

**MECHANICAL SPECIFICATION**

MECHANICAL SUBCONTRACTOR 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.

**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 OPERATION. FINAL INSTALLATION SHALL BE INSTALLED TO COMPLETE SATISFACTION OF THE RESPONSIBLE PROFESSIONAL ENGINEER.
2. THE MECHANICAL SCOPE OF WORK INCLUDES, BUT IS NOT NECESSARILY LIMITED TO THE FOLLOWING PROVISION:
2.1. GENERAL:
2.1.1. FAMILIARIZE CREW WITH SITE IN ORDER TO DETERMINE APPROPRIATE LOCATIONS, SITE CONDITIONS, ETC. THAT MAY AFFECT WORK.
2.1.2. WORK MAY NEED TO BE PERFORMED AT NON-STANDARD HOURS. DETERMINE SCHEDULE WITH OWNER.
2.1.3. O&M MANUALS AND OWNER TRAINING.
2.1.4. RECORD DRAWINGS.
2.1.5. PROVISION OF FIRE STOPPING AT ALL PIPE, DUCT AND CONDUIT WIRING PENETRATIONS INSTALLED BY THIS TRADE (ONLY).
2.2. PLUMBING:
2.2.1. PROVISION OF ALL PIPING, FIXTURES, PLUMBING BRASS, PIPE FITTINGS, LABOR, INSULATION AND MISCELLANEOUS MATERIALS AS REQUIRE TO COMPLETE THE PROJECT.
2.2.2. PROVISIONS OF ALL GAS PIPING AND VENTING FOR SUPPLIED EQUIPMENT.
2.2.3. PROVISION OF ALL DOMESTIC HOT WATER HEATERS, CIRCULATION PUMPS, AND ASSOCIATED PIPING.
2.3. HVAC
2.3.1. PROVISION OF ALL AIR HANDLING EQUIPMENT, FANS, DUCTWORK, CONTROL/BALANCE FITTINGS, INSULATION, GRILLES/REGISTERS/DIFFUSERS/LOUVERS, FIRE DAMPERS, LABOR AND MISCELLANEOUS MATERIALS AS REQUIRED TO COMPLETE THE PROJECT.
2.3.2. PROVISION OF TAB REPORTS INCLUDING FIRE DAMPER TESTING, CERTIFICATION, AIR FLOWS, AND PUMP PERFORMANCE.
2.4. CONTROLS
2.4.1. PROVISION OF COMPLETE ELECTRONIC CONTROLS AS DESCRIBED.
2.4.2. COORDINATION OF ALL CONTROL INTERFACE AND POWER REQUIREMENTS WITH ELECTRICAL SUBCONTRACTOR.

**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. REFER TO CITY OF WINNIPEG SUPPORTING DOCUMENTS FOR GUARANTEE AND WARRANTY REQUIREMENTS.
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 MECHANICAL SUBCONTRACTOR 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, N.F.P.A. REQUIREMENTS.
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 OWNER, 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 EQUIPMENT. THE USE OF AN EQUAL OR ALTERNATE MANUFACTURER SHALL IN NO WAY RELIEVE THE MECHANICAL 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 IN ACCORDANCE WITH B7. NO SUBMITTALS RECEIVED AFTER BID OPPORTUNITY CLOSING WILL BE ACCEPTED.
10. THE MECHANICAL SUBCONTRACTOR SHALL PROVIDE SIX (6) SETS OF SHOP DRAWINGS FOR ALL EQUIPMENT FOR REVIEW AND APPROVAL BY THE 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 THE 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 OWNERS' 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 ELECTRICAL SUBCONTRACTOR, UNLESS OTHERWISE NOTED.
13. MECHANICAL SUBCONTRACTOR 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 MECHANICAL SUBCONTRACTOR 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 CITY, AND THE CITY SHALL BE NOTIFIED AND HIS 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 CITY.
15. RECORD DRAWINGS:
15.1. OBTAIN SETS OF WHITE PRINTS (ONE FOR EACH SYSTEM IE. PLUMBING, HVAC) AND KEEP AT JOB SITE AT ALL TIMES.
15.2. RECORD ALL ADDITIONS OR DEVIATIONS FROM THE CONTRACT DOCUMENTS INCLUDING ALL CHANGES INCURRED BY ADDENDA, CHANGE ORDERS, FIELD CHANGES, JOB CONDITIONS, ETC.

- 15.3. MECHANICAL SUBCONTRACTORS SHALL BE RESPONSIBLE FOR THE PRODUCTION OF RECORD DRAWINGS WHICH SHALL PROVIDE A COMPLETE AND ACCURATE RECORD OF THE ACTUAL MECHANICAL INSTALLATION. ALL PRINCIPLE BELOW GRADE OR INACCESSIBLE PIPING OR DUCT SYSTEMS, ETC. SHALL BE DIMENSIONED AT EACH CHANGE IN DIRECTION. INCLUDE ALL ROUTING OF SERVICES NOT INDICATED ON ORIGINAL DRAWINGS.
15.4. PROJECT RECORD DRAWINGS SHALL BE TRANSFERRED BY MECHANICAL SUBCONTRACTOR TO REPRODUCIBLE BOND DRAWINGS AND LABELED RECORD.
15.5. SUBMIT REPRODUCIBLE BOND DRAWINGS TO THE CONTRACT ADMINISTRATOR FOR REVIEW UPON COMPLETION IF CORRECTIVE MEASURES ARE REQUIRED AFTER THE SECOND CONTRACT ADMINISTRATOR REVIEW (DUE TO MISSING INFORMATION AND/OR IMPROPER DRAFTING STANDARDS). THE MECHANICAL SUBCONTRACTOR SHALL BE RESPONSIBLE FOR CONTRACT ADMINISTRATOR'S TIME COSTS FOR CORRECTIVE MEASURES, COURIER AND PRINTING COSTS.
15.6. CONTRACTOR SHALL EMPLOY CONTRACT ADMINISTRATOR'S OFFICE (OR CAD DRAFTING SERVICE) TO PRODUCE ELECTRONIC COPY RECORD DRAWINGS. MECHANICAL SUBCONTRACTOR SHALL BEAR ALL COSTS OF PRODUCTION.
15.7. COPY OF FINAL RECORD DRAWING SHALL BE SUBMITTED TO ARCHITECT.
15.8. ALL COSTS OF RECORD DRAWINGS PRODUCTION SHALL BE BORNE BY MECHANICAL SUBCONTRACTOR.
16. VERIFY SIZES, INVERTS AND LOCATIONS OF ALL SERVICES PRIOR TO COMMENCEMENT OF WORK. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO SANITARY SEWER, STORM SEWER, DOMESTIC WATER MAINS, ETC.
17. HOISTING OF ALL MECHANICAL EQUIPMENT SHALL BE BY THE MECHANICAL SUBCONTRACTOR.
18. ASSUME FULL RESPONSIBILITY FOR LAYING OUT ALL WORK AND ENSURING THAT NO DAMAGE IS CAUSED TO THE CITY'S EQUIPMENT AND PREMISES DUE TO IMPROPER LOCATION AND EXECUTION OF WORK IN THIS CONTRACT. PROTECT AND MAINTAIN ALL WORK UNTIL WORK HAS BEEN COMPLETED AND ACCEPTED BY THE CITY. STORE ALL MATERIALS AS REQUIRED, AND CLEAN UP REFUSE CAUSED BY ALL WORK.
19. IDENTIFY ALL NEW PIPING WITHIN BUILDING INSTALLED IN THIS CONTRACT SHOWING SERVICE, PIPE SIZE, AND FLOW DIRECTION. USE CAPITAL LETTERS USING EITHER FIRE RESISTANT HIGH GLOSS INTERIOR ENAMEL PAINT OR WATERPROOF, HEAT RESISTANT PLASTIC MARKER TAGS (SIMILAR TO: W.H. BRADY IDENTIFICATION TAPES, BANDS, MARKERS.) IDENTIFY AT MAXIMUM OF EVERY 50 FT. AND AT LEAST ONE IN EACH ROOM. LOCATE AND SIZE LETTERING SUCH THAT IT CAN BE SEEN FROM FLOOR.

- 20. IN THE CASE OF DISCREPANCY BETWEEN ARCHITECTURAL AND MECHANICAL DRAWINGS TO NUMBER, TYPE, OR LOCATION OF HVAC EQUIPMENT AND SYSTEMS COMPONENTS, OBTAIN WRITTEN RULING.
21. ALL TIME/DATE SENSITIVE ELECTRONIC EQUIPMENT AND SOFTWARE PROVIDED ON THIS PROJECT SHALL BE 4 DIGIT YEAR INPUT COMPATIBLE AND SHALL BE BASED ON THE USE OF FULL, UNABBREVIATED, UNAMBIGUOUS DISCRETE TIME AND DATE CODES.
22. MECHANICAL SUBCONTRACTOR SHALL COORDINATE PROVISION OF POWER TO BUILDING CONTROL TRANSFORMERS WITH DIVISION 16 AND CARRY ALL INCREMENTAL COSTS.
23. COORDINATE THE ELECTRICAL REQUIREMENTS OF ALL MECHANICAL EQUIPMENT WITH DIVISION 16. DIVISION 16 SHALL PROVIDE THE FOLLOWING:
23.1. ALL POWER WIRING TO EQUIPMENT.
24. PROVIDE FIRE STOPPING AT ALL PIPING, CONDUIT (CONTROLS) AND DUCTWORK PENETRATIONS OF ALL REQUIRED FIRE SEPARATIONS WITH APPROVED MATERIAL SYSTEMS. ACCEPTABLE MATERIALS: 3M, DOW, CORNING, APS.
25. MECHANICAL CONTRACT DOCUMENTS ARE DIAGRAMMATIC AND APPROXIMATE TO SCALE; REFER TO ARCHITECTURAL AND/OR STRUCTURAL DRAWINGS, AND SITE VERIFY ALL CRITICAL DIMENSIONS. THE DRAWINGS AND SPECIFICATIONS ESTABLISH SCOPE FOR MATERIAL AND INSTALLATION QUALITY AND ARE NOT DETAILED INSTALLATION INSTRUCTIONS. ANY DISCREPANCIES MUST BE BROUGHT TO THE CONTRACT ADMINISTRATOR'S ATTENTION IN WRITING PRIOR TO THE CLOSE OF THE BID OPPORTUNITY.
26. SHOULD ANY DISCREPANCY APPEAR BETWEEN THE DRAWINGS AND SPECIFICATIONS, WHICH LEAVE THE CONTRACTOR IN DOUBT AS TO THE TRUE INTENT AND MEANING OF THE PLANS AND SPECIFICATIONS, THE CONTRACTOR MUST OBTAIN A WRITTEN RULING FROM THE CONTRACT ADMINISTRATOR PRIOR TO BID OPPORTUNITY SUBMISSION. IF WRITTEN APPROVAL IS NOT PROVIDED, THE MOST EXPENSIVE ALTERNATIVE SHALL BE INCLUDED IN THE BID OPPORTUNITY PRICE.
27. FIELD VERIFY ALL BUILDING AND SITE DIMENSIONS AND REVIEW MECHANICAL DRAWINGS AND SPECIFICATIONS PRIOR TO ANY FABRICATION OR INSTALLATION OF EQUIPMENT OR MATERIALS. DO NOT ATTEMPT ANY FABRICATION OR INSTALLATION UNTIL SUCH CLARIFICATION IS PROVIDED. NO CONTRACT REVISIONS WILL BE CONSIDERED FOR FAILURE TO VERIFY THESE DIMENSIONS ON SITE.
28. DRAWINGS AND SPECIFICATIONS ARE COMPLEMENTARY EACH TO THE OTHER, WHAT IS CALLED FOR BY ONE SHALL BE BINDING AS IF CALLED FOR BY BOTH.
29. MECHANICAL WORK SHALL BE COMPLETED IN CONFORMANCE WITH, AND SUBJECT TO, ALL CAUTIONARY NOTES AVAILABLE TO THE READER INCLUDING THOSE AVAILABLE ON THE WEBSITES OF THE MANUFACTURERS, THE RESPONSIBLE PROFESSIONAL ENGINEERS' OFFICE, AND THE CONTRACT ADMINISTRATOR'S OFFICE.

**INSULATION**

ALL INSULATING MATERIALS, METHODS, SIZES AND TYPES OF INSULATION FOR ALL PIPING AND DUCT WORK SHALL BE INSTALLED TO THE REQUIREMENTS OF THE ASHRAE STANDARDS 90.1-2010 "ENERGY STANDARD FOR BUILDING EXCEPT LOW-RISE RESIDENTIAL BUILDING", AND THERMAL INSULATION ASSOCIATION OF CANADA (TIAC) STANDARDS.

- 1. PROVIDE THICK RIGID PIPE INSULATION ON ALL DOMESTIC WATER PIPES C/W VAPOUR BARRIER. INSULATION ON PIPING MINIMUMS:
PIPE SIZE INSULATION THICKNESS
UP TO 2" (50MM) 1 1/2" (38MM)
2" (50MM) AND GREATER 2 1/2" (63MM)
2. PROVIDE 1" (25 MM) THICK PIPE INSULATION ON ALL PLUMBING VENTS PASSING THROUGH ROOF FOR A DISTANCE OF 10'-0" (3 M) INSIDE FROM POINT OF COLD TO WARM SURFACE PENETRATION. INSULATION C/W VAPOUR BARRIER.
3. PROVIDE 1 1/2" (38 MM) THICK KNAUF ATMOSPHERE DUCTWRAP, 1.0 PCF DENSITY R4.5 (RSI 0.80) 25% COMPRESSED FLEXIBLE DUCT INSULATION C/W RFRFK FACING ON EXHAUST DUCTWORK & ALL SUPPLY DUCTWORK FROM ALL AIR HANDLING EQUIPMENT. EXHAUST DUCTWORK SHALL BE INSULATED FOR A MINIMUM DISTANCE OF 10'-0" (3 M) FROM PENETRATION OF BUILDING THERMAL ENVELOPE. REFER TO DRAWINGS FOR ADDITIONAL INSULATION REQUIREMENTS. ALL SUPPLY AIR DUCTWORK CONVEYING AIR-CONDITIONED AIR SHALL BE INSULATED.
4. PROVIDE 2" (50 MM) THICK KNAUF ATMOSPHERE DUCTWRAP, 1.5 PCF DENSITY, R6.4 (RSI 1.13) 25% COMPRESSED THERMAL FACED INSULATION ON ALL DUCTWORK CONVEYING OUTSIDE AIR COMPLETE WITH RFRFK FACING FACING. DUCTWORK SHALL BE INSULATED OVER ENTIRE RUN FROM PENETRATION OF BUILDING THERMAL ENVELOPE TO UNIT CONNECTION.
5. ACOUSTICALLY INSULATE DUCTWORK WITH 1" (25 MM) FLEXIBLE DUCT INSULATION WITH FLAME - ATTENUATED FIBRES BONDED WITH THERMOSETTING RESIN; BLACK

- PLASTIC-COATED MAT FINISH. PROVIDE WHERE NOTED ON DRAWINGS OR AS SHOWN AS HATCHED DUCTWORK OR ALLOW FOR UP TO 10 FT. (3 M) FROM SUPPLY AND RETURN AIR OPENINGS OF ROOF MOUNTED EQUIPMENT. ACCEPTABLE PRODUCT: KNAUF AIR DUCT BOARD.
6. DO NOT EXTERNALLY INSULATE ANY DUCTWORK WHICH IS SPECIFIED OR SHOWN TO BE INTERNALLY INSULATED UNLESS NOTED OTHERWISE.
7. INSULATION COVERINGS:
DUCTWORK RUNNING OUTSIDE BUILDING THERMAL ENVELOPE AND EXPOSED TO THE WEATHER:
7.1. MASTIC FINISH OVER INSULATION SHALL BE VI-CRYL CP-10 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 L/SQ.M), AND WHILE STILL WET A LAYER OF CHIL-GLAS #5 OPEN WEAVE GLASS CLOTH MEMBRANE SHALL BE EMBEDDED WITH ALL FABRIC COAT AT A COVERAGE OF FOUR GALLONS PER 100 SQ. FT. (1.6 L/SQ.M) SHALL BE APPLIED, FULLY COVERING THE CLOTH MEMBRANE, SO THAT THE MINIMUM DRY FILM THICKNESS IS 1/16" (0.63") (1.6 MM). THERE SHALL BE NO VOIDS OR HOLLOWES AND THE MASTIC SHALL BE TOWELED, SPRAYED OR WET-BRUSHED TO A SMOOTH EVEN FINISH. PROVIDE ALUMINUM JACKET THREE(3) SIDES. FINISH AS PER ARCHITECT BY GENERAL CONTRACTOR.

- 7.2. ALL ADJOINING UNINSULATED SURFACES MUST BE COMPLETELY WATER-PROOFED AND FLASHED EITHER BY EXTENDING THE VI-CRYL CP-10/11 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 CHIL-JOINT CP-70 SEALANT AS THE FLASHING COMPOUND.
7.3. 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.
8. PIPE INSULATION:
8.1. ALL PIPING IN EXPOSED LOCATIONS SHALL BE COVERED WITH CANVAS WRAP. THIS SHALL INCLUDE PIPING IN FAN ROOMS, SERVICE ROOMS, GARAGES, ETC.
8.2. INSULATION EXPOSED TO MOISTURE SHALL BE PROVIDED WITH PVC JACKET (PROTO, OR EQUAL).
8.3. ALL PIPING EXPOSED TO OUTDOOR CONDITIONS SHALL BE PROVIDED WITH ALUMINUM JACKETING.

**PLUMBING**

- 1. PROVIDE COMPLETE FUNCTIONAL PLUMBING SYSTEM COMPRISED OF DOMESTIC WATER PIPING, VENTS, SANITARY AND DRAINAGE PIPING, ETC.
2. ACCEPTABLE MATERIALS SHALL BE USED AS DESCRIBED BELOW.
2.1. DRAINAGE WASTE AND VENT (DWV) MATERIALS
2.1.1. UNDERGROUND PIPING
2.1.1.1. PVC MEETING CSA B181.2
2.1.1.2. CAST IRON MEETING CSA B70
2.1.1.1.1. HUB AND SPIGOT CONNECTIONS, THRUST BLOCKS AT CHANGES IN DIRECTION.
2.1.2. FOR ABOVEGROUND DWV APPLICATIONS (COMBUSTIBLE CONSTRUCTION)
2.1.1.1. ABS MEETING CSA B181.1
2.1.1.2. PVC MEETING CSA B181.2
2.1.2. FOR ABOVEGROUND DWV APPLICATIONS (NON-COMBUSTIBLE CONSTRUCTION)
2.1.1.1. ALL PIPING TO HAVE A FLAME SPREAD RATING OF LESS THAN 25.
2.1.1.2. PVC MEETING CSA B151.2, CAN/ULC S102.2
2.1.2. FOR DWV APPLICATIONS IN AIR PLENUMS
2.1.1.1. ALL PIPING TO HAVE A FLAME SPREAD RATING OF LESS THAN 25 AND A SMOKE DEVELOPED CLASSIFICATION OF LESS THAN 50.
2.1.1.2. PVC MEETING CSA B151.2, CAN/ULC S102.2
2.2. DOMESTIC WATER PIPING MATERIALS
2.2.1. ALL PRODUCTS SHALL BE UL CLASSIFIED IN ACCORDANCE WITH ANSI/NSF-61 FOR POTABLE WATER SERVICE, AND SHALL BE CERTIFIED TO THE LOW LEAD REQUIREMENTS OF NSF-372.
2.2.1.1. COPPER
2.2.1.1.1. ABOVE GROUND: COPPER TUBE, HARD DRAWN, TYPE L: TO ASTM B88M.
2.2.1.2. PEX
2.2.1.2.1. ALL PIPE SHALL BE HIGH-DENSITY CROSS-LINKED POLYETHYLENE MANUFACTURED USING THE HIGH-PRESSURE PEROXIDE METHOD OF CROSS-LINKING (PEX A). PIPE SHALL CONFORM TO ASTM F877, CSA B137.5 AND NSF/ANSI 61.
2.2.1.2.2. PIPE SHALL BE RATED FOR CONTINUOUS OPERATION OF 100 PSI GAUGE PRESSURE AT 180F TEMPERATURE ( 630 KPA @ 82°C) AND 80 PSI GAUGE PRESSURE AT 200F TEMPERATURE (550 KPA 93°C)
2.2.1.2.3. PEX PIPE IN EXPOSED LOCATIONS SHALL BE RIGID (NOT COIL).
2.2.1.2.4. PIPE SHALL BE RESISTANT TO HOT CHLORINATED WATER. PIPE TO HAVE A MINIMUM EXTRAPOLATED TIME-TO-FAILURE OF 50 YEARS.
2.2.1.2.5. PEX PIPE TO HAVE A CO-EXTRUDED COLORED UV SHIELD MADE FROM UV-RESISTANT POLYETHYLENE PROVIDING UV RESISTANCE.
2.2.1.2.6. PIPE TO HAVE A FLAME SPREAD INDEX OF LESS THAN 25 AND A SMOKE DEVELOPED INDEX OF LESS THAN 50 WHEN TESTED IN ACCORDANCE WITH CAN/ULC S102.2. IN ANY CASE WHERE THE PIPE DOES NOT CONFORM WITH THESE STANDARDS, APPROPRIATE PIPING INSULATION SHALL BE INSTALLED IN ORDER TO MEET THE STANDARD.
2.2.1.3. CPVC
2.2.1.1.1. ABOVE GROUND USE ONLY TO CSA 137.6
2.2.1.1.2. PIPE SHALL BE RATED FOR CONTINUOUS OPERATION OF 100 PSI GAUGE PRESSURE AT 180F TEMPERATURE (690 KPA @ 82°C)
2.2.1.1.3. PIPE TO HAVE FLAME SPREAD INDEX OF LESS THAN 25, AND A SMOKE DEVELOPED INDEX OF LESS THAN 50 WHEN TESTED IN ACCORDANCE WITH CAN/ULC S102.2.
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, 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 SHALL HAVE A FLAME SPREAD RATING OF 25, AND A SMOKE DEVELOPED RATING OF 50. PIPING AND FITTINGS SHALL BE OF ONE MANUFACTURE: IPEX SYSTEM 15XFR.
6. MECHANICAL SUBCONTRACTOR SHALL VERIFY ON SITE ALL CONNECTION POINTS TO EXISTING BUILDING SERVICES. COORDINATE ALL NEW PIPING RUNS WITH CONTRACT ADMINISTRATOR OR OWNER'S REPRESENTATIVE.
7. SOLDERED FITTINGS IN POTABLE WATER SYSTEMS
7.1. PROVIDE LEAD, ANTIMONY, CADMIUM AND ZINC FREE SOLDERS COMPOSED OF TIN, COPPER, SILVER OR NICKEL COMPONENTS THAT ARE ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION.
8. VALVES
8.1. SHALL BE BY ONE MANUFACTURER. STANDARD OF ACCEPTANCE: JENKINS BROS. LTD.
8.2. SHALL BE UL CLASSIFIED IN ACCORDANCE WITH ANSI/NSF-61 FOR POTABLE WATER SERVICE, AND SHALL BE CERTIFIED TO THE LOW LEAD REQUIREMENTS OF NSF-372.
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. MECHANICAL SUBCONTRACTOR SHALL ALLOW FOR IN BID OPPORTUNITY 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 BID OPPORTUNITY 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 LBS. STANDARD BLACK MALLEABLE 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.
14. RUN GAS PIPING TO SERVE OWNER'S EQUIPMENT. TAKE-OUT PERMITS AND CONNECT EQUIPMENT READY FOR USE. PROVIDE GAS REGULATORS TO SERVE NEW GAS FIRED EQUIPMENT. GAS REGULATORS SHALL BE C.G.A APPROVED AS MANUFACTURED BY FISHER, OR EQUAL. PROVIDE GAS COCK DIRT LEG AND FLEXIBLE CONNECTIONS AT EACH PIECE OF EQUIPMENT.
15. MECHANICAL SUBCONTRACTOR SHALL COORDINATE SERVICE INSTALLATIONS AND/OR MODIFICATIONS WITH LOCAL UTILITY PRIOR TO COMMENCEMENT OF WORK. PAY ALL COSTS AND/OR FEES.
16. ROOF MOUNTED PIPING SHALL BE SUPPORTED WITH C-PORIT UV RESISTANT RUBBER MOUNTS OF SUITABLE WIDTHS TO ACCOMMODATE INSTALLATION REQUIREMENTS, AS MANUFACTURED BY CLEARLINE TECHNOLOGIES OR APPROVED EQUAL. INSTALLATIONS TO CAN/CSA-B149.1 (LATEST EDITION).
17. MECHANICAL SUBCONTRACTOR 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. OFFICE OF THE FIRE COMMISSIONER REQUIREMENTS.
18. PROVIDE DIELECTRIC COUPLINGS WHEREVER PIPES OF DISSIMILAR METALS ARE JOINED.
19. USE THE FOLLOWING ROD DIAMETER AND SPACING SCHEDULE TO ESTABLISH MINIMUM HANGING STANDARDS FOR HORIZONTAL PIPING:

PIPE SIZE	ROD DIA	STEEL	COPPER
UP TO 3/4"	3/8"	6	6'
1" TO 1 1/4"	3/8"	8	6'
1 1/2" & 2"	3/8"	10'	8'

- 20. PIPE HANGERS WHERE REQUIRED SHALL BE GRINNEL FIG.65 FOR STEEL PIPE AND FIG.117 EXPANSION CASE SET IN HOLES DRILLED IN CONCRETE OR ATTACHED TO FIG.225 OR 227 CLAMP ATTACHED TO FLOOR JOIST AND ROOF JOIST. FOR INSULATED PIPING, PROVIDE PROTECTION FIG.167 SADDLES SIZE HANGER TO ACCOMMODATE INSULATION WHERE APPLIED.
21. ALL REFRIGERANT PIPING TO BE SUPPORTED VIA UNISTRUT CHANNELS WITH THREADED SUPPORT RODS AT 6' INTERVALS. THREADED RODS SHALL BE ANCHORED TO STRUCTURE, PIPING CLAMPED TO CHANNELS; PROVIDE DIELECTRIC CONNECTIONS AS REQUIRED. INSULATE PIPING AS SPECIFIED HEREIN.
22. MECHANICAL SUBCONTRACTOR TO PROVIDE REDUCED PRESSURE PRINCIPLE BACK FLOW PREVENTION DEVICE ON INCOMING WATER SERVICE; REFER TO MECHANICAL DRAWINGS FOR SERVICE SIZE REQUIREMENTS.

**PLUMBING FIXTURES AND EQUIPMENT:**

**WHA WATER HAMMER ARRESTORS**

SMITH 'HYDROTROL' WATER HAMMER ARRESTORS SERIES #5000, STAINLESS STEEL, PRESSURIZED CHAMBERS, BELLOWS, 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.

**SIZE FIXTURE UNITS MODEL NO. CONN. SIZE**

A	1 - 11	5005	1/2" (12MM)
B	12 - 32	5010	3/4" (19MM)
C	33 - 60	5020	1" (25MM)
D	61 - 113	5030	1-1/4"(32MM)

**HWT-1 DOMESTIC HOT WATER TANK**

A0 SMITH MODEL BTH-120 MXI GAS FIRED HIGH EFFICIENCY DOMESTIC HOT WATER TANK. 120,000 BTU/HR. RATED INPUT. 60 USG STORAGE CAPACITY. GLASS LINED, INSULATED, MANUAL TEMPERATURE CONTROL, LOW WATER CUT OFF. PROVIDE WITH CONCENTRIC TERMINATION KIT, CONDENSATE NEUTRALIZATION KIT, AND POWER VENT OPTION.

**XT-1 THERMAL EXPANSION TANK**

AMTROL THERM-X-TROL ST-30V OR EQUAL. SUITABLE FOR POTABLE WATER APPLICATIONS.

**CP-1 DOMESTIC HOT WATER RECIRC.**

ARMSTRONG ASTRO 250SS, 70PM AT 15' HD. 0.98A, 117W MOTOR 115V 1 PHASE. BRONZE CONSTRUCTION, C/W TIMER. B&S SHALL ALSO BE ACCEPTED.

**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:
4.1. RECTANGULAR DUCTWORK SHALL BE CONSTRUCTED FROM GALVANIZED SHEET METAL OF THE FOLLOWING U.S. STANDARD GAUGES:
DUCTS UP TO 12" ON LONGEST DIMENSION 26 GA.
DUCTS 13" TO 28" ON LONGEST DIMENSION 24 GA.
4.2. ROUND AND OVAL DUCTWORK SHALL BE SPIRAL CONDUIT CONSTRUCTION OF ZINC COATED STEEL OF THE FOLLOWING U.S. GAUGES:

CONDUIT SIZE	GAUGE OF METAL
8" AND SMALLER	26

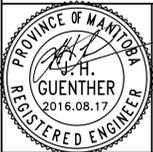
0	CONSTRUCTION	JHG	2016.08.17
No.	REVISION	BY	DATE

THIS DRAWING MUST NOT BE SCALED

CONSULTANT  
**NOVA 3 ENGINEERING LTD.**  
CONSULTING ENGINEERS  
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CONSULTANT



**APECM**  
Certificate of Authorization  
Nova 3 Engineering Ltd.  
No.962 Date: 2016.08.17

LOCATION

**ST. VITAL ARENA**  
580 ST. ANNE'S RD  
WINNIPEG, MANITOBA

DRAWING  
**MECHANICAL SPECIFICATIONS**

DESIGNED BY	APPROVED BY
SJ	JHG
DRAWN BY	
SJ	
DATE	SCALE
2016/08/17	AS NOTED
PROJECT	DWG No.
36-083M	M3.0