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File Name  
Date 2004.10.13  
MECH. & PLUMB. SPEC.  
Description  
Project No. 2004-060  
Address 185 KING STREET

## MECHANICAL SPECIFICATIONS

### PART 1 - MECHANICAL GENERAL CONDITIONS

#### 1. SCOPE

- A. PROVIDE A FULLY FUNCTIONAL HEATING, VENTILATION, AND AIR CONDITIONING (HVAC) SYSTEM FOR THE SPACES NOTED.
- B. MODIFY THE BUILDING TO PERMIT THE HVAC SYSTEM RENOVATION.

#### 2. REFERENCE CODES AND STANDARDS

- A. PERFORM ALL WORK IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS.
- B. SMACNA HVAC DUCT CONSTRUCTION STANDARDS, METAL AND FLEXIBLE, 1985.
- C. SMACNA HVAC DUCT LEAKAGE TEST MANUAL, 1985.
- D. ANSI/NFPA 90B-1989, INSTALLATION OF WARM AIR HEATING AND AIR COND. SYSTEMS.

#### 3. SHOP DRAWINGS

- A. SUBMIT SHOP DRAWINGS FOR ALL COMPONENTS PROVIDED, INCLUDING AIR HANDLING UNITS, CONTROLS, BUILDING PRODUCTS, ELECTRICAL COMPONENTS, ANY COMPONENTS SIGNIFICANT TO PROJECT SUCCESS.
- B. FOR EACH SUBMISSION, SUBMIT TWO SETS OF LETTER OR 11"X17" SHOP DRAWINGS. IF SHOP DRAWINGS ARE LARGER THAN 11"X17" SUBMIT ONE REPRODUCIBLE AND ONE PRINT.

#### 4. DUCT WORK

- A. SEAL CLASSIFICATION: USE SMACNA SEAL CLASS C. TRANSVERSE JOINT AND CONNECTIONS MADE AIR TIGHT WITH GASKETS SEALANT TAPE OR COMBINATION THEREOF. LONGITUDINAL SEAMS UNSEALED.
- B. SEALANT: OIL RESISTANT, POLYMER TYPE FLAME RESISTANT DUCT SEALANT. TEMPERATURE RANGE OF MINUS 30C TO PLUS 93C
- C. TAPE: POLYVINYL TREATED, OPEN WEAVE FIBERGLASS TAPE 2" WIDE.
- D. DUCT LEAKAGE: IN ACCORDANCE WITH SMACNA HVAC DUCT LEAKAGE TEST MANUAL.
- E. FITTINGS:
- FABRICATION: TO SMACNA.
  - RADIUSES ELBOWS
    - RECTANGULAR: STANDARD RADIUS AND OR SHORT RADIUS WITH SINGLE TURNING VANES CENTRELINE RADIUS: 1.5 TIMES WIDTH OF DUCT.
    - ROUND: SMOOTH RADIUS 5 PIECE. CENTRELINE RADIUS: 1.5 TIMES DIAMETER.
    - MITERED ELBOWS, RECTANGULAR
      - TO 18" WITH SINGLE DOUBLE THICKNESS TURNING VANES.
      - OVER 16" WITH DOUBLE THICKNESS TURNING VANES.
  - BRANCHES:
    - RECTANGULAR MAIN AND BRANCH: WITH RADIUS ON BRANCH 1.5 TIMES WIDTH OF DUCT 45° ENTRY ON BRANCH
    - PROVIDE VOLUME CONTROL DAMPER IN BRANCH DUCT NEAR CONNECTION TO MAIN DUCT.
    - MAIN DUCT BRANCHES: WITH SPLITTER DAMPER
  - TRANSITIONS:
    - DIVERGING: 20° MAXIMUM INCLUDED ANGLE.
    - CONVERGING 30° MAXIMUM INCLUDED ANGLE.
  - GALVANIZED DUCTWORK:
    - LOCK FORMING QUALITY: TO ASTM A525M, 200 ZINC COATING
    - THICKNESS, FABRICATION AND REINFORCEMENT: TO ASHRAE AND SMACNA
    - JOINTS: TO ASHRAE AND SMACNA AND OR PROPRIETARY MANUFACTURED DUCT JOINT. PROPRIETARY MANUFACTURED FLANGED DUCT JOINT SHALL BE CONSIDERED TO BE A CLASS "A" SEAL.
  - DUCT HANGERS AND SUPPORTS:
    - STRAP HANGERS: OF SAME MATERIAL AS DUCT BUT NEXT SHEET METAL THICKNESS HEAVIER THAN DUCT. MAXIMUM SIZE DUCT SUPPORTED BY STRAP HANGER 18".
    - HANGER CONFIGURATION: TO ASHRAE AND SMACNA STD.
  - EXECUTION:
    - DO WORK IN ACCORDANCE WITH ANSI/NFPA 90A ANSI/NFPA 90B ASHRAE CSA B228.1 AND SMACNA.
    - DO NOT BREAK CONTINUITY OF INSULATION VAPOUR BARRIER WITH HANGERS OR RODS. INSULATE STRAP HANGERS 100mm BEYOND INSULATED DUCT.
    - SUPPORT RISERS IN ACCORDANCE WITH ASHRAE AND SMACNA.
    - INSTALL BREAKAWAY JOINTS IN DUCTWORK ON EACH SIDE OF FIRE SEPARATION.
    - INSTALL PROPRIETARY MANUFACTURED FLANGED DUCT JOINTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
    - MANUFACTURE DUCT IN LENGTHS TO ACCOMMODATE INSTALLATION OF ACOUSTIC DUCT LINING.
    - APPLY SEALANT TO OUTSIDE OF JOINT TO MANUFACTURER'S RECOMMENDATIONS.
    - BED TAPE IN SEALANT AND RECOAT WITH MINIMUM OF 1 COAT OF SEALANT TO MANUFACTURER'S RECOMMENDATIONS.
    - SUPPLY AIR DUCTS SHALL BE INSULATED WITH MINIMUM 1" FIBERGLASS ALUMINUM FOIL JACKETS.

#### 5. DUCT ACCESSORIES

- A. GENERAL MANUFACTURE IN ACCORDANCE WITH CSA B228.1
- B. FLEXIBLE CONNECTIONS:
- FRAME: GALVANIZED SHEET METAL FRAME mm THICK WITH FABRIC CLENCHED BY MEANS OF DOUBLE LOCKED SEAMS.
  - MATERIAL: FIRE RESISTANT, SELF-EXTINGUISHING, NEOPRENE COATED FABRIC, TEMPERATURE RATED AT MINUS 40°F TO PLUS 190°F DENSITY OF 0.08 LB/FT
- C. EXECUTION:
- INSTALL FLEXIBLE CONNECTIONS IN FOLLOWING LOCATIONS
    - INLETS AND OUTLETS TO SUPPLY AIR UNITS AND FANS.
    - INLETS AND OUTLETS TO EXHAUST AND RETURN AIR FANS.
    - AS INDICATED.
    - LENGTH OF CONNECTION: 4"
    - MINIMUM DISTANCE BETWEEN METAL PARTS WHEN SYSTEM IN OPERATION: 3"
    - INSTALL IN ACCORDANCE WITH RECOMMENDATIONS OF SMACNA.
    - WHEN FAN IS RUNNING: DUCTING ON EACH SIDE OF FLEXIBLE CONNECTION TO BE IN ALIGNMENT AND ENSURE SLACK MATERIAL IN FLEXIBLE CONNECTION.
  - INSTRUMENT TEST PORTS: INSTALL IN ACCORDANCE WITH RECOMMENDATIONS OF SMACNA AND IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
  - TURNING VANES: INSTALL IN ACCORDANCE WITH RECOMMENDATIONS OF SMACNA AND AS INDICATED.

#### 6. TESTING, ADJUSTING AND BALANCING (TAB)

- A. SCOPE
- TAB MEANS TO TEST AND BALANCE, TO PERFORM IN ACCORDANCE WITH REQUIREMENTS OF THE CONTRACT DOCUMENTS AND TO DO ALL OTHER WORK AS SPECIFIED IN THIS SECTION.
  - TEST TO VERIFY PROPER AND SAFE OPERATION, DETERMINE ACTUAL POINT OF PERFORMANCE, EVALUATE QUALITATIVE AND QUANTITATIVE PERFORMANCE OF EQUIPMENT, SYSTEMS AND CONTROLS AT DESIGN, AVERAGE AND LOW LOADS USING ACTUAL OR SIMULATED LOADS.
  - ADJUST AND REGULATE EQUIPMENT AND SYSTEMS SO AS TO MEET SPECIFIC PERFORMANCE REQUIREMENTS AND TO ACHIEVE SPECIFIC INTERACTION WITH ALL OTHER RELATED SYSTEMS UNDER ALL NORMAL AND EMERGENCY LOADS AND OPERATING CONDITIONS.
  - BALANCE SYSTEMS AND EQUIPMENT AND REGULATE FLOW RATES TO MATCH LOAD REQUIREMENTS OVER FULL OPERATING RANGE.
- B. EQUIPMENT STARTUP
- FOLLOW STARTUP PROCEDURES AS RECOMMENDED BY EQUIPMENT MANUFACTURER UNLESS SPECIFIC OTHERWISE.
- C. START OF TAB
- START TAB ONLY WHEN CONSTRUCTION IS ESSENTIALLY COMPLETE
  - STARTUP VERIFICATION FOR PROPER, NORMAL AND SAFE OPERATION OF ALL MECHANICAL AND ASSOCIATED ELECTRICAL CONTROL SYSTEMS AFFECTING TAB INCLUDING BUT NOT LIMITED TO
    - PROPER THERMAL OVERLOAD PROTECTION IN PLACE FOR ELECTRICAL EQUIPMENT
    - AIR SYSTEMS
      - FILTERS IN PLACE, CLEAN
      - DUCT SYSTEM CLEAN
      - DUCTS, AIR SHAFTS, CEILING PLENUMS ARE AIRTIGHT TO WITHIN SPECIFIC TOLERANCES.
      - CORRECT FAN ROTATION
      - FIRE, SMOKE, VOLUME CONTROL DAMPERS INSTALLED AND OPEN
      - COIL FINS COMBED, CLEAN
      - ACCESS DOORS, INSTALLED, CLOSED
      - ALL OUTLETS INSTALLED, VOLUME CONTROL DAMPERS OPEN
    - DO TAB TO PLUS 5%, MINUS 5% OF DESIGN VALUES
    - ACCURACY TOLERANCES: MEASURED VALUES TO BE ACCURATE TO WITHIN PLUS OR MINUS 2% OF ACTUAL VALUES.
- D. INSTRUMENTS:
- CALIBRATE IN ACCORDANCE WITH REQUIREMENTS OF MOST STRINGENT OF REFERENCED STANDARDS FOR HVAC SYSTEM
- E. TAB REPORT:
- FORMAT TO BE IN ACCORDANCE WITH REFERENCED STANDARD
  - TAB REPORT TO SHOW ALL RESULTS IN IMPERIAL UNITS AND TO INCLUDE:
    - PROJECT RECORD DRAWINGS
    - SYSTEM SCHEMATICS
  - SUBMIT 6 COPIES OF TAB REPORT TO CONTRACT ADMINISTRATOR FOR VERIFICATION AND APPROVAL APPROVAL, IN ENGLISH, COMPLETE WITH INDEX TABS.
- F. VERIFICATION:
- ALL REPORTED RESULTS SUBJECT TO VERIFICATION BY CONTRACT ADMINISTRATOR.
  - PROVIDE MANPOWER AND INSTRUMENTATION TO VERIFY UP TO 30% OF ALL REPORTED RESULTS.
  - NUMBER AND LOCATION OF VERIFIED RESULTS TO BE AT DISCRETION OF CONTRACT ADMINISTRATOR.
  - BEAR COSTS TO REPEAT TAB AS REQUIRED TO SATISFACTION OF CONTRACT ADMINISTRATOR.
- G. SETTINGS:
- AFTER TAB IS COMPLETED TO SATISFACTION OF CONTRACT ADMINISTRATOR, REPLACE DRIVE GUARDS, CLOSE ALL ACCESS DOORS, LOCK ALL DEVICES IN SET POSITIONS, ENSURE SENSORS ARE AT REQUIRED SETTINGS.
  - PERMANENTLY MARK ALL SETTINGS TO ALLOW RESTORATION AT ANY TIME DURING LIFE OF FACILITY. MARKINGS NOT TO BE ERADICATED OR COVERED IN ANY WAY.
- H. AIR SYSTEMS:
- STANDARD: TAB TO BE TO MOST STRINGENT OF THIS SECTION OR TAB STANDARDS OF AABC NEBB SMACNA ASHRAE.
  - DO TAB OF ALL SYSTEMS, EQUIPMENT, COMPONENTS, CONTROLS SPECIFIED IN THE MECHANICAL DRAWINGS.
  - QUALIFICATIONS: PERSONNEL PERFORMING TAB TO BE CURRENT MEMBER IN GOOD STANDING OF AABC OR NEBB QUALIFIED TO STANDARDS OF AABC OR NEBB.
  - QUALITY ASSURANCE: PERFORM TAB UNDER DIRECTION OF SUPERVISOR QUALIFIED BY TO STANDARDS OF AABC OR NEBB.
  - MEASUREMENTS: TO INCLUDE, BUT NOT LIMITED TO, FOLLOWING AS APPROPRIATE FOR SYSTEMS, EQUIPMENT, COMPONENTS, CONTROLS: AIR VELOCITY, STATIC PRESSURE, FLOW RATE, PRESSURE DROP (OR LOSS), TEMPERATURES (DRY BULB, WET BULB, DEWPOINT), DUCT CROSS SECTIONAL AREA, RPM, ELECTRICAL POWER, VOLTAGE, NOISE, VIBRATION.
  - LOCATIONS OF EQUIPMENT MEASUREMENTS: TO INCLUDE, BUT NOT BE LIMITED TO, FOLLOWING AS APPROPRIATE:
    - INLET AND OUTLET OF EACH DAMPER, FILTER, COIL, HUMIDIFIER, FAN, OTHER EQUIPMENT CAUSING CHANGES IN CONDITIONS.
    - AT EACH CONTROLLER, CONTROLLED DEVICE
    - LOCATIONS OF SYSTEMS MEASUREMENTS TO INCLUDE, BUT NOT LIMITED TO, FOLLOWING AS APPROPRIATE:
      - EACH MAIN DUCT, MAIN BRANCH, SUB-BRANCH, RUN-OUT (OR GRILLE, REGISTER OR DIFFUSER)

## PLUMBING SPECIFICATIONS

#### 1. GENERAL

- A. CONTRACTOR SHALL SUPPLY ALL LABOUR AND MATERIAL FOR A COMPLETE PLUMBING PIPING INSTALLATION AS INDICATED ON THE MECHANICAL DRAWINGS.
- B. THE APPLICABLE CODES ARE CONSIDERED TO BE MINIMUM STANDARD REQUIREMENTS. IT IS NOTED IN SOME CASES, THE CODE REQUIREMENTS ARE EXCEEDED, AS SHOWN ON DRAWINGS.

#### 2. PRODUCTS

- A. GENERAL
- EQUIPMENT AND MATERIALS ARE TO BE NEW AND CSA CERTIFIED, WHERE APPLICABLE
  - EQUIPMENT SCHEDULES ARE SHOWN ON THE MECHANICAL DRAWINGS

#### B. SHOP DRAWINGS

- SUBMIT FIVE (5) COPIES OF MANUFACTURERS' SHOP DRAWINGS FOR ALL NEW EQUIPMENT.
- SUBMIT SHOP DRAWINGS FOR CONTRACT ADMINISTRATOR'S APPROVAL PRIOR TO PLACING ANY ORDER.

#### C. COLD, HOT WASTE AND VENT PIPING AND FITTINGS

PIPE APPLICATION	PIPE MATERIAL	FITTING MATERIAL
COLD, HOT AND HOT WATER RECIRC. ABOVE GROUND	TYPE 'L' HARD COPPER TUBING	'STREAMLINE' OR EQUAL SOLDER JOINT CAST BRASS C/W SILVER SOLDERED JOINT
COLD WATER, BURIED	TYPE 'K' SOFT COPPER TUBING	FLARED TUBE U/G SERVICE
SOIL, WASTE & VENT ABOVE GROUND OR NOT MORE THAN 2' BELOW	CAST IRON	M.J. STAINLESS STEEL COUPLINGS
BURIED BELOW 2"	DIW COPPER	SOLDER JOINT
SOIL AND WASTE, BURIED	PVC SCHED. 40	PVC-DIW SCHED. 40

#### D. VALVES (BASED ON CRANE NO.)

SIZE	JOINT	GATE	GLOBE	CHECK	VERT. CHECK
UP TO 2"	SOLDER	1320C	1310	1342	
OVER 2"	SCREW	428	5	41	29

#### E. HANGERS

- COPPER PIPING HANGERS, GRINNELL.
- DRAINAGE PIPING HANGER, GRINNELL.
- GALVANISED HANGER ROD SIZE 1/4"
- PIPE SUPPORT SPACING AS FOLLOWS:

SIZE (Inch diameter)	COPPER	C.I.
3/8", 1/2"	5 FEET	
3/4", 1"	6 FEET	
1 1/4" TO 2"	8 FEET	
2" AND UP		6 FEET

#### F. SOLDER MATERIAL FOR COPPER SHALL BE LEAD FREE, SILVABRITE 100.

#### G. WATER HAMMER ARRESTORS SHALL BE ZURN #1700

#### 3. EXECUTION


- A. INSTALLATION
- THE LATEST EDITION OF ALL CODES AND STANDARDS SHALL APPLY. OBTAIN ALL WORK PERMITS, APPROVALS, AND THE LIKE TO COMPLETE THE WORK READY FOR OPERATION.
  - CONTRACTOR SHALL FURNISH ALL MATERIALS, LABOUR AND PLANT NECESSARY TO COMPLETE THE WORK AS SHOWN ON DRAWINGS OR HEREIN.
  - ALL WORKMANSHIP AND FABRICATION SHALL MEET STANDARDS SET FOR THIS TRADE. ALL WORK TO BE DONE BY COMPETENT AND EXPERIENCED WORKMEN.
  - IN THE CASE OF THE CONTRACTOR USING PRODUCTS OTHER THAN SPECIFIED, THIS WILL INCLUDE ALTERNATE AND/OR APPROVED EQUAL ITEMS THAT MAY INCUR ADDITIONAL COSTS DUE TO DIMENSION DIFFERENCE, MODIFICATION TO EXISTING STRUCTURES, POWER, AND CONTROL REQUIREMENTS; CONTRACTOR MUST BEAR ALL ADDITIONAL COSTS TO MAKE SYSTEMS FUNCTIONAL.
  - ALL EQUIPMENT AND PIPING REQUIRING SUPPORT SHALL BE SECURED TO THE BUILDING STRUCTURE.
  - WIRE HANGERS OR PERFORATED STRAPS WILL NOT BE PERMITTED.
  - HANGERS AND SUPPORTS SHALL NOT DAMAGE OR PIERCE INSULATION.
  - ALL HORIZONTAL PIPING SHALL BE SUPPORTED WITH GALV. HANGER ROD, "CAMSTRUT" OR PAINTED IRON ANGLE MEMBERS, CLAMPS AND SADDLES.
  - PIPE LINES SHALL RUN PARALLEL AND GROUP CLOSELY TO EACH OTHER. VERTICAL AND HORIZONTAL PIPE RUNS SHALL BE PARALLEL ALONG BUILDING LINES.
  - ALL CHANGES IN DIRECTION SHALL BE MADE WITH FITTINGS.
  - ALL PIPES SHALL BE CUT ACCURATELY TO MEASUREMENTS TAKEN ON SITE
  - GRADE ALL WATER PIPE FOR PROPER DRAINAGE AND INSTALL 1/2" DRAIN VALVE WITH 1/2 THREADED HOSE END AT LOW POINT IN MECH. ROOM.
  - UNIONS AND FLANGES SHALL BE PROVIDED AT ALL EQUIPMENT REQUIRING DISCONNECT FOR REPAIRS OR REPLACEMENT, LOCATED BETWEEN SHUT OFF VALVES AND EQUIPMENT. ALL UNIONS SHALL BE ACCESSIBLE.
  - INSTALL WATER HAMMER ARRESTOR AT PLUMBING RISES, FIXTURE GROUPS, AND QUICK SHUT OFF VALVE OUTLETS. AT COMPLETION OF WORK, WATER SYSTEM MUST BE WATER HAMMER FREE UNDER NORMAL OPERATION.
  - SHUT OFF VALVES SHALL BE PROVIDED WHERE INDICATED AND SPECIFIED. IF NOT INDICATED, OR SPECIFIED DIRECTLY, VALVES SHALL BE INSTALLED ON MAIN BRANCHES AT POINT OF TAKE OFF FROM SUPPLY MAIN, ON EACH INDIVIDUAL PIECE OF EQUIPMENT INLET AND OUTLET TO PERMIT UNIT REMOVAL WITHOUT AFFECTING OPERATION OF SYSTEM. LOCATE VALVES FOR ACCESS AND OPERATION. DO NOT LOCATE VALVE STEMS BELOW HORIZONTAL.
  - ALL FLOOR DRAINS SHALL HAVE A 18" X 18" CHLORINATED POLYETHYLENE (CPE) WATERPROOF MEMBRANE INSTALLED AROUND BODY OF DRAIN AND BURIED IN THE CONCRETE, TO FORM A WATER TIGHT BARRIER THE MEMBRANE MUST FORM A WATER TIGHT SEAL WITH DRAIN BODY.
  - PROVIDE CLEAN OUTS IN ALL DRAINS, AND SOIL PIPE WHERE OBSTRUCTIONS MIGHT OCCUR, AT THE BASE OF EACH STACK, AT CHANGE OF DIRECTION MORE THAN 45 DEGREES, AT THE END OF ALL HORIZONTAL PIPES, AND AT 50' INTERVALS ALONG STRAIGHT RUNS AS WHERE SHOWN ON DRAWINGS.

NOTES :

NO.	REVISION/DESCRIPTION	BY	DATE
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SEALS

DRAWN BY	DTA	CHECKED BY	APPROVED
DATE	2004.10.13	USER	APPROVAL

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

PROJECT

Fire Paramedic Services  
Executive Office Renovation

185 KING STREET - MANDARIN BLDG. - SECOND FLOOR

SHEET TITLE

MECHANICAL & PLUMBING  
SPECIFICATIONS

SCALE	PROJECT NO.	SHEET NO.
N/A	2004-060	M-4

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

ORIGINAL SEALED BY:  
D.A. Paley P. Eng.  
Date: 2004/10/15