

MECHANICAL SPECIFICATION

CONTRACTOR SHALL SUBMIT PRICE FOR THE COST OF SUPPLY AND INSTALLATION OF EQUIPMENT AND MATERIAL NECESSARY TO PROVIDE A COMPLETE AND OPERATING MECHANICAL PACKAGE. MECHANICAL PACKAGE TO CONSIST OF EQUIPMENT AND MATERIALS AS DESCRIBED IN THIS OUTLINE SPECIFICATION. REFER TO MECHANICAL PLANS FOR ACTUAL REQUIREMENTS OF EQUIPMENT.

SECTION 15005 MECHANICAL SCOPE OF WORK

1. INCLUDE IN MECHANICAL SECTION, PROVISION OF LABOUR, NEW MATERIALS, TOOLS, TRANSPORTATION, SERVICES AND FACILITIES FOR A COMPLETE MECHANICAL INSTALLATION. THE INSTALLATION SHALL BE LEFT COMPLETE IN ALL RESPECTS AND READY FOR FINAL INSTALLATION. THE FINAL INSTALLATION SHALL BE INSTALLED TO COMPLETE SATISFACTION OF THE RESPONSIBLE CONTRACT ADMINISTRATOR.

2. THE MECHANICAL SCOPE OF WORK INCLUDES, BUT IS NOT NECESSARILY LIMITED TO THE FOLLOWING PROVISIONS: 1. PROVISION OF ALL PIPING, VALVES, FLUSH VALVES, PIPE SLEEVES, LABOUR AND MISCELLANEOUS MATERIALS AS REQUIRED TO COMPLETE THE PROJECT.

2. FAMILIARIZE CREW WITH SITE IN ORDER TO DETERMINE APPROPRIATE LOCATIONS, SITE CONDITIONS, ETC. THAT MAY AFFECT WORK.

3. WORK MAY NEED TO BE PERFORMED AT NON-STANDARD HOURS. DETERMINE SCHEDULE WITH CONTRACT ADMINISTRATOR.

SECTION 15010 GENERAL CONDITIONS

1. PROVIDE ALL LABOUR, MATERIALS, AND EQUIPMENT NECESSARY TO COMPLETE THE WORK SHOWN ON DRAWINGS AND AS SPECIFIED HEREIN.

2. ALL NECESSARY PERMITS SHALL BE OBTAINED AND ALL FEES SHALL BE PAID TO CARRY OUT THE SPECIFIED WORK.

3. ALL WORK SHALL BE GUARANTEED FOR ONE YEAR FROM DATE OF COMPLETED WORK ACCEPTANCE BY THE CONTRACT ADMINISTRATOR. SUBMIT DOCUMENTATION IDENTIFYING ADDITIONAL EQUIPMENT WARRANTY COVERAGE AND TIME FRAMES.

4. ALL WORK SHALL COMPLY IN EVERY RESPECT WITH ALL NATIONAL, PROVINCIAL AND LOCAL CODES AND BY-LAWS, WHICH SHALL BE CONSIDERED PART OF THIS SPECIFICATION. IN THE CASE OF CONFLICTING REQUIREMENTS, BE GOVERNED BY THE MOST STRINGENT REGULATIONS.

5. ALL CUTTING, PATCHING, FLASHING FOR WORK AS REQUIRED HEREIN SHALL BE BY THE CONTRACTOR.

6. THE CONTRACTOR SHALL INSTALL PLUMBING, HEATING, VENTILATION AND AIR CONDITIONING SYSTEMS IN COMPLETE ACCORDANCE WITH THE RECOMMENDATIONS OF THE NATIONAL/PROVINCIAL BUILDING CODE, ASHRAE, SMACNA LATEST EDITION DUCT STANDARDS, AND LOCAL PLUMBING CODES.

7. COORDINATE WORK WITH WORK OF OTHER TRADES TO AVOID CONFLICT.

8. ALTER THE LOCATION OF DUCTS OR PIPES AT THE DIRECTION OF THE CONTRACT ADMINISTRATOR WITHOUT CHARGE TO THE CONTRACT ADMINISTRATOR, PROVIDED THE CHANGE IS MADE BEFORE INSTALLATION AND DOES NOT NECESSITATE ADDITIONAL MATERIALS.

9. QUOTATIONS SHALL BE BASED ON THE USE OF SPECIFIED MANUFACTURERS OR APPROVED EQUAL IN ACCORDANCE WITH B6. THE USE OF AN EQUAL OR ALTERNATE MANUFACTURERS (APPROVED IN ACCORDANCE WITH B6) SHALL IN NO WAY RELIEVE THE CONTRACTOR FROM THE RESPONSIBILITY OF PROVIDING ALL WORK THAT MAY BE REQUIRED BY REASON OF DIFFERENT SPACE, WEIGHT, ELECTRICAL, OR OTHER REQUIREMENT FROM THAT OF THE SPECIFIED MANUFACTURER. ALTERNATES SHALL BE APPROVED PRIOR TO THE CLOSE OF TENDERS IN ACCORDANCE WITH BE. NO SUBMITTALS RECEIVED AFTER BID CLOSING WILL BE ACCEPTED.

10. THE CONTRACTOR SHALL PROVIDE SIX (6) SETS OF SHOP DRAWINGS FOR ALL EQUIPMENT FOR REVIEW AND APPROVAL BY CONTRACT ADMINISTRATOR. CONTRACTOR SHALL STAMP SHOP DRAWINGS REVIEWED BY CONTRACTOR PRIOR TO SUBMISSION. FAILURE TO COMPLY WILL RESULT IN SHOP DRAWINGS BEING RETURNED "UNREVIEWED" BY CONTRACT ADMINISTRATOR.

11. FURNISH TO THE CONTRACT ADMINISTRATOR THREE (3) HARD-COVERED LOOSE-LEAF BINDERS CONTAINING THEREIN ONE (1) COMPLETE SET OF MANUFACTURERS' OPERATING AND MAINTENANCE INSTRUCTIONS SHOWING ALL MAJOR EQUIPMENT AND APPARATUS REQUIRING MAINTENANCE. INSTRUCTIONS SHALL BE COMPLETE FOR INSTALLATION, OPERATION AND MAINTENANCE AND SHALL INCLUDE PERTINENT INFORMATION SUCH AS DETAILED DRAWINGS AND OPERATION CURVES. SPARE PARTS, SUPPLIER LISTS AND ADDRESSES SHALL BE SUPPLIED. INSTRUCTION SHALL BE REQUIRED WITH THE CONTRACT ADMINISTRATORS' REPRESENTATIVE TO ENSURE A THOROUGH UNDERSTANDING OF THE EQUIPMENT AND ITS OPERATION.

12. ALL WIRING, SUPPLY AND INSTALLATION OF DISCONNECT SWITCHES FOR EQUIPMENT SPECIFIED HEREIN SHALL BE PERFORMED BY THE CONTRACTOR, UNLESS OTHERWISE NOTED.

13. CONTRACTOR SHALL EXAMINE THE SITE AND CONDITIONS AFFECTING WORK, METHODS OF CONNECTION AND LOCATION OF ALL SERVICES INVOLVED UNDER THIS CONTRACT. FAILURE TO MAKE THIS VISIT IN NO WAY ALLEVIATES THE CONTRACTOR FROM RESPONSIBILITY FOR COMPLETING THE MECHANICAL WORK OF THIS CONTRACT IN A WORKMANLIKE MANNER. NO ALLOWANCE WILL BE MADE AFTER CONTRACT AWARD FOR ANY EXPENSE INCURRED THROUGH A FAILURE TO MAKE THIS EXAMINATION AND INVESTIGATION.

14. SCHEDULING OF ALL WORK SHALL BE ARRANGED WITH THE CONTRACT ADMINISTRATOR, AND THEY SHALL BE NOTIFIED AND APPROVAL OBTAINED PRIOR TO SHUTTING OFF EXISTING SERVICES FOR PURPOSES OF CONNECTING NEW WORK. WORK WITHIN THE BUILDING MAY HAVE TO BE PERFORMED DURING NON-REGULAR WORKING HOURS AND MUST CONFORM TO WORK RULES OF THE BUILDING AS DIRECTED BY THE CONTRACT ADMINISTRATOR.

AS-BUILT DRAWINGS

1. OBTAIN SETS OF WHITE PRINTS (ONE FOR EACH SYSTEM IE. PLUMBING, HVAC, FIRE PROTECTION) AND KEEP AT JOB SITE AT ALL TIMES.

2. RECORD ALL ADDITIONS OR DEVIATIONS FROM THE CONTRACT DOCUMENTS INCLUDING ALL CHANGES INCURRED BY ADDENDA, CHANGE ORDERS, FIELD CHANGES, JOB CONDITIONS, ETC.

3. CONTRACTORS SHALL BE RESPONSIBLE FOR THE PRODUCTION OF AS-BUILT RECORD DRAWINGS WHICH SHALL PROVIDE A COMPLETE AND ACCURATE RECORD OF THE ACTUAL MECHANICAL INSTALLATION. ALL PRINCIPLE BELOW GRADE OR UNACCESSIBLE PIPING OR DUCT SYSTEMS, ETC. SHALL BE DIMENSIONED AT EACH CHANGE IN DIRECTION, INCLUDE ALL ROUTING OF SERVICES NOT INDICATED ON ORIGINAL DRAWINGS.

ADDENDUM 1 ITEM #1

3. CROSS HATCHED DUCT WORK REFERENCES INTERNALLY INSULATED, SINGLE HATCH DUCT WORK REFERENCES EXTERNALLY INSULATED. DUCT WORK FROM RT-1, EXPOSED TO THE OUTDOORS, SHALL BE EQUIPPED WITH 2" INTERNAL INSULATION AND WATERTIGHT CONSTRUCTION.

1. MASTIC FINISH OVER INSULATION SHALL BE V-CRYL CP-10 STEEL PIPE AND FITTING EXPANSION CASE SET IN HOLES DRIED WHITE WEATHER BARRIER COATING AS MANUFACTURED BY CHILDERS PRODUCTS COMPANY. IT SHALL BE APPLIED IN TWO COATS, THE FIRST COAT BEING A TACK COAT APPLIED AT A RATE OF TWO GALLONS PER 100 SQ. FT. (81 1/50QM), AND WHILE STILL WET A LAYER OF CHL-CR-105 OPEN WEAVE GLASS CLOTH MEMBRANE SHALL BE EMBEDDED WITH ALL FABRIC COAT AT A COVERAGE OF FOUR GALLONS PER 100 SQ. FT. (16 1/50QM) SHALL BE APPLIED, FULLY COVERING THE CLOTH MEMBRANE, SO THAT THE MINIMUM DRY FILM THICKNESS IS 1/16" (0.635") (1.6 MM). THERE SHALL BE NO VOIDS OR HOLES AND THE MASTIC SHALL BE TOLLELLED, SPRAYED OR WET-BRUSHED TO A SMOOTH EVEN FINISH. PROVIDE ALUMINUM JACKET.

2. ALL ADJOINING UNINSULATED SURFACES MUST BE COMPLETELY WATER-PROOFED AND FLASHED EITHER BY EXTENDING THE V-CRYL CP-10/FITTING WEATHER BARRIER COATING AND FABRIC MEMBRANE A MINIMUM OF 4" (102 MM) ONTO THE ADJOINING SURFACE, OR, IF THAT SURFACE WILL ATTAIN TEMPERATURES IN EXCESS OF 180 DEGREES F (82 DEGREES C), USE CHL-JOINT CP-70 SEALANT AS THE FLASHING COMPOUND.

3. ALL INSULATION IN EXPOSED LOCATIONS, AND ALL DUCTWORK IN FAN ROOMS, SERVICE ROOMS, GARAGES, ETC., SHALL BE COVERED WITH CANVAS WRAP INSULATION EXPOSED TO THE MOISTURE SHALL BE COMPLETE WITH COVER PER 9.1/9.2 ABOVE.

4. ALL INSULATION IN EXPOSED LOCATIONS, AND ALL DUCTWORK IN FAN ROOMS, SERVICE ROOMS, GARAGES, ETC., SHALL BE COVERED WITH CANVAS WRAP INSULATION EXPOSED TO THE MOISTURE SHALL BE COMPLETE WITH COVER PER 9.1/9.2 ABOVE.

5. ALL INSULATION IN EXPOSED LOCATIONS, AND ALL DUCTWORK IN FAN ROOMS, SERVICE ROOMS, GARAGES, ETC., SHALL BE COVERED WITH CANVAS WRAP INSULATION EXPOSED TO THE MOISTURE SHALL BE COMPLETE WITH COVER PER 9.1/9.2 ABOVE.

6. INSULATION EXPOSED TO MOISTURE SHALL BE PROVIDED WITH PVC JACKET (PROTQ, OR EQUAL IN ACCORDANCE WITH B6).

7. ALL PIPING EXPOSED TO OUTDOOR CONDITIONS SHALL BE PROVIDED WITH ALUMINUM JACKETING.

SECTION 15400 PLUMBING

1. PROVIDE COMPLETE FUNCTIONAL PLUMBING SYSTEM COMPRISED OF DOMESTIC WATER PIPING, SANITARY AND DRAINAGE PIPING, RAIN WATER LEADERS, ETC.

2. ALL WATER PIPING ABOVE GROUND INSIDE BUILDING SHALL BE TYPE "L" HARD COPPER; 3RD PARTY CERTIFIED. ALL PIPING BELOW GROUND SHALL BE TYPE "K" SOFT COPPER, 3RD PARTY CERTIFIED.

3. DRAINS AND VENT PIPING UNDERGROUND INSIDE BUILDING SHALL BE CAST IRON CLASS 4000, OR PVC PLASTIC. FITTINGS SHALL BE MECHANICAL JOINT FOR CAST IRON OR SOLVENT CEMENT FOR PVC.

4. SANITARY WASTE STACKS, HORIZONTAL WASTE, VENT AND RAIN WATER LEADERS, ABOVE GROUND INSIDE BUILDING, SHALL BE CAST IRON CLASS 4000. VENT PIPING AND FIXTURE RUN-OUTS MAY ALSO BE DWV COPPER OR PVC PLASTIC. FITTINGS SHALL BE MECHANICAL JOINT FOR CAST IRON, SOLDER FOR DWV COPPER AND SOLVENT CEMENT FOR PVC.

5. ALL PVC PLASTIC PIPING USED FOR HIGH-RISE BUILDINGS SHALL HAVE A FLAME SPREAD RATING OF 0, AND A SMOKE DEVELOPED RATING OF 35. PIPING AND FITTINGS SHALL BE OF ONE MANUFACTURE: IPEX SYSTEM 155XR.

6. CONTRACTOR SHALL VERIFY ON SITE ALL CONNECTION POINTS TO EXISTING BUILDING SERVICES. COORDINATE ALL NEW PIPING RUNS WITH CONTRACT ADMINISTRATOR.

7. USE 95/5 TIN-ANTIMONY BRAZING SOLDER ON ALL HOT AND COLD WATER PIPING. USE NON-CORROSIVE NON-LEADED FLUX.

8. ALL VALVES TO BE BY ONE MANUFACTURER. STANDARD OF ACCEPTANCE: JENKINS BROS. LTD.

9. MANUFACTURED SHOCK ABSORBERS, AUTOMATIC AIR VENTS, AND PARTITION STOPS SHALL BE INSTALLED AT THE TOP OF ALL RISERS, AND ON ALL FIXTURES OR BATTERY OF FIXTURES.

10. CONTRACTOR SHALL ALLOW FOR IN TENDER QUOTATION ANY ADDITIONAL LABOUR, MATERIALS, ETC. DEEMED NECESSARY DUE TO EXACT SITE CONDITIONS WHICH HAVE NOT BEEN REFLECTED IN MECHANICAL DRAWING OR IN MECHANICAL SPECIFICATION. NOTIFY CONTRACT ADMINISTRATOR OF ALL DISCREPANCIES PRIOR TO TENDER CLOSE.

11. ON COMPLETION, ALL PIPING SYSTEMS SHALL BE CLEANED & FLUSHED OUT TO REMOVE ANY FOREIGN MATERIAL IN THE PIPING.

12. GAS PIPING SHALL BE BLACK STEEL PIPE, EQUAL TO ASTM A-53 SCH. 40 WITH 150 STANDARD GRADE WALLETS, IRON SCREWED FITTINGS. ALL WORK SHALL COMPLY WITH C.G.A. B149.1-00 "NATURAL GAS AND PROPANE INSTALLATION CODE", COMPLETE WITH 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.

13. VALVES IN GAS PIPING SHALL BE GRINNELL FIG. C.G.A. OR EQUAL IN ACCORDANCE WITH B6.

14. RUN GAS PIPING TO SERVE CONTRACT ADMINISTRATORS' EQUIPMENT. TAKE OUT PERMITS AND CONNECT EQUIPMENT READY FOR USE. PROVIDE GAS REGULATORS TO SERVE NEW GAS FRED EQUIPMENT. GAS REGULATORS SHALL BE C.G.A. APPROVED AS MANUFACTURED BY FISHER, OR EQUAL IN ACCORDANCE WITH B6. PROVIDE GAS COCK DIRT LEG AND FLEXIBLE CONNECTIONS AT EACH PIECE OF EQUIPMENT.

15. CONTRACTOR SHALL COORDINATE SERVICE INSTALLATIONS AND/OR MODIFICATIONS WITH LOCAL UTILITY PRIOR TO COMMENCEMENT OF WORK. PAY ALL COSTS AND/OR FEES.

16. CONTRACTOR SHALL PROVIDE PRE-ASSEMBLED AND PRE-TESTED OVER-PRESSURE RELIEF REGULATORS AND VENT ASSEMBLIES ON ALL PROPANE AND NATURAL GAS PIPING SYSTEMS GREATER THAN 7" W.C., INSTALLED AT EACH APPLIANCE AND/OR EQUIPMENT. INSTALLATION AND REQUIREMENTS TO MEET THE CAN/CSA-B149.1-05 AND TSSA/MB. DEPT. OF LABOUR REQUIREMENTS.

17. PROVIDE DIELECTRIC COUPLINGS WHEREVER PIPES OF DISSIMILAR METALS ARE JOINED.

18. USE THE FOLLOWING ROD DIAMETER AND SPACING SCHEDULE TO ESTABLISH MINIMUM HANGING STANDARDS FOR HORIZONTAL PIPING:

Table with 4 columns: PIPE SIZE, ROD DIA., STEEL, COPPER. Rows include sizes like 1/2" x 3/8", 1" x 1/2", 1 1/2" x 3/8", 2 1/2" x 1/2", 4" x 5".

19. PIPE HANGERS WHERE REQUIRED SHALL BE GRINNELL FIG.65 FOR STEEL PIPE AND FIG.117 EXPANSION CASE SET IN HOLES DRIED WHITE WEATHER BARRIER COATING AS MANUFACTURED BY CHILDERS PRODUCTS COMPANY. IT SHALL BE APPLIED IN TWO COATS, THE FIRST COAT BEING A TACK COAT APPLIED AT A RATE OF TWO GALLONS PER 100 SQ. FT. (81 1/50QM), AND WHILE STILL WET A LAYER OF CHL-CR-105 OPEN WEAVE GLASS CLOTH MEMBRANE SHALL BE EMBEDDED WITH ALL FABRIC COAT AT A COVERAGE OF FOUR GALLONS PER 100 SQ. FT. (16 1/50QM) SHALL BE APPLIED, FULLY COVERING THE CLOTH MEMBRANE, SO THAT THE MINIMUM DRY FILM THICKNESS IS 1/16" (0.635") (1.6 MM). THERE SHALL BE NO VOIDS OR HOLES AND THE MASTIC SHALL BE TOLLELLED, SPRAYED OR WET-BRUSHED TO A SMOOTH EVEN FINISH. PROVIDE ALUMINUM JACKET.

PLUMBING FIXTURES AND EQUIPMENT:

WC-1 TOILET - FLOOR MOUNTED FLUSH VALVE (BARRIER FREE DESIGN)

1. AMERICAN STANDARD WADERA ELONGATED 16-1/8" (410MM) HIGH #2305.100 'LOW CONSUMPTION' TOILET, FLOOR MOUNTED FOR FLUSH VALVE, VITREOUS CHINA, ELONGATED SYPHON JET FLUSH ACTION BOWL, FULLY GLAZED 2" (50MM) BALL PASS INTERNAL TRAPWAY, 10" x 12" (254MM x 304MM) LARGE WATER SURFACE, 1.3 GAL. (6L) FLUSH, 1-1/2" (38MM) TOP SPUD AND BOLT CAPS. PROVIDE FLOOR FLANGE, FLANGE BOLTS AND GASKET. 'SLOAN REGAL' #111-V0-LX FLUSH VALVE, C.P. LOW CONSUMPTION, FACTORY SET FLOW, QUIET ACTION DIAPHRAGM TYPE WITH NON-HOLD OPEN FEATURE, VACUUM BREAKER AND EXTENDED SEAT BUMPER ON BACK-CHECK ANGLE STOP. HINGED #8205TS SEAT, ELONGATED HEAVY DUTY SOLID PLASTIC OPEN FRONT WITH COVER, REINFORCED STEEL STEEL CHECK. CENICE, POSTS, WASHERS AND NUTS.

L-1 BASIN - WALL HUNG (BARRIER FREE DESIGN AND GENERAL USE) FOR TIGHT SPACE AREAS

1. AMERICAN STANDARD 'MURRO' #0954.000 BASIN, 4" (102MM) CENTRES, 22" x 21" x 5" - 7-1/2" (69MM x 533MM x 127-191MM) DEEP, WALL HUNG, VITREOUS CHINA, REAR OVERFLOW, FOR CONCEALED ARM SUPPORT. CHICAGO FAUCETS #902-VX FAUCET, C.P. 4" (102MM) C.C. SOLID CAST BRASS LEAD-FREE BODY, 1/4" TURN CERAMIC DISC VALVE, CARTRIDGE, WITH YANDAL-RESISTANT 1.84 GPM (8L) FLOW AERATOR OUTLET AND CAST BRASS LEVER HANDLES. MCGUIRE #155A DRAIN, C.P. OPEN GRIP. MCGUIRE #170BWRB SUPPLIES, C.P., POLISHED, SHORT HORIZONTAL INTEGRAL SWEAT TUBES WITH V.P. COMBINATION WHEEL HANDLE/OOSE KEY BALL VALVE ANGLE STOPS, ESCUTCHEONS AND BRADED FLEXIBLE RISERS. MCGUIRE #8872C 'P' TRAP, C.P., POLISHED, CAST BRASS 1-1/4" (32MM) WITH CLEANOUT AND ESCUTCHEON. SMITH SERIES #0700-W CARRIER, WITH STEEL PIPE LEGS, BLOCK BASE FEET SUPPORT, CONCEALED ARMS AND PEDESTAL PLATE. (FOR NARROW WALL INSTALLATION PROVIDE 2" TYPE SLEEVE FOR ARMS). AMERICAN STANDARD #2059.020 SEMI-CHINA PEDESTAL TO COVER EXPOSED PIPING AS PER LOCAL CODES.

FD-1 FLOOR DRAINS - FIN AREAS

1. SMITH SERIES 2005A FLOOR DRAIN, ALL DUCCO COATED CAST IRON BODY, REVERSIBLE FLASHING CLAMP WITH SEAPAGE OPENINGS AND ADJUSTABLE 5" (127MM) DIAMETER NICKEL BRONZE 1/4" (6.35MM) THICK STRAINER, SECURED WITH S.S. SCREWS, 4" (100MM) THROAT ON STRAINER. (WHERE REQUIRED BY LOCAL CODE PROVIDE TRAP PRIMER CONNECTION "P")

CO-1 FLOOR CLEANOUT (UNFINISHED AND OUTSIDE AREAS)

1. SMITH "TMS-TO-FLOOR" SERIES 4220 FLOOR CLEANOUT, DUCCO COATED CAST IRON BODY AND REMOVABLE POSITIVE GASKET SEAL CLOSURE PLUG AND HEAVY DUTY 6" (150MM) ROUND ADJUSTABLE SCORATED CAST IRON COVER SECURED WITH STAINLESS STEEL SCREWS, C.O. CAST IN COVER. (FOR WATER-PROOFED AREAS PROVIDE "C" FLANGE WITH FLASHING CLAMP).

CO-2 STACK CLEANOUT

1. SMITH SERIES 4510 STACK CLEANOUT, IN BASE OF CAST IRON STACKS. ONE 1/2" (12.7MM) NPT (12.7MM) NPT (M/F) CONNECTIONS WITH STRAINER AND INTEGRAL BACK LOW PREVENTER & VACUUM BREAKER. (FOR TWO DRAIN PRIMER PROVIDE UNIT WITH ASSEMBLY #00-1/2/558)

TP-1 TRAP SEAL PRIMER SERVING 1 TO 2 DRAINS

1. P.P.P. INC. MODEL PR-500 AUTOMATIC TRAP SEAL PRIMER VALVE, CAST BRASS BODY, SERVING 1 OR 2 INDIVIDUAL OR REMOTE AREA DRAINS (PRIMER AUTOMATICALLY ACTIVATED WHEN THERE IS A PRESSURE DROP IN THE SYSTEM) WITH 1/2" (12.7MM) NPT (M/F) CONNECTIONS WITH STRAINER AND INTEGRAL BACK LOW PREVENTER & VACUUM BREAKER. (FOR TWO DRAIN PRIMER PROVIDE UNIT WITH ASSEMBLY #00-1/2/558)

WHA WATER HAMMER ARRESTORS

1. SMITH 'HYDROTRON' WATER HAMMER ARRESTORS SERIES #5000, STAINLESS STEEL, PRESSURIZED CHAMBERS, BELLOW, SIZE ACCORDING TO MANUFACTURER'S RECOMMENDATIONS CHART BELOW TO ELIMINATE WATER HAMMER AND SHOCK FROM PIPING SYSTEM. PROVIDE WATER HAMMER ARRESTORS ON HOT AND COLD WATER SUPPLIES TO ALL QUICK VALVES, SOLENOIDS, AND PLUMBING FIXTURES, AND LOCATE IN AN UPRIGHT POSITION BETWEEN THE LAST TWO FIXTURES ON A LINE, OR HORIZONTALLY AT THE END OF LINE CLOSEST TO SUPPLY SOURCE.

Table with 4 columns: SIZE, FIXTURE UNITS, MODEL NO., CONN. SIZE. Row: A 1-11 5005 1/2" (12MM)

SECTION 15800 HEATING, VENTILATION & AIR CONDITIONING

1. PROVIDE SUPPLY, RETURN AND EXHAUST AIR DUCT SYSTEMS FROM AIR HANDLING EQUIPMENT AND FANS AS SHOWN.

2. ALL DUCTWORK INSTALLATION SHALL BE PERFORMED IN ACCORDANCE WITH ASHRAE, SMACNA LATEST EDITION DUCT STANDARDS.

3. THIS CONTRACTOR SHALL SUPPLY AND INSTALL ALL DUCTWORK INCLUDING APPURTENANCES, HANGERS, DAMPERS, ETC.

4. DUCT CONSTRUCTION: 1. RECTANGULAR DUCTWORK SHALL BE CONSTRUCTED FROM GALVANIZED SHEET METAL OF THE FOLLOWING U.S. STANDARD GAUGES:

Table with 2 columns: DUCTS UP TO 12" ON LONGEST DIMENSION 26 GA. DUCTS 13" TO 28" ON LONGEST DIMENSION 24 GA. DUCTS 29" TO 54" ON LONGEST DIMENSION 22 GA. DUCTS 55" TO 84" ON LONGEST DIMENSION 20 GA.

2. ROUND AND OVAL DUCTWORK SHALL BE SPIRAL CONDUIT CONSTRUCTION OF ZINC COATED STEEL OF THE FOLLOWING U.S. GAUGES:

Table with 2 columns: CONDUIT SIZE, GAUGE OF METAL. Rows: 8" AND SMALLER 26, 9" TO 22" 24, 24" TO 36" 22, 38" TO 50" 20.

1. WELDED STAINLESS STEEL (WATERTIGHT CONSTRUCTION) SHALL BE USED ON THE SUPPLY AND RETURN DUCT MAINS SERVING RT-1, ONLY IN AREAS WHICH EXTEND THROUGH THE INDOOR EXHIBIT AREA 106. GALVANIZED METAL DUCT WORK FOR ALL OTHER SUPPLY AND RETURN DUCT WORK SHALL BE ACCEPTABLE.

5. DUCT SIZES INDICATED ON DRAWINGS REFERENCE INTERNAL DIMENSIONS. ALL SEAMS AND JOINTS IN ROUND OR OVAL DUCT FITTINGS SHALL BE CONTIGUOUSLY WELDED. RE-COAT ZINC COATING DAMAGED BY WELDING PROCEDURE.

5. BALANCING DAMPERS SHALL BE CONSTRUCTED FROM GALVANIZED STEEL 2 GAUGES HEAVIER THAN THE DUCTWORK IN WHICH THEY ARE INSTALLED C/W LOOKING QUADRANT AND INDICATING DEVICE.

6. TURNING VANES SHALL BE CONSTRUCTED TO THE FOLLOWING REQUIREMENTS: - USE DUCT ELBOWS WHICH HAVE A THROAT RADIUS OF 1-1/2 TIMES THE DUCT DIAMETER. - WHERE SPACE IS LIMITED, USE DUCT ELBOWS FABRICATED WITH SPACE THROATS AND BACKS AND FITTED WITH ROVANE TURNING VANES.

7. THE FOLLOWING DUCT JOINING METHODS SHALL BE USED: - PITTSBURGH LOCK OR DOUBLE SLIDE LOCK HAMMERED FIT FOR LONGITUDINAL JOINTS ON STRAIGHT DUCTWORK. - PITTSBURGH LOCK FOR CORNER LOCK OF FITTING. - FLAT DRIVE CLEAT JOINT ON ALL SIDE JOINTS 18" (450MM) AND UNDER IN LENGTH. - FLAT SLIP CLEAT JOINT ON ALL TRANSVERSE JOINTS 18" (450MM) AND UNDER IN LENGTH. - ANGLE "S" OR STANDING DRIVE CLEATS ON ALL SIDE JOINTS 19"(475MM) TO 30"(750MM) ON HEIGHT. - STANDING "S" OR STANDING DRIVE CLEATS ON ALL TRANSVERSE JOINTS 19"(475MM) TO 30"(750MM) IN LENGTH. - ANGLE "S" OR STANDING DRIVE CLEATS ON ALL TRANSVERSE AND SIDE JOINTS 31"(725MM) TO 72"(1800MM). - STANDING "S" OR STANDING DRIVE CLEATS REINFORCED WITH 1 1/2"(38MM) X 4.5MM MILD STEEL BAR ON ALL TRANSVERSE AND SIDE JOINTS 73"(1825MM) AND OVER.

8. PROVIDE FIRE DAMPERS WHICH CONFORM TO NFPA REGULATIONS, BEAR ULC LABEL, AND HAVE APPROVAL OF AUTHORITY HAVING JURISDICTION. DAMPERS TO BE TYPE 'B' AND 'C' (UNLESS OTHERWISE NOTED) AND INSTALLED IN DUCTWORK AT FIRE SEPARATIONS WHETHER SHOWN OR NOT. VERIFY LOCATIONS ON ARCHITECTURAL DRAWINGS.

9. ALL NEW DUCTWORK SHALL BE SEALED USING DUCT BOND II HIGH PRESSURE, NON-TOXIC, DUCT SEALER THROUGHOUT ALL SEAMS AND JOINTS.

10. SUPPORT HORIZONTAL DUCTS ON MAXIMUM 8'-0" (24.4M) CENTERS BY PERFORMED GALV. STEEL RIVETED STRAP FOR DUCTWORK 36" (915 MM) (EITHER DIMENSION) OR LESS, AND MINIMUM 1" x 1" x 1/8" (25 x 25 x 2 MM) GALV. IRON UNDER DUCTS 36" (915 MM) (EITHER DIMENSION) WITH 3/8" (6 MM) DIAM. THREADED RODS SUSPENDING ANGLES FROM STRUCTURE.

11. PROVIDE ACCESS DOORS WHERE REQUIRED FOR SERVING OF EQUIPMENT AND FIRE DAMPERS.

12. PROVIDE 4" (100 MM) FLEXIBLE DUCT CONNECTIONS ON BOTH INLET AND OUTLET DISCHARGE SIDES OF EACH FAN.

13. PROVIDE ONE SPARE SET OF FILTERS FOR EACH AIR HANDLING UNIT AND FIRE DAMPERS.

14. ALL DUCT MOUNTED MOTORIZED DAMPERS SHALL BE INSULATED LOW LEAKAGE TYPE TO TAMCO 900R OR EQUAL IN ACCORDANCE WITH B6.

15. PROVIDE VIBRATION ISOLATORS FOR ALL MECHANICAL EQUIPMENT, INCLUDING PUMPS, UTILITY FANS, AND VENT SETS, AIR HANDLERS, ROOF-TIPS UNITS, CONDENSING UNITS, COMPRESSED, ETC. AS APPLICABLE. SUBMIT SHOP DRAWINGS PRIOR TO INSTALLATION.

16. BACK-DRAFT DAMPERS SHALL BE PROVIDED WITH THE FOLLOWING MINIMUM REQUIREMENTS: - 16 GA. GALVANIZED STEEL OR ALUMINUM CHANNEL FRAME; 16 GA. GALVANIZED BLADES C/W STEENERS, FULL BLADE-LENGTH SHAFT; BRASS BALL OR NYLON BUSHING; FELT OR NEOPRENE ANTI-CHATTER BLADE STRIPS; ADJUSTABLE COUNTER-BALANCE.

17. CHIMNEYS AND BREECING SHALL BE LABORATORY TESTED AND LISTED BY THE UNDERWRITERS LABORATORIES INC. FOR USE WITH BUILDING HEATING EQUIPMENT BURNING NATURAL GAS OR PROPANE GAS, AS DESCRIBED IN NFPA 211, SECTION 6.01. THE DOUBLE WALL STACK SHALL HAVE AN OUTER JACKET OF GALVANIZED STEEL CONFORMING TO ASTM A525. THERE SHALL BE AN AIR SPACE BETWEEN THE WALLS. THE INNER GAS CONVEYING PIPE SHALL BE AN ALUMINUM ALLOY - JOINTS TO BE SECURED WITH SHEET METAL SCREWS.

18. PROVIDE CHIMNEYS AND/OR BREECING FOR: 1. GAS-FRED (INDIRECT) MAKE-UP AIR UNITS.

19. PROVIDE BASE TEE WITH CLEANOUT, ROOF FLASHING AND VENT CAP FOR ALL EQUIPMENT AS REQUIRED.

20. ALL AIR SYSTEMS SHALL BE BALANCED AND TESTED BY A CERTIFIED A.B.C. INDEPENDENT BALANCING AGENCY TO PROVIDE QUANTITIES AS SHOWN. PROVIDE THREE(3) SETS OF BALANCE REPORTS FOR REVIEW BY THE CONTRACT ADMINISTRATOR. ALL BALANCING REPORTS SHALL INCLUDE FIRE DAMPER TESTING AND CERTIFICATION.

MECHANICAL EQUIPMENT SCHEDULES:

Table with 2 columns: TYPE, DESCRIPTION. Row 1: A LBP/15A/1000 LINEAR BAR SUPPLY GRILLE, DUCT MOUNTED, PROVIDE ACOUSTIC LINER DUCT BOOT. (BOOT SIZED (I.D.): FACE AREA OF GRILLE X 12HIGTH). ALUMINUM FINISH. Row 2: B 530/F/A/B12 SIDEWALL RETURN/TRANSFER GRILLE.

Table with 2 columns: TYPE, DESCRIPTION. Row 1: C 620D/B12 DUCT MOUNT ALUMINUM GRILLE C/W ALUMINUM BALANCING DAMPER. Row 2: D 520/F/A/A/B12 SIDEWALL SUPPLY GRILLE, DUCT MOUNTED.

1. THE POINTS BELOW DESCRIBE THE CONTROL SEQUENCE OF THE H.V.A.C. EQUIPMENT SPECIFIED ON THE SCHEDULES. ALL CONTROLS TO BE SUPPLIED BY DIV. 15 AND WIRED BY DIV.15, AND SHALL BE THE COMPLETE RESPONSIBILITY OF THIS DIVISION.

1. MAKE-UP AIR UNIT (MUA-1) 1. PROVIDE INDOOR CONTROL PANEL WITHIN BASEMENT SERVICE AREA FOR AIR TEMPERATURE SELECTOR, AND DISCHARGE AIR TEMPERATURE SENSOR. HEATING SECTION SHALL CYCLE AS REQUIRED TO MAINTAIN DISCHARGE AIR TEMPERATURE SENSOR. ALL HEAT RECOVERY/DEFROST CONTROLS SHALL REMAIN INTEGRAL TO THE EQUIPMENT.

2. PROVIDE MANUAL HI-LOW SELECTOR SWITCH FOR MANUAL CONTROL OF FAN SPEED.

3. MUA-1 TO OPERATE VIA WALL MOUNT HUMIDITY SENSOR WITHIN INDOOR EXHIBIT AND HUMIDISTAT IN BASEMENT SERVICE AREA. UPON DETECTION OF ELEVATED HUMIDITY LEVELS, MUA-1 SHALL ENERGIZE AT FAN SPEED AS DETERMINED BY FAN SELECTOR SWITCH. MUA-1 SHALL DE-ENERGIZE ONCE HUMIDITY LEVELS FALL BELOW SETPOINT.

4. PROVIDE MANUAL 0-6 HOUR OVERRIDE TIMER TO ENERGIZE MUA-1 AT FAN SPEED AS DETERMINED BY FAN SELECTOR SWITCH. MUA-1 SHALL DE-ENERGIZE ONCE MANUAL TIMER DURATION HAS EXPIRED.

5. ALL DAMPERS SHALL FULLY CLOSE IN UNOCCUPIED MODE. 2. ROOF TOP UNIT (RT-1): 1. PROVIDE PROGRAMMABLE THERMOSTAT C/W NIGHT SETBACK, OCCUPIED/UNOCCUPIED SCHEDULE, DURING UNOCCUPIED MODE, ALL OUTDOOR AIR DAMPERS SHALL REMAIN CLOSED.

2. IAQ (CO2) SENSOR AT RETURN PLENUM INLET SHALL OPERATE TO ECONOMIZER DAMPERS BASED ON OCCUPANT DEMAND. 3. ROOFTOP UNIT (RT-2) - TEMPERIZED PRICE: 1. PROVIDE PROGRAMMABLE THERMOSTAT C/W REMOTE SPACE SENSOR; THERMOSTAT MOUNTED IN BASEMENT SERVICE AREA.

1. MAKE-UP AIR UNIT SHALL BE AN OUTDOOR PACKAGED ENGINEERED AIR DESIGN WITH FORWARD CURVE SUPPLY AND RETURN BLOWERS WITH PULLOW BLOCK BEARINGS, HORIZONTAL DISCHARGE, TOP RETURN AIR, Hinged ACCESS DOORS, SUMMER/WINTER FILTER SECTION WITH 2" MERV 7 FLEATED FILTERS, EXHAUST AIR FILTER SYSTEM, INLET DAMPERS C/W 2 POSITION OPERATOR ON INTAKE AND EXHAUST, 1" 1/2 LB./CU.FT. INSULATION THROUGHOUT, 18 GA. CONSTRUCTION WITH GREY ENAMEL FINISH COAT. UNIT TO BE BASE MOUNTED.

2. HEATING UNITS SHALL BE INDIRECT NATURAL GAS FRED 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.

3. ALL UNITS 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 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 PLOT IGNITION SYSTEM TO PROVIDE INCREASED SAFETY. UNITS USING CONTINUOUS OR INTERMITTENT PLOTS ARE NOT ACCEPTABLE.

4. FLAME SURVEILLANCE SHALL BE FROM THE MAIN FLAME AFTER IGNITION NOT THE PLOT FLAME. ATMOSPHERIC BURNERS OR BURNERS WITH POWER ASSISTED VENTING ARE NOT ACCEPTABLE. 5. 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 PLOT ASSEMBLY, WITHOUT ON/OFF CYCLING AND INCLUDE BUILT IN ELECTRONIC LINEARIZATION OF FUEL AND COMBUSTION AIR. EFFICIENCY SHALL INCREASE FROM HIGH TO LOW FIRE.

6. VENTING FOR OUTDOOR UNITS SHALL BE PROVIDED BY THE EQUIPMENT MANUFACTURER AND SHALL INCLUDE A DOUBLE WALL VENT SUITABLE FOR -40 F (-40 C) APPLICATIONS. 7. PROVIDE A MAKE UP AIR REVERSE AIRFLOW HIGH LIMIT SWITCH IN SERIES WITH THE STANDARD HIGH LIMIT SWITCH MOUNTED IN THE BLOWER DISCHARGE.

8. PROVIDE AN AIR-TO-AIR HEAT PIPE EXCHANGER WITH PERFORMANCE AS SHOWN IN THE SCHEDULE, TO BE ODT AS MANUFACTURED AND SUPPLIED BY ENGINEERED AIR. ALTERNATIVE HEAT PIPE MANUFACTURERS SHALL PROVIDE AT THE CONTRACT ADMINISTRATORS' REQUEST, SAMPLES OF TUBES WITH THE INTERNAL WICK BEFORE AND AFTER EXPANSION OF THE TUBES.

9. THE TRU SHALL BE MOUNTED ON A CRADLE WITH ACCOMPANYING LINKAGE, FULCRUM, CONTROL ACTUATOR AND O-TRAC SOLID STATE DEDICATED OPERATING CONTROLLER. 10. PROVIDE EXHAUST RECOVERY: MAXIMUM HEAT RECOVERY IS OBTAINED BY FIRST ALLOWING FROST TO FORM ON THE EXHAUST SIDE OF THE COIL AND USING A PRESSURE DIFFERENTIAL SWITCH TO SENSE WHEN THE FROST FORMS. JUST PRIOR TO FROST FORMING MAXIMUM HEAT RECOVERY OCCURS. WHEN FROST IS DETECTED THE FROST CONTROL SETPOINT IS RESET UPWARDS AND THE HEAT PIPE AND HEAT PIPE DEFROST MODE. RECOVERY IS STILL ACHIEVED BUT AT A LOWER LEVEL UNTIL THE HEAT PIPE IS CLEAR OF FROST.

11. VINYL COATED FLEXIBLE CONNECTORS SHALL BE INSTALLED TO PERMIT THE NECESSARY TILTING MOVEMENT OF THE REGUM COIL. PROVIDE THREE (3) FLEX CONNECTORS, ONE FOR EACH FACE OF THE HEAT PIPE EXCHANGER EXCEPT THE EXHAUST LEAVING FACE. 12