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MECHANICAL SPECIFICATIONS

1.0 GENERAL

.1 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 COORDINATE INSTALLATION WITH ALL RELATED TRADES, INTERIOR DESIGN PLANS AND REFLECTED CEILING PLANS. VERIFY ALL DIMENSIONS AND LOCATIONS OF EXISTING EQUIPMENT AND SERVICES PRIOR TO PROCEEDING WITH WORK.

.4 SUBMIT SHOP DRAWINGS FOR ALL EQUIPMENT TO CONTRACT ADMINISTRATOR.

.5 PROVIDE ONE YEAR GUARANTEE FOR ALL EQUIPMENT.

.6 ALL CONNECTIONS TO EXISTING BUILDING MECHANICAL SERVICES SHALL BE COORDINATED WITH THE CONTRACT ADMINISTRATOR.

.7 ALL NECESSARY CUTTING AND PATCHING SHALL BE PERFORMED BY CONTRACTOR. MECHANICAL SUBCONTRACTOR TO CO-ORDINATE ON SITE.

.8 REFER TO INSTRUCTIONS TO BIDDERS FOR REQUIREMENTS REGARDING PROJECT PHASING, WORKING HOURS, SHUT-DOWN PROCEDURES, ACCESS, ETC.

.9 ALL INTERIOR SPACE POWER HAMMERING, DRILLING AND OTHER NOISY WORK SHALL BE PERFORMED BETWEEN HOURS OF 6:00 P.M. AND 8:00 A.M.

.10 FURNISH TO THE CONTRACT ADMINISTRATOR THREE (3) COMPLETE SETS OF MANUFACTURER'S OPERATING AND MAINTENANCE INSTRUCTIONS FOR ALL EQUIPMENT REQUIRING MAINTENANCE. REVIEW INSTRUCTIONS WITH CONTRACT ADMINISTRATOR TO ENSURE A THOROUGH UNDERSTANDING OF THE EQUIPMENT AND ITS OPERATION.

.11 PROVIDE A MARK-UP OF THE CONTRACT DRAWINGS FOR RECORD "AS-BUILT" DRAWINGS, REVISED AS REQUIRED TO SHOW ANY CHANGES FROM THAT ORIGINALLY SHOWN.

.12 PROVIDE AS-BUILT DRAWING IN AUTOCAD FORMAT, COMPLETE WITH DISK PAID FOR BY MECHANICAL SUBCONTRACTOR.

.13 ALL DUCTWORK AND PIPING TO BE INSTALLED STRAIGHT, PARALLEL TO THE BUILDING WALLS.

.14 PIPE HANGERS SHALL BE GRINNELL 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 PROVIDE FIRESTOPPING FOR ALL OPENINGS IN FIRE SEPARATIONS FOR PASSAGE OF PIPES, DUCTS, ETC. TO MAINTAIN INTEGRITY OF FIRE SEPARATIONS AS PER MANUFACTURER'S PUBLISHED RECOMMENDATIONS.

.16 INSTALLATION OF WORK SHALL BE COORDINATED WITH THE CONTRACTOR AND SHALL BE SCHEDULED SO AS NOT TO ENDANGER OR DISTURB THE USERS OF THE BUILDING. SHUTDOWN OF EXISTING BUILDING SYSTEMS SHALL BE COORDINATED WITH THE CONTRACT ADMINISTRATOR.

.17 ALL WIRING FOR EQUIPMENT SPECIFIED HEREIN SHALL BE BY THE ELECTRICAL SUBCONTRACTOR, UNLESS OTHERWISE NOTED.

.18 CONTRACTOR SHALL REVIEW ALL EQUIPMENT REQUIRING ELECTRICAL HOOK-UP WITH ELECTRICAL SUBCONTRACTOR AND ELECTRICAL DRAWINGS PRIOR TO ORDERING EQUIPMENT. ENSURE PROPER ELECTRICAL CHARACTERISTICS ARE DETERMINED FOR ALL AFFECTED AND RELATED WORK.

.19 PRIOR TO INSTALLATION OF THE CEILING, NOTIFY THE CONTRACT ADMINISTRATOR AND ARRANGE FOR A FINAL REVIEW OF THE WORK. FOR UNDERTAKING THIS REVIEW, THE FOLLOWING SHALL BE COMPLETED:
- .1 ALL SYSTEMS TO BE FULLY OPERATIONAL, AS-BUILT DRAWINGS SUPPLIED AND OPERATING AND MAINTENANCE MANUALS SUBMITTED. TWO (2) DAYS NOTIFICATION (IN WRITING) IS REQUIRED TO BE GIVEN TO THE CONTRACT ADMINISTRATORS PRIOR TO REVIEWS BEING UNDERTAKEN.
- .2 ALL DEFICIENCIES SHALL BE COMPLETED WITHIN TWO (2) WEEKS OF AN AGREED PERIOD OF TIME AFTER FINAL REVIEW AND A LETTER SHALL BE SUBMITTED TO THE CONTRACT ADMINISTRATOR WITHIN THAT TIME ADVISING OF SUCH. FAILURE TO COMPLETE WORK MAY RESULT IN WORK BEING DONE BY THE OWNER AND THE COSTS DEDUCTED FROM FINAL PAYMENT.

.20 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.

2.0 INSULATION

.1 INSULATE CONDITIONED AIR DUCTWORK WITH 1" FIBERGLAS RFFRK FLEXIBLE DUCT INSULATION INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

.2 INSULATE ALL LIQUID AND SUCTION REFRIGERANT PIPING LINES WITH 12MM (1/2") ARMSTRONG ARMAFLEX AP SEALED WITH ARMSTRONG 520 ADHESIVE. REFINISH WITH ARMSTRONG WB ARMAFLEX FINISH.

3.0 PLUMBING

.1 PROVIDE LABOUR, MATERIAL, EQUIPMENT AND SERVICES NECESSARY FOR AND INCIDENTAL TO SUPPLY AND INSTALLATION OF SYSTEMS SHOWN ON DRAWINGS.

.2 GAS PIPING
- .1 GAS PIPING SHALL BE BLACK STEEL PIPE, EQUAL TO ASTM A-53 SCHEDULE 40 WITH 150 LB STANDARD BLACK MALLEABLE IRON SCREWED FITTINGS. ALL WORK SHALL COMPLY WITH CAN/CSA, A NATIONAL STANDARD OF CANADA. NATURAL GAS AND PROPANE INSTALLATION CODE B149.1-05, COMPLETE WITH MANITOBA DEPARTMENT OF LABOUR GAS NOTICES, AND SHALL BE PERFORMED BY FULLY QUALIFIED GAS FITTERS AND/OR WELDERS LICENSED TO PRACTICE IN THE PROVINCE OF MANITOBA.

.3 JOINTING
- .1 MAKE ALL JOINTS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- .2 BRACE FITTINGS NECESSARY TO PREVENT JOINTS FROM COMING APART UNDER PRESSURE.
- .3 MAKE JOINTS IN DOMESTIC WATER AND DRAINAGE SYSTEMS WITH SOLDER CONTAINING NO LEAD. SOLDER MATERIAL SHALL BE SILVERBRITE 100 OR EQUAL CONSISTING OF COMBINATION OF TIN, COPPER AND SILVER.

.4 CLEANING AND FLUSHING
- .1 ON COMPLETION, FLUSH OUT PIPING SYSTEM TO REMOVE ANY FOREIGN MATERIAL IN PIPING.

.5 TESTING
- .1 PRESSURE TEST ALL PIPING SYSTEMS AS FOLLOWS:
  - .1 PLUMBING SYSTEM - IN ACCORDANCE WITH LOCAL REGULATIONS.
  - .2 WATER SUPPLY PIPING - TEST WITH WATER TO 100 PSIG AT HIGHEST POINT OF SYSTEM. MAINTAIN PRESSURE WITHOUT LOSS FOR 4 HOURS.
  - .3 CONTRACT ADMINISTRATOR'S REPRESENTATIVE SHALL WITNESS TESTS. GIVE 48 HOURS NOTICE IN ADVANCE OF TESTS.
  - .4 NATURAL GAS SYSTEM - IN ACCORDANCE WITH LOCAL REGULATIONS.

.6 HANGERS
- .1 WATER - GRINNELL CT65 PLATED CLEVIS.
- .2 DRAINAGE - GRINNELL 260 CLEVIS.
- .3 INSTALL HANGERS 6 FT. ON CENTRE FOR PIPES UP TO 1", 8 FT. ON CENTRE FOR PIPES 1 1/4" AND LARGER.

4.0 VENTILATION

.1 DUCTWORK
- .1 GALVANIZED IRON SCHEDULE:

MAX. SIDE	GAUGES (USSG)	BRACING
UP TO 24"	24	NONE
25 TO 30"	24	1" X 1" X 1/8" ANGLE, 4' FROM JOINT.
31 TO 40"	22	1" X 1" X 1/8" ANGLE, 4' FROM JOINT.
ROUND DUCT UP TO 19"	26	NONE

MECHANICAL SPEC'S CONTINUED:

- .2 WHERE DUCT WIDTH EXCEEDS 18" IN LARGEST DIMENSION, STIFFEN BY BREAKING SHEETS DIAGONALLY.
- .3 DUCT SIZES SHOWN ARE INSIDE DIMENSIONS. IF DUCTS ARE ACOUSTICALLY LINED, OUTSIDE DUCT SIZE TO BE INCREASED TO SUIT.
- .4 DUCTWORK SHALL BE CONSTRUCTED AS RECOMMENDED IN ASHRAE GUIDE.
- .5 SEAL ALL JOINTS (NEW AND EXISTING) AIRTIGHT WITH DURO-DYNE S-2 DUCT SEALER OR EQUAL, IN STRICT ACCORDANCE WITH MANUFACTURER'S PUBLISHED RECOMMENDATIONS. PRIOR TO APPLICATION, DUCTWORK TO BE DRY AND FREE OF GREASE, ETC. USE 1/4" BEAD OF MATERIAL ALONG JOINTS, MATERIAL, WHEN DRY, TO HAVE 1/8" DEPTH EXTENDING 1" ON EACH SIDE OF JOINT OR SEAM.
- .6 SIZE ROUND DUCTS, INSTALLED IN PLACE OF RECTANGULAR DUCTS, FROM ASHRAE TABLE OF EQUIVALENT RECTANGULAR AND ROUND DUCTS.
- .7 PRIOR TO FABRICATION OF DUCTWORK, CHECK ALL CEILING SPACES AND HEIGHTS FOR CONFLICTION WITH OTHER TRADES.
- .8 DUCT AND EQUIPMENT SUPPORTS, HANGERS AND INSERTS
  - .1 SUPPORT HORIZONTAL DUCTS ON MAXIMUM 8'-0" CENTRES BY NON-PERFORATED GALV. STEEL, RIVETTED STRAP FOR DUCTWORK 36" (EITHER DIMENSION) OR LESS, AND MINIMUM 1" X 1" X 1/8" GALV. IRON PASSING UNDER DUCTS 37" OR OVER (EITHER DIMENSION) WITH 3/8" DIAM. THREADED RODS SUSPENDING ANGLES FROM STRUCTURE.
  - .2 FOR INSERTS IN EXISTING CONCRETE, USE HILTI H.K.D. STEEL ANCHORS.
- .9 MANUAL VOLUME DAMPERS TO BE #16 GA. GALV. STEEL, STIFFENED, DAMPERS HARDWARE TO BE DURO-DYNE KS-145, KS-385 OR KS-12 AS RECOMMENDED BY MANUFACTURER.
- .10 FIRE DAMPERS SHALL CONFORM TO MANITOBA FIRE CODE AND LOCAL AUTHORITIES. ALL FIRE DAMPERS TO BE TYPE 'B', I.E. BLADES OUT OF AIR STREAM.
- .11 PROVIDE INSULATED ACCESS DOORS AT ALL FIRE DAMPERS, COILS, AIR VALVES AND WHERE NOTED.
- .12 DIFFUSERS, GRILLES AND REGISTERS
  - .1 REFER TO SCHEDULE.
- .13 PROVIDE FOR TEMPORARY FILTERS AT EXISTING MAIN RETURN AIR DUCTS DURING CONSTRUCTION ON EACH FLOOR BEING RENOVATED. REPLACE FILTERS REGULARLY DURING THE CONSTRUCTION PERIOD. REMOVE TEMPORARY FILTERS AT END OF CONSTRUCTION AND PRIOR TO AIR BALANCING.
- .14 FLEXIBLE AIR DUCTS SHALL CONFORM TO UL-181, NFPA 90A AND SHALL HAVE A FIRE RATING TO SUIT WALL RATING. USE MAXIMUM OF 18" LENGTH STRAIGHT RUN TO EACH BOOT CONNECTION.
- .15 F-3, NEW ROOFTOP UNIT SHALL BE ENGINEERED AIR, OUTDOOR DESIGN WITH 0.063" 6061 ALUMINUM BASE RAILS, UNIT CASING, AND MUSHROOM HOOD. ROOFTOP UNIT SHALL COME WITH FORWARD CURVE DIDW FAN WITH PILLOW BLOCK BEARINGS, DOWN DISCHARGE, HINGED ACCESS DOORS, FLAT FILTER SECTIONS WITH 2" MERV 13 PLEATED FILTERS, MIXING DAMPERS C/W OPERATOR, STAINLESS STEEL HEAT EXCHANGER SECTION, AND 1" 1-1/2 LB./CU.FT. INSULATION THROUGHOUT. UNIT TO MATCH DIMENSIONS INDICATED ON THE DRAWINGS. UNIT TO BE MOUNTED ON EXISTING ROOF TOP PLATFORM WITH ADDITIONAL SLEEPERS AT EACH END OF THE UNIT. UNIT CANNOT BE SUPPORTED ON DUCT CONNECTIONS. DESIGN IS BASED ON ENGINEERED AIR PRODUCT.
  - .1 HEATING UNIT SHALL BE INDIRECT NATURAL GAS FIRED APPROVED FOR BOTH SEA LEVEL AND HIGH ALTITUDE AREAS. THE ENTIRE PACKAGE, INCLUDING DAMPER CONTROLS, FAN CONTROLS, AND ALL OTHER MISCELLANEOUS CONTROLS AND ACCESSORIES SHALL BE APPROVED BY AN INDEPENDENT TESTING AUTHORITY AND CARRY THE APPROVAL LABEL OF THAT AUTHORITY AS A COMPLETE OPERATING PACKAGE.
  - .2 UNIT MUST EXCEED THE ASHRAE 90.1 REQUIREMENT OF STEADY STATE EFFICIENCY AT LOW FIRE. HEAT EXCHANGER SHALL BE A PRIMARY DRUM AND MULTI-TUBE SECONDARY ASSEMBLY CONSTRUCTED OF TITANIUM STAINLESS STEEL WITH MULTI-PLANE METAL TURBULATORS AND SHALL BE OF A FLOATING STRESS RELIEVED DESIGN. HEAT EXCHANGER SECTION SHALL BE CONSTRUCTED OF 18 GA G90 GALVANIZED STEEL. HEAT EXCHANGER SHALL BE PROVIDED WITH CONDENSATE DRAIN CONNECTION, USING DUCT TYPE FURNACES AND CLOSED COUPLED BLOWERS ARE NOT ACCEPTABLE. THE HEAT EXCHANGER/BURNER ASSEMBLY SHALL BE A BLOW THROUGH POSITIVE PRESSURE TYPE AND SHALL HAVE AN INTERRUPTED PILOT IGNITION SYSTEM TO PROVIDE INCREASED SAFETY. UNITS USING CONTINUOUS OR INTERMITTENT PILOTS ARE NOT ACCEPTABLE. FLAME SURVEILLANCE SHALL BE FROM THE MAIN FLAME AFTER IGNITION NOT THE PILOT FLAME. ATMOSPHERIC BURNERS OR BURNERS WITH POWER ASSISTED VENTING ARE NOT ACCEPTABLE.
  - .3 THE HEAT EXCHANGER/BURNER ASSEMBLY SHALL INCLUDE 15:1 TURNDOWN. THE HIGH TURN DOWN HEAT EXCHANGER/BURNER ASSEMBLY MINIMUM INPUT SHALL BE CAPABLE OF CONTROLLING 6.7% OF ITS RATED INPUT, EXCLUDING THE PILOT ASSEMBLY, WITHOUT ON/OFF CYCLING AND INCLUDE BUILT IN ELECTRONIC LINEARIZATION OF FUEL AND COMBUSTION AIR. EFFICIENCY SHALL INCREASE FROM HIGH TO LOW FIRE.
  - .4 PROVIDE ELECTRONIC REMOTE THERMOSTAT MODULE COMPLETE WITH PROPORTIONAL / INTEGRAL CONTROL AND ROOM SENSOR TO MAINTAIN SET POINT TEMPERATURE IN SPACE. COMBUSTION AIR MOTOR SPEED VARIES PROPORTIONALLY IN RESPONSE TO THE MODULATION OF GAS FLOW TO PROVIDE OPTIMUM FUEL/AIR MIXTURE AND EFFICIENCY AT ALL CONDITIONS. TWO SPEED OR STEP SPEED COMBUSTION BLOWERS ARE NOT ACCEPTABLE.
  - .5 COMBUSTION EFFICIENCY OF HIGH EFFICIENCY HEAT EXCHANGERS SHALL INCREASE BY UP TO 4 5% FROM HIGH FIRE TO LOW FIRE WHILE TURNING DOWN ON UNITS INCORPORATING 15:1 TURNDOWN (HT BURNER). HEAT EXCHANGERS SHALL PROVIDE A MINIMUM OF 80% EFFICIENCY THROUGHOUT THE ENTIRE OPERATING RANGE.
  - .6 DX COIL SHALL C/W TWO CIRCUITS AND HAVE ALTERNATE ROW CIRCUITING. DX COIL REFRIGERANT SHALL BE R-410A.
  - .7 REFRIGERATION SPECIALTIES SUCH AS SOLENOID VALVES, TX VALVES, ETC., TO BE SUPPLIED AND INSTALLED BY REFRIGERATION CONTRACTOR. ELECTRICAL DISCONNECT BY ELECTRICAL CONTRACTOR.
  - .8 THE CENCON/CAREL CONTROLLER SHALL SUPPORT MONITORING AND CONTROL OF BACNET COMMUNICATIONS RTU PROTOCOL, MEETING THE SPECIFICATIONS AS DEFINED IN THE EIA-485 STANDARD.
  - .9 THE FOLLOWING POINTS TO BE ACCESSIBLE FOR MONITORING ONLY (READ ONLY):
    - ON/OFF STATUS
    - PRESENT MODE OF OPERATION
    - DISCHARGE AIR TEMPERATURE
    - COOLING STATUS
    - COOLING OUTPUT
    - HEATING STATUS
    - HEATING OUTPUT
    - HEATING FAILURE
    - ECONOMIZER STATUS
    - ECONOMIZER OUTPUT
    - OUTSIDE AIR DAMPER POSITION
    - BLOWER STATUS
    - MIXED AIR TEMPERATURE
    - RETURN AIR TEMPERATURE
    - CLOGGED FILTER ALARM
  - .10 THE FOLLOWING POINTS TO BE ACCESSIBLE FOR CHANGE IN SETPOINT OR STATUS (READ/WRITE):
    - UNIT ON/OFF

MECHANICAL SPEC'S CONTINUED:

- DISCHARGE AIR TEMPERATURE SETPOINT
- MINIMUM OUTSIDE AIR SETPOINT
- DISABLE HEATING
- DISABLE ECONOMIZER TO MINIMUM OUTSIDE AIR POSITION

.11 CONDENSING UNIT TO COME WITH CURRENT SENSORS ON COMPRESSORS TO BE WIRED INTO RTU BACNET CONTROL FOR FEEDBACK.

.12 UNIT SCHEDULE:

1

- .1 ROOF TOP UNIT F-3, ENG. A MODEL DJE40/C/O, 4,600 CFM AT 1.6" ESP, 1,620 CFM OUTDOOR AIR, GAS FIRED, 300 MBH INPUT, 240 MBH OUTPUT, 48 DEGREE HEATING TEMPERATURE RISE, 7.5HP, 208/3/60 SUPERE ODP MOTOR, 15/15 FORWARD CURVE BLOWER, 12 TON DX COOLING COIL, MERV 13 FILTER, RELIEF AIR DAMPER, ECONOMIZER, UNIT WEIGHT NOT TO EXCEED 2000 LBS.
- .2 CONDENSING UNIT CU-3, CARRIER MODEL 38AUD CONDENSING UNIT, DUAL STAGE, 208/3/60, REFRIGERANT R410A, 12.5 TONS TOTAL COOLING, UNIT OPERATING WEIGHT 654 LBS, UNIT DIMENSIONS 4'11.4"X3'9.9"X4'2.4". CONDENSING UNIT TO COME WITH CURRENT SENSORS ON COMPRESSORS TO BE WIRED INTO RTU BACNET CONTROL FOR FEEDBACK.

5.0 TESTING AND BALANCING

.1 AIR SYSTEMS SHALL BE BALANCED AND TESTED BY AN INDEPENDENT AIR BALANCE AGENCY (AABC) TO PROVIDE AIR QUANTITIES AS SHOWN. PROVIDE AIR BALANCE REPORT FOR REVIEW BY THE CONTRACT ADMINISTRATOR. SUBMIT TWO COPIES FOR REVIEW UPON COMPLETION. PROVIDE DAMPER STICKER UPON FINAL BALANCING COMPLETION.

.2 AIR BALANCE AGENCY SHALL TEST ALL FIRE DAMPERS AND PROVIDE A REPORT FOR REVIEW BY THE CONTRACT ADMINISTRATOR. SUBMIT TWO COPIES FOR REVIEW UPON COMPLETION. THIS WORK SHALL INCLUDE THE FOLLOWING:
- .1 PROVIDE INSPECTION, VERIFICATION AND TESTING OF ALL FIRE DAMPERS, FIRE/SMOKE DAMPERS, SMOKE CONTROL DAMPERS AND CEILING FIRE STOPS AFTER INSTALLATION. COORDINATE THE WORK WITH VENTILATION AND CONTROLS CONTRACTOR(S).
- .2 PROVIDE DETAILED VERIFICATION REPORT TO INCLUDE ALL FIRE PROTECTION DEVICES NOTED. REPORT SHALL LIST EACH DEVICE AND VERIFICATION OF ITS OPERATION AND INSTALLATION PER THE REQUIREMENTS SPECIFIED.
- .3 PROVIDE TWO COPIES OF COMPLETED DRAFT VERIFICATION REPORT TO CONTRACT ADMINISTRATOR FOR REVIEW.
- .4 INCORPORATE COMMENTS OR CHANGES REQUESTED BY CONTRACT ADMINISTRATOR AND PROVIDE SUFFICIENT NUMBER OF COPIES OF FINAL REPORT TO MECHANICAL SUBTRADE FOR INCLUSION IN OPERATING & MAINTENANCE MANUALS.
- .5 TESTING SHALL BE PERFORMED AFTER AIR BALANCING HAS BEEN COMPLETED.
- .6 TEST SHALL INCLUDE FOLLOWING:
  - .1 VISUAL INSPECTION OF EACH DEVICE:
    - .1 CONFIRM APPROPRIATELY RATED DEVICE INSTALLED AND CSA/ULC LABEL AFFIXED AND VISIBLE THROUGH DUCT/CEILING ACCESS DOOR.
    - .2 CONFIRM APPROPRIATE DUCT AND/OR CEILING ACCESS DOOR PROVIDED TO PERMIT SERVICING OF DEVICE. CONFIRM DUCT ACCESS DOOR OPENABLE WITHOUT INTERFERENCE FROM ADJACENT CEILING, PIPES, DUCTS, ETC.
    - .3 CONFIRM DEVICE HAS BEEN INSTALLED IN ACCORDANCE WITH REQUIREMENTS OF THE SPECIFICATIONS, MANUFACTURER'S INSTRUCTIONS AND CODES.
    - .4 CONFIRM PROPER INSTALLATION, CLEARANCES, USE OF PROPER ANGLE FRAMING, USE OF PROPER FASTENERS, USE OF FIRE RATED MATERIAL IN WALL OPENING, LOCATION OF BREAKAWAY JOINTS ETC.
    - .5 CONFIRM THAT DEVICE HAS NOT BEEN PAINTED.
  - .2 OPERATIONAL INSPECTION OF EACH DEVICE TO INCLUDE:
    - .1 MANUAL RELEASE OF FUSIBLE LINK ALLOWING DEVICE TO CLOSE. CONFIRM TIGHT FIT CLOSURE WITHOUT BINDING.
    - .2 CONFIRM THAT APPROPRIATE FUSIBLE LINK IS INSTALLED.
    - .3 RE-OPEN DEVICE AND RESET FUSIBLE LINK CONNECTION.
- .7 VERIFICATION REPORT SHALL INDICATE GENERAL LOCATION (E.G. ROOM NUMBER OR DESCRIPTION) AND SPECIFIC LOCATION (E.G. NORTH WALL ABOVE CEILING) OF ACCESS DOOR TO DEVICE. REPORT SHALL INCLUDE ITEMIZED VERIFICATION OF FOLLOWING, AS APPROPRIATE, FOR EACH DEVICE:
  - .1 DEVICE IS FULLY ACCESSIBLE.
  - .2 DEVICE HAS BEEN PROPERLY INSTALLED
  - .3 DEVICE HAS BEEN SUCCESSFULLY TESTED.
  - .4 DEVICE HAS BEEN RESET.
  - .5 NAME OF TESTER.
  - .6 DATE DEVICE TESTED SUCCESSFULLY.

6.0 CONTROLS

.1 PROVIDE ALL LABOUR, MATERIAL, PLANT, TOOLS, EQUIPMENT, AND SERVICES NECESSARY AND REASONABLY INCIDENTAL TO COMPLETION OF CONTROLS SYSTEMS AS NOTED HEREIN AND/OR SHOWN ON DRAWINGS.

.2 PROVIDE COMPLETE DDC SYSTEM OF JOHNSON CONTROLS METASYS FOR SYSTEMS INDICATED.

.3 ALL NEW WORK RELATED TO NEW AND EXISTING CONTROLS SHALL BE PERFORMED BY A QUALIFIED CONTROLS SUBCONTRACTOR.

.4 NEW THERMOSTATS WILL BE PROVIDED AND INSTALLED BY CONTROL CONTRACTOR.

.5 ALL NEW CONTROLS WILL COMMUNICATE USING MSTP AND ADHERE TO BACNET STANDARD PROTOCOL SSPC-135, CLAUSE 9. PROVIDE FIELD MSTP CONTROLLER AS REQUIRED AND CONNECT TO THE EXISTING METASYS MSTP SYSTEM.

.6 PROVIDE ALL NECESSARY DAMPERS, DAMPER OPERATORS, VALVES, VALVE OPERATORS, CONTROLLERS, INDICATION, RELAYS, CUMULATORS, POSITIONERS, PNEUMATIC ELECTRIC SWITCHES, SOLENOID VALVES, SWITCHES, CLOCKS, TRANSFORMERS, ETC., TO MAKE COMPLETE AND OPERABLE SYSTEM.

.7 MECHANICAL SUB-CONTRACTOR TO DISTRIBUTE AND MOUNT ALL PIPE AND DUCT CONNECTED TO EQUIPMENT.

.8 MECHANICAL SUB-CONTRACTOR TO DISTRIBUTE AND MOUNT ALL MOTORIZED DAMPERS IN THEIR RESPECTIVE LOCATIONS.

.9 ELECTRICAL 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. 1

.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, ELECTRICAL WIRING SHALL BE INSTALLED IN CONFORMANCE WITH CSA, ULC, MANITOBA BUILDING CODE AND DIVISION 26 ELECTRICAL REQUIREMENTS.

.11 THE CITY OF WINNIPEG HAS AN EXISTING CENTRAL MONITORING SYSTEM IN PLACE, LOCATED AT THE CENTRAL CONTROL OFFICES, 510 MAIN STREET, WINNIPEG, MANITOBA. THE CONTROLS CONTRACTOR SHALL PROVIDE AND INSTALL REQUIRED HARDWARE AND SOFTWARE FOR THE MONITORING AND CONTROL OF OBJECTS TO BE VIEWED AND ADJUSTED THROUGH THE CITY OF WINNIPEG ADX SERVER. OBJECTS TO BE ADDED BOTH TO THE METASYS USERVIEW AND JOHNSON CONTROLS LATEST GRAPHIC PACKAGE.

.12 ROOF TOP UNIT F-3 CONTROL SEQUENCES
- .1 FAN SYSTEM CONTROLS-GENERAL
  - .1 FOLLOWING CONTROL SEQUENCES SHALL APPLY TO ALL SUPPLY FAN SYSTEMS WHETHER SPECIFICALLY NOTED IN SEQUENCE OF OPERATION OR NOT.
  - .2 WHERE FAN SYSTEMS HAVE OUTDOOR AND RETURN AIR DAMPERS MODULATED TO MAINTAIN MIXED AIR, DISCHARGE AIR, OR SPACE TEMPERATURE, PROVIDE ADJUSTABLE (0-1 MIN.) RESTRICTION FEATURE TO RETARD OPENING OF O.A. DAMPER ON SYSTEM START UP AND ENABLE HEATING SOURCE CONTROLS TO COME INTO CONTROL AND PREVENT NUISANCE TRIPPING OF LOW LIMIT PROTECTION CONTROLS.
  - .3 PROVIDE INTERLOCKS TO ENSURE AUXILIARY EQUIPMENT SUCH AS OUTDOOR AIR DAMPERS, RELIEF AIR DAMPERS, ETC. ARE SHUT OFF AND/OR CLOSED WHEN SUPPLY FAN IS OFF.
  - .4 PROVIDE ALL FAN SYSTEMS THAT INTRODUCE O.A. WITH LOW LIMIT CONTROL IN DISCHARGE AIR TO SHUT DOWN SUPPLY FAN AND ACTIVATE LOCAL ALARM WHEN DISCHARGE AIR TEMPERATURE DROPS BELOW 3 DEG.C(37 DEG.F), LOCATE LOW LIMIT IN MANNER THAT SHALL PROTECT HEATING AND COOLING COILS, AND AT SAME TIME NOT BE SUBJECT TO NUISANCE TRIPPING.
  - .5 PROVIDE DIFFERENTIAL PRESSURE SWITCHES ACROSS EACH FILTER BANK TO INDICATE "FILTER DIRTY" NOTIFICATION.
- .2 ROOF TOP UNIT (F-3)
  - .1 SYSTEM IS COMPRISED OF A CENTRAL SINGLE DUCT CONSTANT AIR VOLUME ROOF TOP AIR HANDLING UNIT, INCLUDING SUPPLY FAN, FILTER BANKS, CONTROL DAMPERS, GAS HEATING BURNER, DX COOLING COIL, AIR MIXING SECTION AND ACCESS SECTION.
  - .2 UNITS SHALL OPERATE ON AN OCCUPIED/UNOCCUPIED SCHEDULE AS PROGRAMMED INTO THE DEDICATED CONTROLLER.
  - .3 PROVIDE NIGHT SETBACK DURING UNOCCUPIED MODE. IN UNOCCUPIED MODE, SUPPLY FAN SHALL BE CYCLED WITH 100% RETURN AIR TO MAINTAIN SETBACK SPACE TEMPERATURE.
  - .4 THE FOLLOWING LISTS THE MINIMUM I/O POINTS TO BE SENSED/CONTROLLED BY THE CONTROLLER:
    - .1 ANALOGUE INPUTS
      - .1 DISCHARGE AIR TEMPERATURE
      - .2 MIXED AIR TEMPERATURE
      - .3 RETURN AIR TEMPERATURE
      - .4 OUTSIDE AIR TEMPERATURE
      - .5 FILTER DIFFERENTIAL PRESSURE
      - .6 SPACE AIR TEMPERATURE
    - .2 ANALOGUE OUTPUTS
      - .1 OUTDOOR/RETURN DAMPERS
    - .3 BINARY INPUTS
      - .1 LOW TEMPERATURE LIMIT SWITCH
      - .2 FILTER STATUS
      - .3 SUPPLY FAN STATUS
    - .4 BINARY OUTPUTS
      - .1 SUPPLY FAN START/STOP
      - .2 HEATING STAGES START/STOP
      - .3 DX COOLING START/STOP
- .3 F-3 CONTROLS SHALL TAKE ADVANTAGE OF FREE COOLING WITH ECONOMIZER CONTROL:
  - .1 ON A CALL FOR COOLING, WITH OUTDOOR AIR TEMPERATURE BELOW THE ECONOMIZER LOCKOUT, OUTSIDE DAMPERS SHALL BE MODULATED WITH RETURN AIR DAMPER TO MAINTAIN MIXED AIR TEMPERATURE. WHEN ECONOMIZER DAMPERS ARE AT 100% O.A. POSITION, RETURN AIR DAMPER SHALL CLOSE.
  - .2 WITH THE OUTSIDE TEMPERATURE ABOVE THE RETURN AIR TEMPERATURE, THE DAMPERS WILL REVERT TO A MINIMUM OUTDOOR AIR SETTING TO PROVIDE VENTILATION TO THE SPACE.
- .4 CEILING FAN CF-1
  - .1 THE FANS TO TURN ON/OFF BY A CONTROL SWITCH LOCATED IN SUPERVISOR'S OFFICE 108.
  - .2 STATUS OF FANS TO BE SENT BACK TO THE CENTRAL DDC CONTROL SYSTEM.
- .5 EXISTING CO SENSOR IN THE SUPPLY DUCT
  - .1 WHEN CO LEVEL EXCEED THE MINIMUM PPM, AN ALARM WILL BE SENT TO THE CENTRAL DDC CONTROL SYSTEM AND THE ROOF TOP UNIT WILL SHUT DOWN.
- .6 IN THE EVENT OF FIRE, THE SMOKE DETECTOR IN THE RETURN DUCT WILL SHUT DOWN THE ROOF TOP UNIT.

MECHANICAL SPEC'S CONTINUED:

NOTES:

No.	REVISION/DESCRIPTION	BY	DATE
1	RE-ISSUED FOR CONSTRUCTION	EAG	DEC 11 2020
0	ISSUED FOR CONSTRUCTION	EAG	NOV 12 2020

SEAL

PROVINCE OF MANITOBA
2020-12-11
X. WU
Member
13709
REGISTERED PROFESSIONAL ENGINEER

DRAWN	CHECKED	DESIGNED	APPROVED
EAG		XYW	

DATE 2020.12.11 USER APPROVAL

Winnipeg

THE CITY OF WINNIPEG
PLANNING, PROPERTY AND DEVELOPMENT DEPARTMENT
MUNICIPAL ACCOMMODATIONS DIVISION
3–65 GARRY STREET, R3C 4K4

PROJECT

MAGNUS ELIASON RECREATION CENTRE
ROOFTOP UNIT REPLACEMENT

430 LANGSIDE ST.

SHEET TITLE

MECHANICAL
SPECIFICATIONS

SCALE	PROJECT No:	SHEET No:
AS SHOWN	2019-116	M3-R1

DRAWING SHEET SIZE: A1 (841mm x 594mm) PLOT 1:1