGN FOR RUGGED, HARSH ENVIRONMENTS OR OUTDOOR USE) AS MANUFACTURED BY SUPERIOR RADIANT PRODUCTS a. INPUT RATE SHALL BE AS CALLED FOR IN THE CONTRACT DOCUMENTS WITHIN
- THE RANGE OF 40,000 TO 220,000 BTU/H. b. RADIANT TUBE LENGTH SHALL BE AS CALLED FOR ON THE CONTRACT DOCUMENTS WITHIN THE RANGE OF 10 FEET (3048 MM) TO 70 FEET (21336 MM). REFER TO DRAWING SCHEDULE c. RECOMMENDED RANGE OF MINIMUM HANGING HEIGHTS SHALL BE 10 FEET TO 29 FEET (3048 TO 8839 MM) AS CALLED FOR IN THE CONTRACT DOCUMENTS. d. ALL BURNER OPERATING COMPONENTS SHALL BE ENCLOSED IN BURNER
- .5 ALTERNATE MANUFACTURERS OTHER LOW INTENSITY RADIANT HEATERS OF EQUAL OR GREATER THERMAL EFFICIENCY AND WITH THE SAME OR LOWER BURNER FIRING RATE CAPACITY, AND WITH THE RADIANT DISTRIBUTION PATTERN SHOWN ON DRAWING MAY BE ACCEPTABLE PROVIDED THEY MEET THE INTENT OF THESE SPECIFICATIONS AND PRIOR APPROVAL IN WRITING IS OBTAINED FROM THE CONTRACT ADMINISTRATOR AT LEAST TWENTY (20) DAYS BEFORE THE BID DATE. IF SUCH SYSTEMS ARE APPROVED, THE CONTRACTOR ASSUMES RESPONSIBILITY FOR THE DESIGN, PERFORMANCE AND EXPANSE OF SAME. THE REDESIGNED SYSTEM GAS PIPING AND ELECTRIC WIRING SHALL BE DONE BY A REGISTERED MECHANICAL CONTRACT ADMINISTRATOR, SHOP DRAWINGS OF THE ENTIRE NEW SYSTEM SHALL BE PROVIDED BY THIS CONTRACTOR. THE CONTRACTOR SHOULD STATE THE AMOUNT TO BE CREDITED TO THE THE CITY OF WINNIPEG DUE TO THIS
- WHERE APPROVED SUBSTITUTES ARE USED. THE CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR PHYSICAL DIMENSIONS AND ALL OTHER RESULTING CHANGES. THIS RESPONSIBILITY EXTENDS TO COVER ALL EXTRA WORK AS NECESSITATED BY OTHER TRADES AS A RESULT OF THE SUBSTITUTIONS .3 THE CONTRACT ADMINISTRATOR RESERVES THE RIGHT TO REQUIRE THE CONTRACTOR TO REMOVE AND REPLACE ANY MATERIAL OR EQUIPMENT WHICH DOES NOT MEET SPECIFICATIONS OR DOES NOT HAVE ANY PRIOR APPROVAL AS A SUBSTITUTE ITEM. WORK SHALL BE COMPLETED IMMEDIATELY WITHOUT COST OR INCONVENIENCE TO THE
- .6 FIELD QUALITY CONTROL .1 START-UP: START-UP, TEST, AND ADJUST GAS FIRED, RADIANT HEATERS IN ACCORDANCE WITH MANUFACTURER'S START-UP INSTRUCTIONS, AND UTILITY COMPANY'S REQUIREMENTS. CHECK AND CALIBRATE CONTROLS, ADJUST BURNERS IF APPLICABLE ACCORDING TO MANUFACTURER'S INSTRUCTIONS FOR MAXIMUM EFFICIENCY.

THE CITY OF WINNIPEG.

- 7 CLOSFOUT PROCEDURES TRAINING: PROVIDE SERVICES OF MANUFACTURER'S TECHNICAL REPRESENTATIVE TO INSTRUCT OPERATING PERSONNEL IN OPERATION AND MAINTENANCE OF GAS FIRED SCHEDULE INSTRUCTION WITH OPERATING BUILDING THE CITY OF WINNIPEG, PROVIDE AT LEAST 7 DAYS NOTICE.
- .1 PROVIDE WRITTEN WARRANTY, BY MANUFACTURER, AGREEING TO REPLACE/REPAIR, WITHIN WARRANTY PERIOD, COMPONENTS OF GAS FIRED RADIANT SYSTEMS FURNISHED BY MANUFACTURER, WHICH ARE DEFECTIVE IN EITHER MATERIAL OR WORKMANSHIP, PROVIDED MANUFACTURER'S INSTRUCTIONS FOR HANDLING, INSTALLING, PROTECTING,
- AND MAINTAINING UNITS HAVE BEEN ADHERED TO DURING WARRANTY PERIODS WARRANTY PERIOD: 3 YEAR WARRANTY ON ALL COMPONENTS. WARRANTY PERIOD: 5 YEAR WARRANTY ON HOT ROLLED HEAT EXCHANGER WITHOUT POST PURGE FEATURE.
- WARRANTY PERIOD: 7 YEAR WARRANTY ON HOT ROLLED HEAT EXCHANGER WITH POST PURGE FEATURE AND ALUMINIZED OR STAINLESS STEEL HEAT EXCHANGER WITHOUT POST PURGE FEATURE. .4 WARRANTY PERIOD: 10 YEAR WARRANTY ON ALUMINIZED OR STAINLESS STEEL HEAT EXCHANGER WITH POST PURGE FEATURE
- .9 REFER TO RADIANT HEATER SCHEDULE. .10 APPROVED MANUFACTURER: SUPERIOR RADIANT.
- PROVIDE ONE .PDF SOFT COPY AND THREE HARD COVER COPIES OF INFORMATION PERTAINING TO TEMPERATURE CONTROL SYSTEM FOR CITY PERMANENT RECORD, INCLUDE SCHEMATIC DRAWINGS AND CONTROL SEQUENCE WRITE-UPS OF ALL CONTROL SYSTEMS TO MECHANICAL CONTRACTOR FOR INCLUSION IN OPERATIONS AND MAINTENANCE MANUAL. PROVIDE ALL LABOUR, MATERIAL, PLANT, TOOLS, EQUIPMENT, AND SERVICES NECESSARY AND REASONABLY INCIDENTAL TO COMPLETION OF TEMPERATURE CONTROLS SYSTEMS AS NOTED
- HEREIN AND/OR SHOWN ON DRAWINGS .3 THE CITY OF WINNIPEG HAS AN EXISTING CENTRAL MONITORING SYSTEM IN PLACE. WHERE DDC POINTS ARE IDENTIFIED AS CENTRALLY MONITORED POINTS, THE CONTROLS CONTRACTOR SHALL PROVIDE AND INSTALL REQUIRED HARDWARE AND SOFTWARE TO INTERFACE TO THE THE CITY'S JOHNSON CONTROLS METASYS EA SERVERS AND WORKSTATIONS. THESE ARE LOCATED AT THE CENTRAL CONTROL OFFICES, 510 MAIN STREET, WINNIPEG, MANITOBA (IE CITY HALL).
- .4 PROVIDE THERMOSTAT CALIBRATION DATA SHEETS TO MECHANICAL CONTRACTOR FOR INCLUSION IN OPERATIONS AND MAINTENANCE MANUAL WHERE SHOWN, PROVIDE NEW THERMOSTAT TO MATCH ADJACENT BAYS. PROVIDE ALL NECESSARY THERMOSTATS, VALVES, VALVE OPERATORS, CONTROLLERS, INDICATION.
- RELAYS, CUMULATORS, POSITIONERS, SOLENOID VALVES, SWITCHES, CLOCKS, TRANSFORMERS, ETC.. TO MAKE COMPLETE AND OPERABLE SYSTEM. .8 MECHANICAL CONTRACTOR TO DISTRIBUTE AND MOUNT ALL PIPE CONNECTED EQUIPMENT. .9 ELECTRICAL SUBCONTRACTOR TO SUPPLY AND INSTALL ALL CONDUIT, WIRE AND CONNECTIONS
- FROM DISTRIBUTION PANELS TO LINE SIDE OF MAGNETIC STARTERS AND THERMAL OVERLOAD SWITCHES, AND FROM LOAD SIDE OF STARTERS AND SWITCHES TO MOTORS. .10 CONTROL CONTRACTOR SHALL SUPPLY AND INSTALL ALL CONDUIT, WIRE, ELECTRIC RELAYS, CONNECTIONS AND OTHER DEVICES REQUIRED FOR CONTROL CIRCUIT WIRING FOR SYSTEMS AS SPECIFIED HEREIN WHETHER LINE OR LOW VOLTAGE FLECTRICAL WIRING SHALL BE INSTALLED IN
- CONFORMANCE WITH CSA, ULC, MANITOBA BUILDING CODE AND DIVISION 26 ELECTRICAL REQUIREMENTS AND SPECIFICATIONS INCLUDED WITHIN THIS PROJECT. .11 CONTROL CONTRACTOR TO SUPPLY ALL DRAWINGS/GRAPHICS/SEQUENCE OF OPERATIONS IN BOTH A HARD AND SOFT COPY. DRAWINGS AND GRAPHICS TO BE ABLE TO BE READ AND MODIFIED BY CITY OF WINNIPEG STAFF. USER INTERFACE GRAPHICS TO BE COMPLETED USING GRAPHIC GENERATION TOOL SOFTWARE. GRAPHICS MUST USE CITY OF WINNIPEG GRAPHIC TEMPLATES. CONTRACTOR TO
- WINNIPEG STAFF. CONTRACTOR SHALL USE METRIC UNITS: IMPERIAL UNITS WILL NOT BE ACCEPTED .12 THE USE OF EITHER N2OPEN OR BACNET TO BE DETERMINED BASED ON TYPE OF BUILDING WHERE THE WORK IS BEING PERFORMED. THE NEW WORK IS TO BE TIED INTO THE EXISTING CONTROLS. THE CONTRACTOR SHOULD CONTACT CITY OF WINNIPEG TECHNICAL STAFF TO DETERMINE THE BEST PROTOCOL TO USE BASED ON EXISTING EQUIPMENT. .13 NO LON PROTOCOLS ARE TO BE ACCEPTED.

SUPPLY AS-BUILT DRAWINGS IN AN EDITABLE FORMAT. ABLE TO BE EASILY EDITED BY CITY OF

- .14 THE BUILDING MANAGEMENT SYSTEM (BMS) SHALL BE A COMPLETE SYSTEM DESIGNED FOR USE WITH THE ENTERPRISE IT SYSTEMS. THIS FUNCTIONALITY SHALL EXTEND INTO THE EQUIPMENT ROOMS. DEVICES RESIDING ON THE AUTOMATION NETWORK LOCATED IN EQUIPMENT ROOMS AND SIMILAR SHALL BE FULLY IT COMPATIBLE DEVICES THAT MOUNT AND COMMUNICATE DIRECTLY ON THE IT INFRASTRUCTURE IN THE FACILITY. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE THE CITY'S IT STAFF TO ENSURE THAT THE FMS WILL PERFORM IN THE THE CITY'S ENVIRONMENT WITHOUT DISRUPTION TO ANY OF THE OTHER ACTIVITIES TAKING PLACE ON THAT LAN.
- .15 ALL POINTS OF USER INTERFACE SHALL BE ON STANDARD PCS THAT DO NOT REQUIRE THE PURCHASE OF ANY SPECIAL SOFTWARE FROM THE BMS MANUFACTURER FOR USE AS A BUILDING OPERATIONS TERMINAL. THE PRIMARY POINT OF INTERFACE ON THESE PCS WILL BE A STANDARD .16 WHERE NECESSARY AND AS DICTATED ELSEWHERE IN THESE SPECIFICATIONS, SERVERS SHALL BE USED FOR THE PURPOSE OF PROVIDING A LOCATION FOR EXTENSIVE ARCHIVING OF SYSTEM
- CONFIGURATION DATA, AND HISTORICAL DATA SUCH AS TREND DATA AND OPERATOR TRANSACTIONS. ALL DATA STORED WILL BE THROUGH THE USE OF A STANDARD DATA BASE PLATFORM: MICROSOFT DATA ENGINE (MSDE) OR MICROSOFT SQL SERVER AS DICTATED ELSEWHERE .17 THE WORK OF THE SINGLE BMS CONTRACTOR SHALL BE AS DEFINED INDIVIDUALLY AND COLLECTIVELY IN ALL SECTIONS OF THIS DIVISION SPECIFICATIONS TOGETHER WITH THE

ASSOCIATED POINT SHEETS AND DRAWINGS AND THE ASSOCIATED INTERFACING WORK AS

- REFERENCED IN THE RELATED DOCUMENTS. .18 THE BMS WORK SHALL CONSIST OF THE PROVISION OF ALL LABOR, MATERIALS, TOOLS, EQUIPMENT, SOFTWARE, SOFTWARE LICENSES, SOFTWARE CONFIGURATIONS AND DATABASE ENTRIES, INTERFACES, WIRING, TUBING, INSTALLATION, LABELING, ENGINEERING, CALIBRATION, DOCUMENTATION, SAMPLES, SUBMITTALS, TESTING, COMMISSIONING, TRAINING SERVICES, PERMITS AND LICENSES. TRANSPORTATION, SHIPPING, HANDLING, ADMINISTRATION, SUPERVISION, MANAGEMENT, INSURANCE, TEMPORARY PROTECTION, CLEANING, CUTTING AND PATCHING WARRANTIES, SERVICES, AND ITEMS, EVEN THOUGH THESE MAY NOT BE SPECIFICALLY MENTIONED IN THESE DIVISION DOCUMENTS WHICH ARE REQUIRED FOR THE COMPLETE, FULLY FUNCTIONAL AND
- .19 PROVIDE A COMPLETE, NEAT AND WORKMANLIKE INSTALLATION. USE ONLY MANUFACTURER EMPLOYEES WHO ARE SKILLED, EXPERIENCED, TRAINED, AND FAMILIAR WITH THE SPECIFIC EQUIPMENT, SOFTWARE, STANDARDS AND CONFIGURATIONS TO BE PROVIDED FOR THIS PROJECT .20 MANAGE AND COORDINATE THE BMS WORK IN A TIMELY MANNER IN CONSIDERATION OF THE
- PROJECT SCHEDULES, COORDINATE WITH THE ASSOCIATED WORK OF OTHER TRADES SO AS TO NOT IMPEDE OR DELAY THE WORK OF ASSOCIATED TRADES. .21 THE BMS AS PROVIDED SHALL INCORPORATE, AT MINIMUM, THE FOLLOWING INTEGRATED FEATURES. FUNCTIONS AND SERVICES: .1 OPERATOR INFORMATION, ALARM MANAGEMENT AND CONTROL FUNCTIONS. ENTERPRISE-LEVEL INFORMATION AND CONTROL ACCESS. INFORMATION MANAGEMENT INCLUDING MONITORING, TRANSMISSION, ARCHIVING, RETRIEVAL,
- AND REPORTING FUNCTIONS. .4 DIAGNOSTIC MONITORING AND REPORTING OF BMS FUNCTIONS. .5 OFFSITE MONITORING AND MANAGEMENT ACCESS. .6 ENERGY MANAGEMENT .22 SEQUENCES OF OPERATION
- .1 INFRARED HEATERS .1 INFRARED HEATERS SHALL MODULATE TO MAINTAIN A SPACE TEMPERATURE OF 70°F .2 PROVIDE BMS ALARM IF SPACE TEMPERATURE FALLS BELOW 50°F (ADJUSTABLE).

.3 INFRARED HEATERS SHALL BE ENABLED AND DISABLED THROUGH BAS IN THE FOLLOWING

SERVICE BAY NORTH ZONE .2 SERVICE BAY SOUTH ZONE

RAPID ROLLING DOOR SPECIFICATION (RRD-X)

- .1 DESIGN IS BASED ON THE INDUSTRIAL DOORS INC. MODEL HDC. CONTRACTOR IS RESPONSIBLE FOR ALL STRUCTURAL AND ELECTRICAL REQUIREMENTS IF AN ALTERNATIVE MANUFACTURER IS SELECTED THAT REQUIRES DIFFERENT PROVISIONS THAN SPECIFIED. 2.0 RAPID ROLLING DOOR (RRD-1, RRD-2, RRD-3, RRD-4 AND RRD-5):
 - .1 TNR INDUSTRIAL DOORS INC, MODEL HDC, CUSTOM FABRICATED TO SUIT, RRD-1 TO RRD-4 SHALL BE 10'W X 12' H AND RRD-5 SHALL BE 20' W X 14' H (CONTRACTOR TO SITE VERIFY DOOR SIZE), INTERIOR MOUNT ON EXTERIOR WALL, DIRECT DRIVE MOTOR. UNIT TO MEET FLAME AND SMOKE SPREAD REQUIREMENTS OF MANITOBA BUILDING CODE. .3 ROLLING DOOR CURTAIN AND ASSEMBLY, IN THE DOWN POSITION, TO WITHSTAND WINDLOADS OF
 - .4 ROLLING DOOR TO PROVIDE A NEAR AIRTIGHT SEAL AND KNOCK-AWAY FEATURE FOR EASY REASSEMBLY UPON IMPACT .5 ROLLING DOOR SBR CURTAIN FOR SERVICE TEMPERATURE RANGE OF -40°F TO +180°F (-40°C TO
- .6 DIRECT CONNECT INERTIA BRAKE MOUNTED DIRECTLY ON THE DRIVE BARREL SHAFT OF ALL .2 CURTAIN .1 TWO (2) LAYERS OF STYRENE BUTADIENE RUBBER (SBR) EACH .8 MM (1/8") THICK, 70 DUROMETER; SANDWICHED WITH 1-PLY, 50KG (110 LBS.) POLYESTER CORD CENTRE, MATERIAL PROVIDES
- NORMAL RESILIENCY AND FLEXIBILITY AT TEMPERATURES RANGING FROM -40° F TO +180°F (-40°C .2 COMPLETE WITH MOLDED NEWGEN® CURTAIN LOKS™ THAT ARE MECHANICALLY ATTACHED TO THE VERTICAL EDGES OF THE CURTAIN MATERIAL. THIS RETENTION SYSTEM MAINTAINS AND HOLDS THE CURTAIN IN GUIDES UNDER EXTREME WINDLOAD CONDITIONS. CONTINUOUS SBR WINDLOCK OR MOLDED-IN PLACE TEFLON WINDLOCK DESIGNS WILL NOT BE ACCEPTED.
- .3 STANDARD COLOR: TO MATCH EXISTING. SIDE CURTAIN RETENTION: NEWGEN® GUIDES SHALL BE ONE-PIECE EXTRUDED ALUMINUM TO FORM A SLOT OF SUFFICIENT DEPTH TO ALLOW THE NEWGEN® CURTAIN LOK™ TO MOVE FREELY IN THE GUIDES AT ALL TIMES. ALUMINUM MEMBERS ARE TO BE OF SUFFICIENT THICKNESS AND RIGIDITY TO MAINTAIN THE NEWGEN® CURTAIN LOK™ WITHIN THE GUIDES AT PRESSURES OF UP TO 0.96 KPA (20 PSE). WHILE ENABLING THE NEWGEN® CURTAIN LOK™ TO RELEASE DURING IMPACTS THAT GENERATE PRESSURES BEYOND 0.96 KPA (20 PSF). BOLTED OR SPRING-LOADED GUIDES ARE NOT ACCEPTABLE. SIDE FRAME: MOUNTING STEEL ANGLE IS PROVIDED FOR INSTALLATION DIRECTLY ONTO
- REQUIRED 4 BOTTOM RAIL .1 BOTTOM BAR SHALL EXTEND THE FULL WIDTH OF THE CURTAIN, SUFFICIENT TO MAINTAIN THE BOTTOM EDGE OF THE CURTAIN PARALLEL TO THE DOOR THRESHOLD AT ALL TIMES. THE BOTTOM BAR SHALL BE CONSTRUCTED OF TWO STEEL ANGLES BOLTED TOGETHER AND SHALL HAVE A KNOCK-AWAY SECTION TO REDUCE RISK OF DAMAGE DURING ACCIDENTAL IMPACTS AND

CONCRETE OR STEEL DOOR FRAMING. ADDITIONAL CUSTOMIZATION OF DOOR FRAME IS NOT

- PROVIDE EASE OF STRAIGHTENING, ALLOWING FOR SIMPLE RE-ASSEMBLY. 5 ROLL-UP DOOR SYSTEM THE CURTAIN IS TO BE ROLLED ON A BARREL OF SUFFICIENT SIZE TO CARRY THE DOOR LOAD WITH A DEFLECTION OF NOT MORE THAN 2.5 MM/M (.03" PER FOOT) OF OPENING WIDTH. BOTH THE DRIVE BARREL SHAFTS ARE TO BE CONSTRUCTED OF MINIMUM 38MM (1 1/2") C1018 COLD ROLLED
- DOOR SHALL BE DESIGNED TO OPERATE SAFELY WITHOUT THE USE OF A COUNTERBALANCE SYSTEM, A DIRECT CONNECT INERTIA BRAKE SHALL BE MOUNTED DIRECTLY ON THE DRIVE BARREL SHAFT OF ALL DOOR SIZES. ENGAGEMENT OF THE INERTIA BRAKE SHALL DISABLE THE ELECTRICAL CONTROL CIRCUIT. A CHAIN-DRIVEN INERTIA BRAKE IS NOT ACCEPTABLE. .3 THE IDLER BARREL SHALL BE CONSTRUCTED OF 102MM (4") O.D. ROUND H.S.S. STRUCTURAL TUBING WITH A MINIMUM WALL THICKNESS OF 3.4MM (.134") AND SUPPORTED BY 32MM (1 1/4")
- C1018 COLD ROLLED STEEL SHAFTS AT EITHER END. IDLER MUST BE GUIDE MOUNTED NOT END BRACKET MOUNTED FOR PROPER TRACKING OF CURTAIN INTO NEWGEN® GUIDES. .4 FND BRACKETS ARE CONSTRUCTED OF 6MM (1/4") HOT-ROLLED STEEL PLATE C/W SEALED HEAVY-DUTY, SELF-ALIGNING BEARINGS WITH CAST IRON HOUSINGS TO SUPPORT THE DRIVE BARREL. BEARINGS SHALL BE LOAD-RATED AT 2540 KG (5600 LBS.) DYNAMIC AND 1524 KG (3360
- .5 WELDED TRUSS SHALL BRACE ENDPLATES TOGETHER AT THE TOP AND BOTTOM WITH C3 X 4.1 CHANNEL AND 2" X 1/4" FLATBAR DIAGONAL BRACING. .6 REVERSING EDGE 1 EQUIP DOOR WITH REVERSING SENSING EDGE TO STOP AND REVERSE DOOR TO
- MANUFACTURER'S STANDARD. A 1/8" THICK EPDM RUBBER LOOP SHALL WRAP THE REVERSING EDGE. BOTH THE REVERSING EDGE AND RUBBER LOOP MUST BE REPLACEABLE WITHOUT REMOVING THE BOTTOM BAR FROM THE CURTAIN. .7 ACCESSORIES NEW TRAFFIC LIGHTS AS NOTED ON DRAWINGS.
- LOOP DETECTOR AS NOTED ON DRAWINGS. PROGRAMMING FOR SEQUENCE OF OPERATION. 4 GUIDE MOUNTED WINDBAR.
- INTERIOR MOUNT ON EXTERIOR WALL NEMA4 EXTERIOR WALL PHOTOEYES FOR DOOR CLOSING.
- WINDOWS ON RRD-3 AND RRD-4 (MINIMUM HEIGHT OF 24" ALONG ENTIRE WIDTH OF DOOR). 8 CONSTRUCTION
- DOORS: CONSTRUCTED OF STEEL, ALUMINUM AND SBR RUBBER/WOVEN CURTAIN. STRUCTURAL ELEMENTS: ASSEMBLED BY WELDING OR BY MECHANICAL FASTENERS. .9 OPERATION OF DOOR
- DOORS SHALL BE EQUIPPED FOR OPERATION BY: 2- MANUAL CHAIN HOIS

AND HOLD DOOR IN ANY POSITION TO MANUFACTURER'S STANDARDS

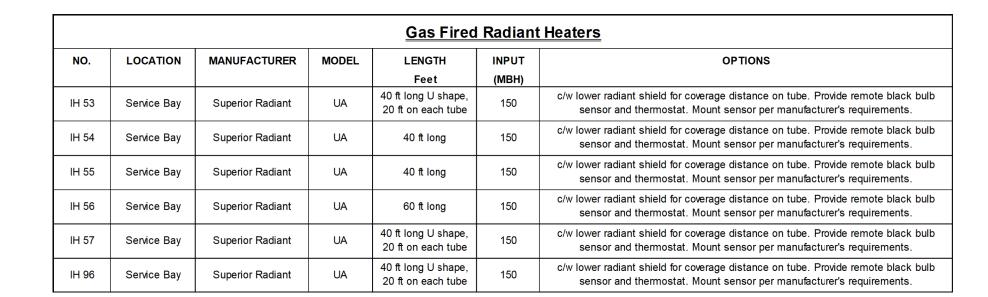
CLOSE AND STOP FUNCTIONS AND A CYCLE COUNTER.

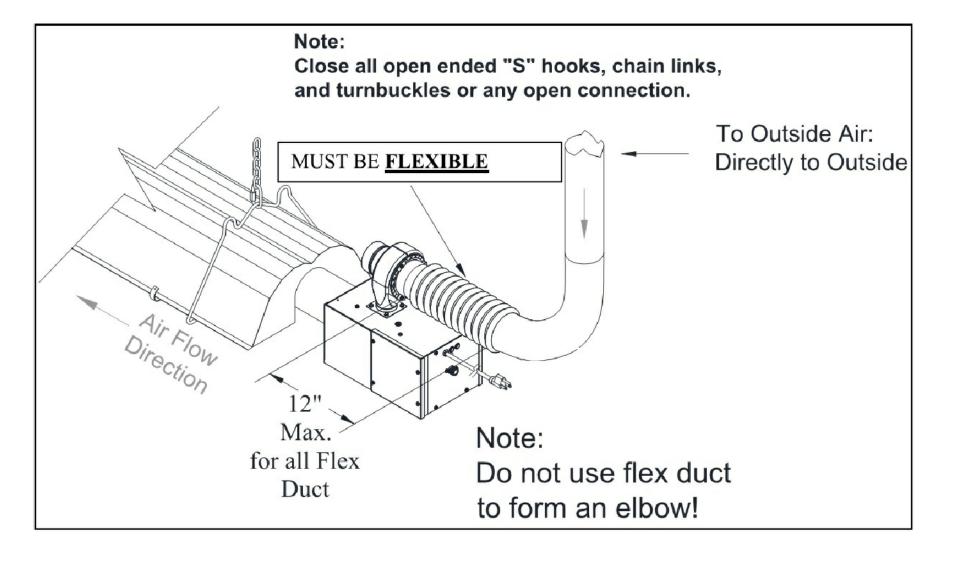
- .2 DOORS SHALL BE OPERATED PER GROUND LOOP OPENS AND PHOTO EYE CLOSES. RRD-5 SHALL BE SUITABLE FOR TRAFFIC ON BOTH WAYS. .10 MANUAL OPERATION EMERGENCY MANUAL CHAIN HOIST SHALL BE PROVIDED TO ALLOW MANUAL DOOR OPERATION.
- CHAIN HOIST SHALL BE OF SUFFICIENT CAPACITY TO OPERATE A DOOR AT A MAXIMUM PULL REQUIREMENT OF 9 TO 14 KG (20 TO 30 LBS.). THE STATIC LOAD ON THE HAND CHAIN TO HOLD THE DOOR IN ANY POSITION MUST NOT EXCEED 5 KG (11 LBS.)
- .11 ELECTRICAL OPERATION 1 ELECTRIC DOOR OPERATORS SHALL BE CSA/UL APPROVED, MODEL HG, HIGH RPM, HEAVY-DUTY GEARHEAD TYPE C/W PRE-WIRED, NUMBER CODED CONTROL CABINET AS REQUIRED, TO MANUFACTURER'S STANDARD. PANEL ENCLOSURE TO NEMA-4 RATING. 2 MOTOR TO BE TIE EIC. HIGH-STARTING TORQUE FLANGE & FOOT MOUNT, HOIST-TYPE
- OPERATING THROUGH A PARALLEL HELICAL GEAR REDUCER MECHANISM. THE GEAR REDUCER IS MOUNTED ON A HEAVY-DUTY BASE OF 5/16" STEEL .3 MOTOR AND SPROCKETING TO BE OF CAPACITY TO OPEN DOOR AT SPEED OF 16" PER SECOND AND CLOSE DOOR AT SPEED OF 12" PER SECOND. RATED FOR 575V. 3PH. 4 OPERATOR SHALL BE EQUIPPED WITH ROTARY SCREW-TYPE LIMIT SWITCHES TO CONTROL OPEN AND CLOSE DOOR POSITIONS AS WELL AS AN ELECTRO MECHANICAL BRAKE SYSTEM TO STOP

.5 OPERATOR SHALL BE EQUIPPED WITH BUILT-IN MANUAL EMERGENCY CHAIN HOIST, BUILT-IN

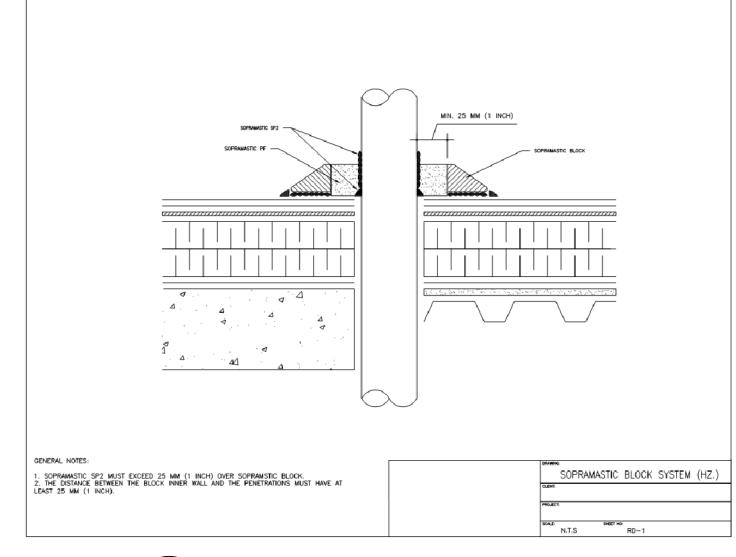
ELECTRICAL INTERLOCK SHALL PREVENT MOTOR OPERATION DURING USE OF MANUAL CHAIN

6 CONTROL PANEL: PANEL ENCLOSURE SHALL BE NEMA-4 WATER PROOF AND WIRING SHALL BE COMPLETED BY MANUFACTURER AND SHALL BE ULLISTED, DRIVE SYSTEM SHALL BE CONTROLLED BY PROGRAMMABLE LOGIC CONTROLLER (PLC) C/W INVERTER DRIVE FOR SOFT START AND SOFT STOP DOOR OPERATION, MOTOR CONTROL BY A REVERSING CONTACTOR IS NOT ACCEPTABLE OPTIONAL CUSTOM DESIGNED CONTROL SYSTEM AND/OR COMPONENTS ARE AVAILABLE. CONTROL PANEL SHALL HAVE ADJUSTABLE CLOSING TIMER, THREE PUSH BUTTONS FOR OPEN,

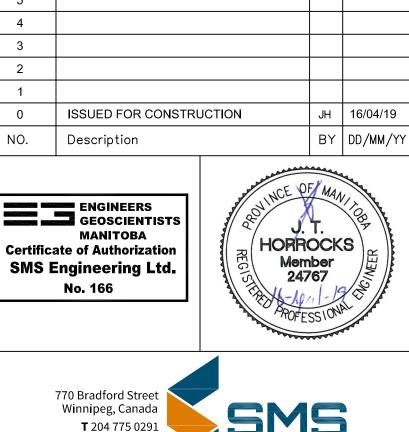




COMBUSTION AIR DUCT INSTALLATION









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CITY OF WINNIPEG FORT ROUGE TRANSIT BASE - RAPID ROLL DOORS AND RADIANT HEATERS REPLACEMENT

WINNIPEG

MANITOBA MECHANICAL SPECIFICATION.

SCHEDULE AND DETAILS Checked By Approved By

AS SHOWN APRIL 2019 Sheet Order Revision Number Drawing Number 3 OF 3