

GENERAL SPECIFICATIONS

- THE BIDDERS SHALL EXAMINE THE SITE AND THE EXISTING CONDITIONS AFFECTING THE PROJECT. EXAMINE THE COMPLETE SET OF CONTRACT DOCUMENTS TO ENSURE THAT THE WORK CAN BE CARRIED OUT WITHOUT SIGNIFICANT CHANGES TO THE INTENT OF THE DOCUMENTS. NO FUTURE ALLOWANCE WILL BE MADE FOR CHANGES UNLESS THE CONTRACT ADMINISTRATOR HAS BEEN NOTIFIED IN WRITING OF ANY DISCREPANCIES OR INTERFERENCES, PRIOR TO THE CLOSE OF BID OPPORTUNITIES. NO ALLOWANCE WILL BE MADE FOR ITEMS THAT SHOULD HAVE BEEN NOTED DURING A PRE-BID OPPORTUNITY SITE INSPECTION.
- THE LOCATION, ROUTING AND ELEVATIONS OF ALL NEW AND EXISTING SERVICES AND UTILITIES AS SHOWN ON THE DRAWINGS ARE TO BE CONSIDERED AS APPROXIMATIONS ONLY. VERIFY THE EXACT LOCATIONS, ROUTINGS AND ELEVATIONS OF ALL SERVICES PRIOR TO COMMENCING WORK, AND ASSUME RESPONSIBILITY FOR LAYING OUT ALL WORK. THE CONTRACTOR SHALL RETAIN RESPONSIBILITY FOR ANY DAMAGE TO EXISTING SERVICES AND UTILITIES.
- ALL ASPECTS OF THE INSTALLATION MUST COMPLY WITH THE MOST STRINGENT OF THE APPLICABLE BUILDING CODES, LOCAL REGULATIONS, AND BY-LAWS. BEFORE PROCEEDING WITH THE WORK, OBTAIN APPROVED DRAWINGS AND SPECIFICATIONS FROM THE AUTHORITIES HAVING JURISDICTION.
- PROVIDE ALL NECESSARY NOTICES, OBTAIN ALL REQUIRED PERMITS, PAY ALL FEES REQUIRED BY LAW, AND ARRANGE FOR ALL INSPECTIONS RELATED TO THE PERFORMANCE OF THE SPECIFIED WORK.
- PROVIDE ALL MATERIALS, LABOUR AND EQUIPMENT REQUIRED TO COMPLETE THE WORK AS SHOWN AND AS SPECIFIED, SO AS TO LEAVE THE CITY WITH A COMPLETE AND FUNCTIONING SYSTEM.

- ALL EQUIPMENT AND MATERIALS SHALL BE NEW AND C.S.A. APPROVED, UNLESS SPECIFICALLY NOTED OTHERWISE.
- ALL SIMILAR EQUIPMENT AND OR MATERIALS SHALL BE BY THE SAME MANUFACTURER.

REQUEST FOR APPROVAL OF SUBSTITUTE MATERIAL AND/OR EQUIPMENT FOR THAT SPECIFIED, SHALL BE SUBMITTED TO THE CONTRACT ADMINISTRATOR WITH A STAMPED SELF-ADDRESSED ENVELOPE OR RETURN FAX NUMBER AT LEAST FIVE WORKING DAYS PRIOR TO BID OPPORTUNITY CLOSING. REQUESTS SHALL INCLUDE ALL PERFORMANCE SPECIFICATIONS, PHYSICAL DATA AND OTHER PERTINENT INFORMATION REQUIRED FOR THE CONTRACT ADMINISTRATOR TO MAKE A COMPLETE COMPARISON.

PROVIDE A MINIMUM OF SEVEN COPIES OF SHOP DRAWINGS FOR REVIEW BY THE CONTRACT ADMINISTRATOR. THE SHOP DRAWINGS MUST BE ASSEMBLED INTO COMPLETE BROCHURES, WITH NO LOOSE SHEETS. UNASSEMBLED SUBMISSIONS WILL BE RETURNED AS INCOMPLETE.

THE REVIEW OF THE SHOP DRAWINGS IS FOR THE SOLE PURPOSE OF ASCERTAINING CONFORMANCE WITH THE GENERAL DESIGN CONCEPT. THE REVIEW SHALL NOT MEAN APPROVAL OF THE DETAILED DESIGN INHERENT IN THE EQUIPMENT, THE RESPONSIBILITY FOR WHICH SHALL REMAIN WITH THE CONTRACTOR. THE REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY TO MEET THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL REMAIN RESPONSIBLE FOR CONFIRMING AND CORRELATING THE DIMENSIONS ON THE JOBSITE, AND FOR INFORMATION THAT PERTAINS TO THE FABRICATION PROCESS, CONSTRUCTION TECHNIQUES, AND INSTALLATION DETAILS, AND FOR COORDINATING ALL WORK OF THE RELATED SUB-TRADES.

ALL CUTTING AND PATCHING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. EXISTING EXPOSED SURFACES SHALL BE RETURNED TO AN "AS-FOUND" CONDITION ACCEPTABLE TO THE CITY.

EACH CONTRACTOR SHALL COORDINATE THE WORK WITH OTHER CONTRACTORS IN ORDER TO AVOID CONFLICTS.

NEATLY STORE ALL MATERIALS, AND CLEAN UP REFUSE ON A REGULAR BASIS. PROTECT AND MAINTAIN ALL WORK UNTIL THE PROJECT HAS BEEN COMPLETED AND TURNED OVER TO THE CITY.

THE INSTALLATION SHALL BE COMPLETELY TESTED, DEMONSTRATING THAT THE EQUIPMENT AND SYSTEMS INSTALLED ARE PERFORMING IN THE MANNER INTENDED.

AT THE COMPLETION OF THE INSTALLATION, PROVIDE TWO MARKED-UP COPIES OF THE BID OPPORTUNITY DRAWINGS FOR RECORD PURPOSES. PROVIDE THREE SETS OF OPERATION AND MAINTENANCE MANUALS. PAY ALL COSTS ASSOCIATED WITH THE PRODUCTION OF THE "RECORD" DRAWINGS AND THE MANUALS. SUBMIT THE DOCUMENTS TO THE CONTRACT ADMINISTRATOR FOR REVIEW, AND MAKE ANY REQUESTED CHANGES BEFORE DELIVERING THEM TO THE CITY.

REVIEW THE OPERATION AND MAINTENANCE OF THE SYSTEMS WITH THE CITY'S MAINTENANCE PERSONNEL AND PROVIDE WRITTEN AND/OR VERBAL INSTRUCTIONS AS REQUIRED.

FURNISH CERTIFICATES CONFIRMING THAT THE WORK HAS BEEN INSTALLED TO THE SATISFACTION OF THE AUTHORITIES HAVING JURISDICTION.

NO CERTIFICATE ISSUED, PAYMENT MADE, OR PARTIAL OR ENTIRE USE OF THE SYSTEMS BY THE CITY, SHALL BE CONSTRUED AS ACCEPTANCE OF DEFECTIVE WORK OR MATERIALS.

THE CONTRACTOR SHALL PROVIDE A ONE YEAR LABOR AND MATERIAL WARRANTY ON ALL NEW EQUIPMENT AND COMPONENTS, COMMENCING UPON THE DATE OF ACCEPTANCE BY THE CITY.

REPLACE AT NO CHARGE TO THE CITY, ALL ITEMS WHICH FAIL OR PROVE DEFECTIVE WITHIN A PERIOD OF ONE YEAR AFTER THE DATE OF FINAL ACCEPTANCE BY THE CITY, PROVIDED THAT THE FAILURE IS NOT DUE TO IMPROPER USAGE BY THE CITY. MAKE GOOD ALL DAMAGES INCURRED AS A RESULT OF THE FAILURE AND OF THE REPAIRS.

PROVIDE TEMPORARY HEATING AS REQUIRED. DO NOT USE NEW EQUIPMENT FOR THIS PURPOSE WITHOUT THE EXPRESS CONSENT OF THE CONTRACT ADMINISTRATOR.

SCHEDULING OF ALL WORK SHALL BE ARRANGED WITH THE CITY. COORDINATE THE SHUT-DOWN OF EXISTING UTILITIES AND SERVICES AS REQUIRED FOR CONNECTIONS OF NEW WORK. WORK WITHIN THE BUILDING MAY HAVE TO BE PERFORMED DURING NON-REGULAR HOURS, AND MUST CONFORM TO THE WORK RULES OF THE BUILDING, AS DIRECTED BY THE CITY.

THE DRAWINGS FOR THE MECHANICAL WORK ARE PERFORMANCE DRAWINGS, DIAGRAMATIC AND APPROXIMATELY TO SCALE, INTENDED TO CONVEY THE SCOPE OF WORK AND INDICATE THE GENERAL ARRANGEMENT AND APPROXIMATE LOCATIONS OF APPARATUS, FIXTURES AND PIPE/DUCT RUNS. THESE DRAWINGS DO NOT INTEND TO SHOW CONTRACT ADMINISTRATORIAL AND STRUCTURAL DETAILS.

EVEN THOUGH SOME PIPING AND/OR DUCTWORK IS NOT COMPLETELY SHOWN SCHEMATICALLY, AND ALL DETAILS ARE NOT SHOWN OR SPECIFIED, IT IS EXPECTED THAT THE CONTRACTORS BE FAMILIAR ENOUGH WITH THEIR FIELDS OF WORK TO COMPLETE THE PROJECT TO THE STANDARDS GENERALLY ADHERED TO BY THE LOCAL INDUSTRY, INCLUDING GOOD WORKMANSHIP AND COMMON SENSE. THE CONTRACT ADMINISTRATOR RESERVES THE RIGHT TO FURNISH ANY ADDITIONAL DETAIL DRAWINGS, WHICH IN THE JUDGEMENT OF THE CONTRACT ADMINISTRATOR, MAY BE NECESSARY TO CLARIFY THE WORK, AND SUCH DRAWINGS SHALL FORM PART OF THIS CONTRACT. THE WORK FOR SUCH CLARIFICATIONS SHALL BE AT NO COST TO THE CITY.

MECHANICAL SPECIFICATIONS

SECTION 15100 - GENERAL

- PROVIDE ONE SET OF SPECIAL TOOLS REQUIRED TO SERVICE EQUIPMENT, AS RECOMMENDED BY THE MANUFACTURERS/SUPPLIERS.
- PROVIDE DI-ELECTRIC COUPLINGS WHEREVER PIPES OF DISSIMILAR METALS ARE JOINED.
- HOISTING AND PLACING OF MECHANICAL EQUIPMENT SHALL BE THE RESPONSIBILITY OF THE SUB-CONTRACTOR PROVIDING THE EQUIPMENT.
- PIPE HANGERS SHALL BE GRINNELL FIGURE 65 FOR STEEL PIPE AND FIGURE CP65 FOR COPPER PIPE, WITH FIGURE 140 THREADED ROD. THREADED ROD SHALL BE ATTACHED TO FIGURE 117 EXPANSION CASE SET IN HOLES DRILLED IN CONCRETE, OR ATTACHED TO FIGURE 225 OR FIGURE 227 CLAMP ATTACHED TO ROOF/FLOOR JOISTS. FOR INSULATED PIPING, PROVIDE FIGURE 167 PROTECTION SADDLES. SIZE HANGERS AND SADDLES TO SUIT INDIVIDUAL PIPE SIZES, INCLUDING INSULATION WHERE APPLICABLE.

USE THE FOLLOWING SCHEDULE FOR MINIMUM HANGING STANDARDS FOR HORIZONTAL PIPING:

STEEL PIPE	ROD DIAMETER	MAXIMUM SPACING
1-1/4" (32 mm) AND SMALLER	3/8" (10mm)	3'-0" (900mm)
1-1/2" (38 mm) AND 2" (50 mm)	3/8" (10mm)	10'-0" (3000mm)
2-1/2" (65 mm) AND 3" (75 mm)	1/2" (12mm)	12'-0" (3600mm)
4" (100 mm) AND 5" (125 mm)	5/8" (16mm)	12'-0" (3600mm)
6" (150 mm)	3/4" (19mm)	12'-0" (3600mm)
COPPER PIPE	ROD DIAMETER	MAXIMUM SPACING
1" (25 mm) AND SMALLER	3/8" (10mm)	6'-0" (1800mm)
1.25" TO 2" (32 mm TO 50 mm)	3/8" (10mm)	10'-0" (3000mm)

PIPE HANGERS MAY BE PERFORATED GALVANIZED STEEL STRAP HANGERS FOR 2" (50mm) AND SMALLER PIPING IN CONCEALED SPACES.

PROVIDE ACCESS DOORS AS REQUIRED TO INSTALL, MAINTAIN AND ADJUST EQUIPMENT AND CONTROLS. ACCESS DOORS IN CEILINGS AND WALLS SHALL HAVE PIANO HINGES AND SCREWDRIVER CAM LOCKS.

PROVIDE FIRESTOPPING AND/OR INTUMESCENT DONUTS, AS REQUIRED, WHERE PIPING PASSES THROUGH FIRE SEPARATIONS.

SECTION 15800 - INSULATION

- PROVIDE 1/2" (12mm) THICK, FOIL-FACED RIGID PRE-FORMED FIBREGLASS EXTERNAL THERMAL PIPE INSULATION ON ALL NEW DOMESTIC COLD WATER PIPES.
- PROVIDE 1/2" (12mm) THICK, RIGID, PRE-FORMED FIBREGLASS EXTERNAL THERMAL PIPE INSULATION ON ALL NEW DOMESTIC HOT WATER PIPES.
- PROVIDE "TRAP-WRAP" OR EQUAL INSULATION ON ALL P-TRAPS ON ALL LAVATORIES, WHERE NOTED AS HANDICAP ACCESSIBLE OR NOT.
- PROVIDE 1" (25mm) THICK, FOIL-FACED RIGID PRE-FORMED FIBREGLASS EXTERNAL THERMAL PIPE INSULATION ON ALL NEW PLUMBING VENTS FOR 10' (3000mm) ON WARM SIDE OF A PENETRATION THROUGH A WALL OR CEILING/ROOF TO A COLD SPACE, AND FOR FULL LENGTH IN COLD ATTIC SPACES.
- PROVIDE 1" (25mm) THICK, FOIL-FACED RIGID PRE-FORMED FIBREGLASS EXTERNAL THERMAL PIPE INSULATION ON ALL NEW ROOF DRAIN PIPING FOR 10' (3000mm) ON THE WARM SIDE OF A PENETRATION THROUGH A WALL OR CEILING/ROOF TO A COLD SPACE, AND FOR FULL LENGTH IN COLD ATTIC SPACES. PROVIDE 1/2" (12mm) THICK FOIL-FACED FLEXIBLE FIBREGLASS EXTERNAL THERMAL INSULATION ON THE BODY OF ALL NEW ROOF DRAINS.
- PROVIDE 1" (25mm) THICK, FOIL-FACED RIGID PRE-FORMED FIBREGLASS EXTERNAL THERMAL PIPE INSULATION ON ALL NEW NATURAL GAS PIPING FOR 10' (3000mm) ON THE WARM SIDE OF A PENETRATION THROUGH A WALL OR CEILING/ROOF TO A COLD SPACE.
- PROVIDE 2" (50mm) THICK, FOIL-FACED RIGID (FIBREGLASS OR FIBREBOARD) OR FLEXIBLE FIBREGLASS EXTERNAL THERMAL INSULATION ON ALL NEW EXHAUST OR RELIEF DUCTWORK FOR 10'-0" (3.0M) ON THE WARM SIDE OF A PENETRATION THROUGH A WALL/FLOOR/CEILING/ROOF TO A COLD SPACE, WHERE A BACKDRAFT DAMPER IS PROVIDED AT THE PENETRATION TO THE COLD SPACE. WHERE THE BACKDRAFT DAMPER IS PROVIDED IN THE DUCTWORK, INSULATION SHALL EXTEND FROM THE PENETRATION TO 10'-0" (3.0M) UPSTREAM OF THE BACK DRAFT DAMPER.
- PROVIDE 1" (25mm) THICK, FOIL-FACED EXTERNAL THERMAL INSULATION ON ALL NEW SUPPLY AIR DUCT MAINS, EXCLUDING INDIVIDUAL RUN-OUTS TO DIFFUSERS. INSULATION SHALL BE FLEXIBLE FIBREGLASS, OR RIGID FIBREBOARD.
- PROVIDE 2" (50mm) THICK, FOIL-FACED RIGID FIBREGLASS OR FIBREBOARD EXTERNAL THERMAL INSULATION ON ALL NEW OUTSIDE AIR INTAKE, MIXED AIR AND COMBUSTION AIR DUCTWORK. RETURN COMBUSTION AIR DUCTWORK MAY BE FLEXIBLE FIBREGLASS.
- PROVIDE 1" (25mm) THICK, BLACK CELLULAR FOAM RUBBER INSULATION ON ALL REFRIGERATION PIPING. INSTALL USING PLASTIC WIRE TIES.
- WHERE 1" ACOUSTIC INSULATION IS PROVIDED, 1" OF THERMAL INSULATION MAY BE DELETED.
- ALL JOINTS AND ELBOWS SHALL BE COMPLETELY INSULATED EXCEPT JOINTS AND ELBOWS MAY BE LEFT UNCOVERED ON HOT PIPING IN CONCEALED SPACES.
- ALL VALVES AND UNIONS SHALL BE COMPLETELY INSULATED, EXCEPT VALVES AND UNIONS MAY BE LEFT UNCOVERED ON HOT PIPING IN CONCEALED SPACES.
- SEAMS OF FOIL-FACED THERMAL INSULATION SHALL BE SEALED WITH ALUMINUM DUCT TAPE.
- PROVIDE ADDITIONAL LAYER OF CANVAS, FIELD APPLIED, ADHERED, LAP SEALED AND FINISHED WITH A BRUSH COAT OF SIZING.
- PROVIDE PVC FITTING COVERS WHERE CANVAS JACKET IS APPLIED.
- COVER BUTT JOINTS WITH A STRIP OF THE SAME MATERIAL AS THE JACKET.
- FLEXIBLE INSULATION SHALL BE INSTALLED IN A MANNER THAT DOES NOT REDUCE ITS THICKNESS.

SECTION 15400 - PLUMBING

- DOMESTIC WATER PIPING ABOVE GROUND SHALL BE TYPE 'L' HARD COPPER, WITH SOLDERED COPPER JOINTS AND FITTINGS. USE LEAD-FREE SOLDER.
- DOMESTIC WATER PIPING BELOW GROUND SHALL BE TYPE 'L' SOFT COPPER, WITH NO JOINTS.
- DRAIN AND VENT PIPING ABOVE GROUND SHALL BE AS ALLOWED BY CODE, INCLUDING DWV COPPER, CAST IRON, AND PVC/ABS PLASTIC. JOINTS SHALL BE SOLDERED FOR COPPER, SOLVENT WELDED FOR PLASTIC, AND MECHANICAL JOINT FOR CAST IRON.
- DRAIN AND VENT PIPING BELOW GROUND SHALL BE AS ALLOWED BY CODE, INCLUDING CAST IRON, AND PVC/ABS PLASTIC. JOINTS SHALL BE SOLVENT WELDED FOR PLASTIC, AND MECHANICAL JOINT FOR CAST IRON.
- NATURAL GAS PIPING SHALL BE SCHEDULE 40 STEEL, WITH SCREWED OR WELDED JOINTS AND FITTINGS AS PER CODE.
- DOMESTIC WATER VALVES SHALL BE BALL OR BUTTERFLY TYPE.
- NATURAL GAS VALVES SHALL BE APPROVED PLUG TYPE.
- PROVIDE CHROME PLATED ESCUTCHEONS WHERE VISIBLE PIPING PASSES THROUGH WALLS AND PARTITIONS.
- PROVIDE UNIONS WHERE PIPING CONNECTS TO EQUIPMENT. UNIONS SHALL BE LOCATED SO THAT THE PIPING DOES NOT HAVE TO BE ADJUSTED IN ORDER TO REMOVE THE EQUIPMENT.
- DURING CONSTRUCTION, OPEN ENDED PIPING SHALL BE TEMPORARILY CAPPED TO PREVENT THE ENTRY OF DIRT AND DEBRIS. ON COMPLETION, PIPING SYSTEMS SHALL BE FLUSHED TO REMOVE ANY FOREIGN MATERIAL.
- SLOPE ALL DRAIN LINES AT A MINIMUM OF 1/8" PER FOOT (1%) UNLESS A GREATER SLOPE IS REQUIRED BY CODE, OR A LESSER SLOPE IS NOTED ON THE DRAWINGS.

SECTION 15600 - REFRIGERATION

- USE REFRIGERATION GRADE HARD COPPER WITH SOLDERED CONNECTIONS.
- INSTALLATION AND SIZING OF REFRIGERANT PIPING SHALL BE AS PER MANUFACTURER'S RECOMMENDATIONS AND TABLES.
- PROVIDE FULL CHARGE OF REFRIGERANT.

SECTION 15800 - VENTILATION

- ALL DUCTWORK AND RELATED ACCESSORIES SHALL BE INSTALLED AS PER THE LATEST SMACNA STANDARDS.
- DUCTWORK SHALL BE GALVANIZED SHEET METAL UNLESS NOTED OTHERWISE, AND SHALL BE OF THE FOLLOWING GAUGES:

RECTANGULAR

DUCTS UP TO 12" (300 MM) ON LONGEST DIMENSION = 26 GA.
 DUCTS 13" TO 28" (325 TO 700 MM) ON LONGEST DIMENSION = 24 GA.
 DUCTS 29" TO 48" (725 TO 1200 MM) ON LONGEST DIMENSION = 22 GA.
 DUCTS 49" TO 96" (1225 TO 2400 MM) ON LONGEST DIMENSION = 20 GA.

ROUND (EXPOSED SHALL BE SPIRAL. CONCEALED SHALL BE SNAP-LOCK OR SPIRAL)

DUCTS 8" (200 MM) AND SMALLER = 26 GA.
 DUCTS 9" TO 22" (225 TO 550 MM) = 24 GA.
 DUCTS 24" TO 36" (600 TO 900 MM) = 22 GA.

- BALANCING DAMPERS SHALL BE PROVIDED FOR EACH SUPPLY AIR OUTLET AND RETURN/EXHAUST AIR INLET. DAMPERS MOUNTED AT GRILLES SHALL BE MULTI-BLADE TYPE. BUTTERFLY DAMPERS IN DUCTWORK SHALL BE CONSTRUCTED OF SHEET METAL, TWO GAUGES HEAVIER THAN THE DUCTWORK. DUCT DAMPERS SHALL HAVE LOCKING QUADRANTS AND POSITION INDICATORS.
- ALL DUCTWORK SHALL BE SEALED WITH NON-TOXIC DUCT SEALANT.
- PROVIDE 4" (100mm) WIDE FLEXIBLE FABRIC DUCT CONNECTIONS AT INLETS AND OUTLETS OF FANS.
- WHERE SHOWN OR NOTED ON THE DRAWINGS, PROVIDE 1" THICK, FLEXIBLE RESIN IMPREGNATED FIBREGLASS INTERNAL ACOUSTIC INSULATION WITH BLACK PLASTIC-COATED MATTE FINISH.

ACOUSTIC INSULATION SHALL BE INSTALLED USING PINS WELDED TO THE DUCTWORK, AND ADHESIVE. PROVIDE BLACK MASTIC TO SEAL ALL JOINTS.

FIRE DAMPERS SHALL BE INSTALLED AT ALL LOCATIONS WHERE DUCTWORK PASSES THROUGH A RATED SEPARATION, WHETHER SHOWN ON THE DRAWINGS OR NOT. CONFIRM ALL SEPARATION LOCATIONS WITH THE CONTRACT ADMINISTRATOR/DRAWINGS.

DUCT ACCESS DOORS AT ALL LOCATIONS REQUIRED FOR INSTALLATION, MAINTENANCE OR ADJUSTMENT OF EQUIPMENT OR CONTROLS. ACCESS DOORS SHALL HAVE GASKETS, PIANO HINGES AND THUMB LATCHES. DOORS SHALL BE INSTALLED TO ALLOW FOR INSTALLATION OF INTERNAL OR EXTERNAL INSTALLATION AS REQUIRED. FOR FIRE DAMPER ACCESS, MINIMUM 12"x12" IN SIZE UNLESS DUCT IS SMALLER.

SUPPORT HORIZONTAL DUCTWORK AT MAXIMUM 8'-0" (2400mm) ON CENTRE

- FOR ROUND DUCTWORK UP TO 36" (900mm) DIAMETER, SUPPORT DUCT USING PERFORATED GALVANIZED STEEL STRAP, SUSPENDED USING THREADED RODS ATTACHED TO THE STRUCTURE. USE 3/8" (10mm) RODS FOR DUCTS 12" (300mm) DIAMETER AND LESS. USE 1/2" (12mm) RODS FOR DUCTS 14" TO 22" (350mm TO 550mm) DIAMETER. USE 5/8" (16mm) RODS FOR DUCTS OVER 24" (600mm) DIAMETER.
- FOR ROUND DUCTWORK OVER 36" (900mm) DIAMETER, SUPPORT DUCT USING 1" x 1" x 1/8" (25mm x 25mm x 3mm) GALVANIZED ANGLE IRON TRAPEZE, SUSPENDED BY 5/8" (16mm) DIAMETER THREADED RODS ATTACHED TO THE STRUCTURE.
- FOR RECTANGULAR DUCTWORK 18" (450mm) WIDE OR LESS, SUPPORT DUCT WITH PERFORATED GALVANIZED STEEL STRAP, SUSPENDED USING 1/2" (12mm) THREADED RODS ATTACHED TO THE STRUCTURE.
- FOR RECTANGULAR DUCTWORK OVER 18" (450mm) WIDE, SUPPORT DUCT WITH 1" x 1" x 1/8" (25mm x 25mm x 3mm) GALVANIZED ANGLE IRON TRAPEZE, SUSPENDED BY 5/8" (16mm) DIAMETER THREADED RODS ATTACHED TO THE STRUCTURE.
- IN CONCEALED SPACES FOR ROUND AND RECTANGULAR DUCTWORK 12" (300mm) WIDE OR LESS, PERFORATED GALVANIZED STEEL STRAP MAY BE USED IN LINE OF THREADED ROD SUSPENSION.

PROVIDE COMPLETE CLEANING OF ALL NEW AND EXISTING DUCTWORK AND FURNACES INCLUDING ALL UNDERSLAB DUCTS. PROVIDE CERTIFICATE WHEN ALL CLEANING IS COMPLETE.

- AMERICAN STANDARD CADET ELONGATED PRESSURE ASSISTED. 6 LITRE FLUSH C/W LINED TANK, TANK COVER LOCKING DEVICE. OLSONITE #L246 WHITE SOLID PLASTIC OPEN FRONT SEAT FOR ELONGATED BOWL WITH SELF SUSTAINING CONCEALED CHECK HINGE.
- AMERICAN STANDARD CADET ELONGATED PRESSURE ASSISTED. 6 LITRE FLUSH C/W LINED TANK, TANK COVER LOCKING DEVICE. OLSONITE #L246 WHITE SOLID PLASTIC OPEN FRONT SEAT FOR ELONGATED BOWL WITH SELF SUSTAINING CONCEALED CHECK HINGE. FLEX SUPPLY PIPE WITH ESCUTCHEON AND SCREWDRIVER STOP.
- BASIN - COUNTER MOUNTED LAV-1.
- FRANKE OV1721R/3, 4" (102MM) CENTRES, 20-1/4"x 16-7/8" x 7-3/8" (521MM x 445MM x 187MM) DEEP, COUNTER MOUNTED, STAINLESS STEEL, FRONT OVERFLOW, SELF-RIMMING WITH SEALANT. DELTA SYNERGY 22C101, C.P. 4" (102MM) C.C., BRASS LEAD-FREE WATERWAYS BODY, CERAMIC DISC VALVE CARTRIDGE, WITH 1.5 GPM VANDAL PROOF FLOW AERATOR OUTLET, SINGLE CONTROL METAL LEVER HANDLE, AND 3/8" (10MM) SUPPLY TUBES. C.P. DRAIN, C.P. OPEN GRID, SUPPLIES, C.P., POLISHED, RIGID HORIZONTAL INTEGRAL SWEAT TUBES WITH V.P. COMBINATION WHEEL HANDLE/LOOSE KEY BALL VALVE ANGLE STOPS, ESCUTCHEONS, LESS FLEXIBLE RISERS. "P" TRAP, C.P. 17 GAUGE (1.5MM), 1-1/4" (32MM) AND ESCUTCHEON.
- URINAL UR-1 - WALL HUNG FLUSH VALVE
- AMERICAN STANDARD "WASHROCK" #6501.010 'LOW CONSUMPTION' URINAL, WALL HUNG FOR FLUSH VALVE, VITREOUS CHINA, WASH OUT FLUSH ACTION 0.84 GAL. (3.8L) FLUSH, EXTENDED SIDES FOR PRIVACY, INTEGRAL FLUSH SPREADER, 3/4" (19mm) TOP SPUD, WALL HANGERS, OPEN TRAP #047068-0070A STRAINER, REMOVABLE STAINLESS STEEL, 2" (50mm) OUTLET, CONNECTING FLANGE WITH GASKET AND BOLTS. SLOAN 'REGAL' #1186-1-XL FLUSH VALVE, C.P. LOW CONSUMPTION, FACTORY SET FLOW, QUIET ACTION DIAPHRAGM TYPE WITH NON-HOLD OPEN FEATURE, VACUUM BREAKER AND BACK-CHECK ANGLE STOP. SMITH SERIES #S04-1819 URINAL WALL ACCESS CLEAN-OUT, WITH ROUND STAINLESS FACE AND V.P. SCREW. SMITH SERIES #0637 CARRIER, WITH STEEL PIPE LEGS, BLOCK BASE FEET SUPPORTS AND BEARING PLATES.
- FLOOR DRAIN - ED-1:
ZURN ZN-556 Y, LACQUERED CAST IRON FLOOR DRAIN WITH NICKEL BONZE STRAINER.

SECTION 15900 - CONTROLS

THE POINTS BELOW DESCRIBE THE CONTROL SEQUENCES FOR THE NOTED EQUIPMENT. THE MECHANICAL SUBCONTRACTOR IS RESPONSIBLE FOR THE OPERATION OF THE EQUIPMENT AS SPECIFIED, COORDINATE WITH THE SUB-CONTRACTOR FOR THE PROVISION OF ALL NECESSARY CONTROL EQUIPMENT, DEVICES AND WIRING FOR THE PROPER OPERATION OF THE SYSTEMS.

- MULTI-PURPOSE ROOM SYSTEM CONTROL**
 - THE SYSTEM SHALL CONSIST OF EXISTING FURNACE WITH NEW CONDENSING UNIT CU-1, NEW HRV-1 AND NEW ELECTRONIC PROGRAMMABLE THERMOSTAT (HONEYWELL TB-8220 VISION PRO COMMERCIAL PROGRAMMABLE THERMOSTAT WITH SUB-BASE) WHICH WILL CYCLE THE HEATING/COOLING STAGES TO MAINTAIN SPACE SET-POINTS.
 - THE SYSTEM SHALL BE CONTROLLED BY A NEW ELECTRONIC PROGRAMMABLE THERMOSTAT AND AIR QUALITY SENSOR.
 - PROVIDE FREEZE STAT ON SYSTEM TO PROTECT NEW COOLING COIL.
 - OCCUPIED MODE:
 - IN THE OCCUPIED CYCLE AS SET AT THE THERMOSTAT, THE FURNACE SHALL OPERATE CONTINUOUSLY AND HRV-1 SHALL OPERATE AT LOW SPEED.
 - THE HRV-1 SHALL BE RAISED TO HIGH SPEED UPON SENSING LOW AIR QUALITY IN THE SPACE.
 - THE THERMOSTAT SHALL BRING ON THE GAS HEAT OR VARIOUS STAGES OF COOLING AS REQUIRED TO MAINTAIN SET POINT TEMPERATURE.
 - UNOCCUPIED MODE:
 - IN THE UNOCCUPIED CYCLE, THE HRV-1 SHALL NOT OPERATE.
 - THE FURNACE SHALL CYCLE TO MAINTAIN SET-BACK TEMPERATURES.
 - A TEMPORARY OVERRIDE BUTTON AT THE THERMOSTAT SHALL ENERGIZE THE SYSTEM TO OCCUPIED OPERATION FOR A FIXED PERIOD OF TIME WHEN ACTIVATED.
- GYMNASIUM SYSTEM CONTROL**
 - THE SYSTEM SHALL CONSIST OF EXISTING FURNACE WITH NEW CONDENSING UNIT CU-2, NEW HRV-1 AND NEW ELECTRONIC PROGRAMMABLE THERMOSTAT (HONEYWELL TB-8220 VISION PRO COMMERCIAL PROGRAMMABLE THERMOSTAT WITH SUB-BASE) WHICH WILL CYCLE THE HEATING/COOLING STAGES TO MAINTAIN SPACE SET-POINTS.
 - THE SYSTEM WILL OPERATE ON AN OCCUPIED/UNOCCUPIED SCHEDULE AS PROGRAMMED IN THE THERMOSTAT.
 - PROVIDE FREEZE STAT ON SYSTEM TO PROTECT NEW COOLING COIL.
 - OCCUPIED MODE:
 - IN THE OCCUPIED CYCLE AS SET AT THE THERMOSTAT, THE FURNACE SHALL OPERATE CONTINUOUSLY AND HRV-1 SHALL OPERATE AT LOW SPEED.
 - DURING THE OCCUPIED CYCLE THE UNIT WILL OPERATE CONTINUOUSLY, THE UNIT WILL SEQUENCE THE GAS HEATING VALVE, THE MIXING DAMPERS AND THE DX COOLING TO MAINTAIN SPACE TEMPERATURES. THE FIRST STAGE OF COOLING WILL BE MODULATING THE EXISTING OUTSIDE AIR, RETURN AIR AND RELIEF AIR DAMPERS TO PROVIDE FREE COOLING.
 - UNOCCUPIED MODE:
 - DURING THE UNOCCUPIED SCHEDULE, THE UNIT WILL CYCLE WITH THE OUTDOOR AND DAMPERS CLOSED TO MAINTAIN A LOWERED SETBACK TEMPERATURE.
 - A TEMPORARY OVERRIDE BUTTON AT THE THERMOSTAT SHALL ENERGIZE THE SYSTEM TO OCCUPIED OPERATION FOR A FIXED PERIOD OF TIME WHEN ACTIVATED.

SECTION 15990 - TESTING AND BALANCING

- BALANCE EACH FAN AND EACH AIR OUTLET AND INLET TO THE AIR QUANTITY NOTED. AFTER BALANCING, MECHANICALLY FIX THE ADJUSTED DAMPERS TO PREVENT TAMPERING OR MOVEMENT.
- TEST EACH FIRE DAMPER TO ENSURE PROPER ACCESS AND PERFORMANCE. TAG EACH FIRE DAMPER WITH THE DATE OF TESTING.
- PROVIDE A WRITTEN REPORT TO THE CONTRACT ADMINISTRATOR REGARDING THE TESTING AND BALANCING. MAKE ANY REQUESTED CHANGES TO THE REPORT BEFORE DELIVERING THREE FINAL COPIES TO THE CITY.
- TESTING AND BALANCING COMPANY SHALL BE A MEMBER IN GOOD STANDING WITH A.A.B.C., OR SHALL PROVE EQUIVALENCY TO THE CONTRACT ADMINISTRATOR.

EQUIPMENT SCHEDULE:

- HEAT RECOVERY UNIT SCHEDULE
 - HRV-1
LENNOX MODEL HRV2-500DOP, 450 CFM @ 0.3" SP., 90% MAXIMUM TEMPERATURE RECOVERY, DUAL HEAT EXCHANGERS, DAMPER DEFROST C/W FLEXIBLE CONNECTORS, REMOTE AIR QUALITY SENSOR, VIBRATION ISOLATORS.
- CONDENSING UNIT SCHEDULE
 - CU-1/2
ALL CONDENSING UNITS SHALL BE C/W CRANKCASE HEATERS, REFRIGERANT LINE SIGHT GLASS, HI-LO REFRIGERANT SWITCHES, LOW TEMP LOCKOUT, AIR FLOW PROVING SWITCH, LENNOX 27699 SPRING ISOLATION KITS FIELD INSTALLED. PROVIDE 10 YEAR EXTENDED WARRANTY.

- CU-1/2
LENNOX MODEL HS29-060, CONDENSING UNIT, NOMINAL 5 TON CAPACITY, R-22 REFRIGERANT, PROVIDE EVAPORATOR COIL MATCHED TO CONDENSING UNIT TO BE INSTALLED IN FURNACE SUPPLY PLENUM, REFRIGERANT KIT TO SUIT, FULL CHARGE OF REFRIGERANT.
- ONE COMPARTMENT S.S. SINK SK-1:
KINDRED "ARISTALINE" #LBS4607-1 S.S. SINK, 3 HOLE, 8" (203MM) CENTRES, 18-9/16" X 18-1/8" X 7" (471MM X 460MM X 178MM) DEEP, COUNTER MOUNTED, BACK LEDGE, GRADE 18-8 TYPE 302 STAINLESS STEEL, SINGLE COMPARTMENT, SATIN FINISHED RIM AND BOWL, SELF-RIMMING, WITH CRUMB CUP STRAINER, SOUND DEADENING AND MOUNTING KIT. DELTA 100, C.P. 8" (203MM) C.C., DECK MOUNTED, BRASS LEAD-FREE WATERWAYS BODY, METAL DECK PLATE, CERAMIC DISC VALVE CARTRIDGE, SWING SPOUT WITH 2.25 GPM FLOW AERATOR OUTLET, SINGLE CONTROL METAL LEVER HANDLE AND 3/8" (10MM) SUPPLY TUBES, SUPPLIES WITH ANGLE STOPS, ADAPTORS AND ESCUTCHEONS. CAST BRASS "P" TRAP, 1-1/2" (38MM) WITH CLEANOUT, UNION AND ESCUTCHEON.

- WATER CLOSETS (FLUSH TANK)
 - WC-1 - AMERICAN STANDARD CADET ELONGATED PRESSURE ASSISTED. 6 LITRE FLUSH C/W LINED TANK, TANK COVER LOCKING DEVICE. OLSONITE #L246 WHITE SOLID PLASTIC OPEN FRONT SEAT FOR ELONGATED BOWL WITH SELF SUSTAINING CONCEALED CHECK HINGE.
 - WC-1 - AMERICAN STANDARD CADET ELONGATED PRESSURE ASSISTED. 6 LITRE FLUSH C/W LINED TANK, TANK COVER LOCKING DEVICE. OLSONITE #L246 WHITE SOLID PLASTIC OPEN FRONT SEAT FOR ELONGATED BOWL WITH SELF SUSTAINING CONCEALED CHECK HINGE. FLEX SUPPLY PIPE WITH ESCUTCHEON AND SCREWDRIVER STOP.

- BASIN - COUNTER MOUNTED LAV-1.
- FRANKE OV1721R/3, 4" (102MM) CENTRES, 20-1/4"x 16-7/8" x 7-3/8" (521MM x 445MM x 187MM) DEEP, COUNTER MOUNTED, STAINLESS STEEL, FRONT OVERFLOW, SELF-RIMMING WITH SEALANT. DELTA SYNERGY 22C101, C.P. 4" (102MM) C.C., BRASS LEAD-FREE WATERWAYS BODY, CERAMIC DISC VALVE CARTRIDGE, WITH 1.5 GPM VANDAL PROOF FLOW AERATOR OUTLET, SINGLE CONTROL METAL LEVER HANDLE, AND 3/8" (10MM) SUPPLY TUBES. C.P. DRAIN, C.P. OPEN GRID, SUPPLIES, C.P., POLISHED, RIGID HORIZONTAL INTEGRAL SWEAT TUBES WITH V.P. COMBINATION WHEEL HANDLE/LOOSE KEY BALL VALVE ANGLE STOPS, ESCUTCHEONS, LESS FLEXIBLE RISERS. "P" TRAP, C.P. 17 GAUGE (1.5MM), 1-1/4" (32MM) AND ESCUTCHEON.
- URINAL UR-1 - WALL HUNG FLUSH VALVE

- AMERICAN STANDARD "WASHROCK" #6501.010 'LOW CONSUMPTION' URINAL, WALL HUNG FOR FLUSH VALVE, VITREOUS CHINA, WASH OUT FLUSH ACTION 0.84 GAL. (3.8L) FLUSH, EXTENDED SIDES FOR PRIVACY, INTEGRAL FLUSH SPREADER, 3/4" (19mm) TOP SPUD, WALL HANGERS, OPEN TRAP #047068-0070A STRAINER, REMOVABLE STAINLESS STEEL, 2" (50mm) OUTLET, CONNECTING FLANGE WITH GASKET AND BOLTS. SLOAN 'REGAL' #1186-1-XL FLUSH VALVE, C.P. LOW CONSUMPTION, FACTORY SET FLOW, QUIET ACTION DIAPHRAGM TYPE WITH NON-HOLD OPEN FEATURE, VACUUM BREAKER AND BACK-CHECK ANGLE STOP. SMITH SERIES #S04-1819 URINAL WALL ACCESS CLEAN-OUT, WITH ROUND STAINLESS FACE AND V.P. SCREW. SMITH SERIES #0637 CARRIER, WITH STEEL PIPE LEGS, BLOCK BASE FEET SUPPORTS AND BEARING PLATES.

- FLOOR DRAIN - ED-1:
ZURN ZN-556 Y, LACQUERED CAST IRON FLOOR DRAIN WITH NICKEL BONZE STRAINER.

GRILLE/DIFFUSER SCHEDULE

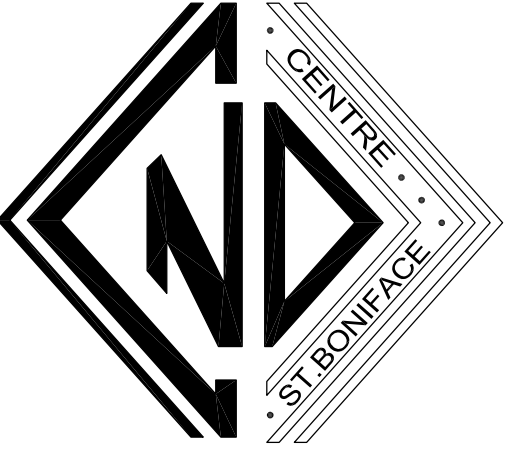
?	QUANTITY (IF APPLICABLE)
?	TYPE
? X ?	SIZE
-	CFM
?	NECK SIZE (IF APPLICABLE)

TYPE	DESCRIPTION
R1	PRICE MODEL 80/F/A/B12
R2	PRICE MODEL 530/F/A/B12
S1	PRICE MODEL 5200/F/A/B12
S2	PRICE MODEL LBPH25C/750/B15

ACCEPTABLE MANUFACTURERS:

AS SUBMITTED, THE FOLLOWING MANUFACTURERS HAVE BEEN REVIEWED AND ACCEPTED AS "EQUAL" MANUFACTURERS TO THOSE SPECIFIED. FINAL ACCEPTANCE OF THE PROPOSED PRODUCTS/ITEMS IS SUBJECT TO THE REVIEW OF THE SHOP DRAWINGS AND THE SUBSEQUENT CONFORMANCE OF THE PROPOSED PRODUCTS/ITEMS WITH THE SPECIFIED PRODUCTS' CAPABILITIES AND FEATURES.

ITEM	PROPOSED MANUFACTURER
HEAT RECOVERY VENTILATOR	NU-AIR
AIR COOLED CONDENSING UNITS	YORK, CARRIER
DX COOLING COIL	YORK
BALANCING DAMPERS	RUSKIN, AMI
FIRE DAMPERS	RUSKIN, AMI
GRILLES, REGISTERS, DIFFUSERS	TITUS
FLUSH VALVES	DELTA
CLEANOUTS	MIFAB
FIXTURE CARRIERS	MIFAB
FLOOR DRAINS	MIFAB



#	ADDENDUM ITEMS	01/11/08	M.H.
3	RE-ISSUED FOR BID OPPORTUNITY	12/05/07	M.H.
2	ISSUED FOR BID		