

GENERAL MECHANICAL SPECIFICATION

SCOPE OF WORK

DIVISION 15 SHALL FURNISH ALL LABOUR, MATERIALS AND EQUIPMENT NECESSARY FOR THE PROPER AND TIMELY COMPLETION OF THE MECHANICAL SYSTEMS AS SHOWN ON THE DRAWINGS AND/OR AS SPECIFIED.

THE SPECIFICATIONS SHALL BE CONSIDERED AS AN INTEGRAL PART OF THE PLANS WHICH ACCOMPANY THEM, NEITHER THE PLANS NOR THE SPECIFICATIONS SHALL BE USED ALONE. ANY ITEMS OR SUBJECT OMITTED FROM ONE, BUT WHICH IS MENTIONED OR REASONABLY IMPLIED IN THE OTHER, SHALL BE CONSIDERED AS PROPERLY AND SUFFICIENTLY SPECIFIED, AND MUST, THEREFORE, BE PROVIDED. MISINTERPRETATIONS OF EITHER THE PLANS OR THE SPECIFICATIONS SHALL NOT RELIEVE THIS DIVISION OF RESPONSIBILITY.

STANDARD OF ACCEPTANCE

THE ITEM NAMED AND SPECIFIED BY MODEL OR CATALOGUE NUMBER FORMS PART OF SPECIFICATION AND SETS THE STANDARD REGARDING PERFORMANCE, QUALITY OF MATERIAL AND WORKMANSHIP.

CODES, REGULATIONS AND PERMITS

ALL MECHANICAL WORK SHALL BE INSTALLED, INSPECTED AND TESTED IN ACCORDANCE WITH GOVERNING CODES, RULES AND REGULATIONS OF THE MUNICIPALITY IN WHICH THE WORK IS PERFORMED AND ALSO OF PROVINCIAL AND FEDERAL AUTHORITIES HAVING JURISDICTION.

RECORD DRAWINGS

CLEARLY RECORD ALL CONTRACT CHANGES AND DEVIATIONS FROM THE CONTRACT DRAWINGS ON A SET OF DRAWINGS AVAILABLE FROM THE GENERAL CONTRACTOR FOR THIS PURPOSE AND FORWARDED TO THE GENERAL CONTRACTOR AT THE COMPLETION OF THE PROJECT.

SITE VISIT

THIS CONTRACTOR SHALL VISIT THE SITE AND EVALUATE ALL EXISTING SITE CONDITIONS AS THEY MAY AFFECT THIS WORK. NO EXTRAS WILL BE ALLOWED FOR ANY EFFECTS FROM FAILING TO COMPLETE A COMPREHENSIVE SITE TOUR TO UNDERSTAND AND ACCOUNT FOR THE IMPACT OF EXISTING SITE CONDITIONS ON THE CONTRACT SCOPE OF WORK.

CUTTING AND PATCHING

THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR AND PAY FOR ALL CUTTING AND PATCHING REQUIRED IN THE SCOPE OF WORK AS DEFINED IN THE GENERAL CONDITIONS. ALL NEW FINISHES SHALL BE EQUAL TO THOSE OF SURROUNDING SURFACES FOR MATERIALS, COLOUR, TEXTURE AND WORKMANSHIP. THIS DIVISION SHALL CLEARLY MARK OUT ALL OPENINGS REQUIRED AND REVIEW WITH THE GENERAL CONTRACTOR BEFORE CUTTING PROCEEDS. THIS DIVISION SHALL INSTALL ALL OPENING FRAMES, SLEEVES, DUCTWORK AND PIPING, LOUVRES, ETC., INTO THE BUILDING STRUCTURE AS CONSTRUCTION PROGRESSES. ANY ITEMS MISSED DURING CONSTRUCTION THAT MUST BE ADDED WILL BE THE RESPONSIBILITY OF THIS DIVISION AND BE CO-ORDINATED WITH THE GENERAL TRADES.

CO-ORDINATION

CONFER AND COOPERATE WITH OTHER TRADES IN ORDER TO ELIMINATE ANY UNNECESSARY DELAYS TO THE CONSTRUCTION SCHEDULE. WHERE DOUBT EXISTS REGARDING OTHER TRADES, CONFER WITH THE SUPERINTENDANT WITHOUT DELAY FOR DETAILED INSTRUCTIONS CONCERNING HOW TO PROCEED WITH THE WORK. EXPEDITE DELIVERY OF ALL EQUIPMENT AND MATERIALS TO MEET CONSTRUCTION SCHEDULE.

INTERRUPTION AND DEMOLITION OF EXISTING SERVICES

ARRANGE, SCHEDULE AND PERFORM WORK WITH MINIMUM DISTURBANCE TO EXISTING FACILITIES AND SERVICES.

SUBMIT A COMPLETE SCHEDULE OF SERVICE INTERRUPTIONS AND CHANGEOVERS WITH APPROXIMATE DATES REQUIRED, DURATIONS AND TIMES OF DAY, FOR APPROVAL BEFORE PROCEEDING.

SHOP DRAWINGS

SHOP DRAWINGS AND DATA SHEETS FOR EQUIPMENT INTENDED FOR INSTALLATION UNDER THIS CONTRACT SHALL BE SUBMITTED FOR REVIEW. AFTER CHECKING AND WHEN REVIEWED, COPIES WILL BE RETURNED TO THE CONTRACTOR.

SUBMIT 8 HARD COPIES OF ALL SHOP DRAWINGS. NO ELECTRONIC SUBMISSIONS WILL BE REVIEWED.

EXCAVATION AND BACKFILLING

THIS DIVISION SHALL COMPLETE ALL EXCAVATING AND BACKFILLING WORK REQUIRED TO INSTALL THE MECHANICAL SYSTEMS. ALL SUCH WORK SHALL CONFORM STRICTLY TO THE REQUIREMENTS OF MUNICIPAL STANDARDS AND PROVINCIAL CODES AND REGULATIONS.

WHERE PIPES ARE LOCATED NEAR OR BELOW FOOTINGS, THE PIPES SHALL BE SLEEVED, AND 1500 LB. CONCRETE BACKFILL SHALL BE INSTALLED TO UNDERSIDE OF FOOTINGS.

EXCAVATIONS SHALL BE MAINTAINED FREE OF WATER WHILE UNDERGROUND PIPING IS BEING INSTALLED AND UNTIL BACKFILL WORK IS COMPLETED. ALL TESTS FOR UNDERGROUND PIPING SHALL BE CONDUCTED AND ACCEPTED BEFORE JOINTS ON SUCH PIPING ARE BACKFILLED.

PROTECT ALL EXCAVATIONS WITH SAFETY FENCING, SIGNAGE, SHORING OR BRACING. PROVIDE TRAFFIC CONTROL PERSONNEL WHEN REQUIRED BY THE MUNICIPALITY. RESTORE ALL PAVEMENT, SODDING AND LANDSCAPING TO PRE-CONSTRUCTION CONDITION TO MEET THE MUNICIPALITY STANDARDS.

TRENCHES SHALL BE EXCAVATED TO A DEPTH WHICH SHALL ALLOW FOR A MINIMUM OF 150MM OF HAND PLACED BEDDING MATERIAL, THOROUGHLY COMPACTED. THE BEDDING SHALL BE REMOVED AT PIPE HUBS OR COUPLINGS TO PROVIDE CONTINUOUS SUPPORT OVER EACH LENGTH OF PIPE.

BACKFILL TO 300 MM ABOVE THE PIPING SHALL BE HAND PLACED IN 100 MM LAYERS AND COMPACTED SIMULTANEOUSLY ON BOTH SIDES OF THE PIPING. ALL ADDITIONAL BACKFILL SHALL BE PLACED IN APPROXIMATELY 150 MM LAYERS AND MAY BE MECHANICALLY PLACED.

BEDDING AND BACKFILL MATERIALS TO 300 MM ABOVE TOP OF PIPE SHALL BE CLEAN GRANULAR MATERIAL OF NON-ORGANIC NATURE. THIS APPLIES TO AREAS BOTH INSIDE AND OUTSIDE OF BUILDING LINES. BACKFILL MATERIAL FOR TRENCHES WITHIN THE BUILDING FROM 300 MM ABOVE TOP OF PIPE TO GRADE SHALL BE NEW GRANULAR MATERIAL CONFORMING TO DHO GRANULAR "B" MATERIAL. BACKFILL MATERIAL FOR TRENCHES OUTSIDE OF THE BUILDING BUT UNDER ROADWAYS, PAVED OR CONCRETE PARKING AREAS, RAMPS, WALKWAYS, ETC. FROM 300MM ABOVE TOP OF PIPE TO GRADE SHALL BE NEW GRANULAR MATERIAL CONFORMING TO DHO GRANULAR "B" MATERIAL.

ALL BEDDING AND BACKFILLING SHALL BE MECHANICAL TAMPED IN THE SPECIFIED LAYER AND THOROUGHLY COMPACTED. USE A STANDARD PROCTOR OF 95% OUTSIDE OF THE BUILDING AND 100% FOR INTERIOR TRENCHES FOR TESTING DENSITY. ALL BEDDING AND HAUNCHING TO THE CENTRELINE OF P.V.C. PIPING SHALL BE COMPACTED TO 95% PROCTOR DENSITY.

ARRANGEMENT OF PIPING AND DUCTWORK

CONCEAL PIPING AND DUCTWORK WHEREVER POSSIBLE BY RUNNING IT IN PIPE SPACES, DUCT SHAFTS, CHASSES, CEILING SPACES AND FURRED OUT SECTIONS OF WALLS AND COLUMNS. DO NOT RUN PIPING OR DUCTWORK EXPOSED IN FINISHED AREAS WITHOUT OBTAINING PERMISSION OF THE ENGINEER.

TESTING

DIVISION 15 SHALL PERFORM TESTS ON ALL PIPING AND EQUIPMENT SYSTEMS AS OUTLINED IN VARIOUS SECTIONS OF THESE SPECIFICATIONS AND SHALL PROVIDE ALL NECESSARY PUMPS, COMPRESSORS, GAUGES, RECORDERS AND TEMPORARY CONNECTIONS TO THE PIPING AND EQUIPMENT.

ACCESS DOORS

SUPPLY ACCESS DOORS FOR FURRED CEILINGS OR SPACES FOR SERVICING EQUIPMENT AND DUCT ACCESSORIES OR FOR INSPECTION OF LIFE SAFETY OR OPERATING DEVICES. SUPPLY STAINLESS STEEL ACCESS DOORS FOR TILED, MARBLE, TERRAZZO OR SPECIAL SURFACES. STANDARD OF ACCEPTANCE: ZURN, ACUDOR, ANCON.

MAINTENANCE INSTRUCTIONS

SUPPLY CERTIFIED PERSONNEL TO INSTRUCT OWNERS OPERATING STAFF ON OPERATION OF MECHANICAL EQUIPMENT. SUPPLY MAINTENANCE SPECIALIST PERSONNEL TO INSTRUCT OPERATING STAFF ON MAINTENANCE AND ADJUSTMENT OF MECHANICAL EQUIPMENT AND ANY CHANGES OR MODIFICATIONS IN EQUIPMENT MADE UNDER THE TERMS OF THE GUARANTEE. PROVIDE INSTRUCTION TO OWNERS STAFF DURING REGULAR WORK HOURS PRIOR TO ACCEPTANCE OF THE SYSTEMS FOR REGULAR OPERATION.

BUILDING STRUCTURE

INITIATE NO DRILLING, CUTTING OR WELDING OF THE BUILDING STEEL OR CONCRETE CONSTRUCTION FOR THE PURPOSE OF SUPPORTING MATERIALS OR EQUIPMENT WITHOUT PRIOR APPROVAL OF THE PRIME CONSULTANT.

PIPING AND EQUIPMENT IDENTIFICATION

IDENTIFY ALL PIPING SYSTEMS. INDICATE PIPE SIZE, SERVICE AND DIRECTION OF FLOW.

THE LETTERING SHALL BE PROPORTIONAL TO THE OUTSIDE DIAMETER OF THE PIPE OR COVERING RANGING FROM 13 MM HIGH TO 20 MM O.D., PIPE OR COVERING UP TO 100 MM HIGH ON 300 MM O.D. PIPE OR COVERING. BRADEY PIPE TAGS SHALL BE THE STANDARD OF LABELS. PIPES SMALLER THAN 20 MM O.D. PIPE OR COVERING MAY BE Banded WITH COLOURED PLASTIC TAPE IN LIEU OF PAINT AND THE CONTENTS IDENTIFIED BY MEANS OF "DYMO" EMBOSSED PLASTIC LABELS. STENCIL A DIRECTION-OF-FLOW ARROW ON EACH COLOUR BAND. PIPE IDENTIFICATION SHALL BE APPLIED AT EACH HORIZONTAL OR VERTICAL CHANGE IN DIRECTION AND A MAXIMUM OF 12 M. APART.

EQUIPMENT SHALL BE IDENTIFIED WITH 25 MM HIGH LETTERS IN LAMACOOD ENGRAVED SELF ADHESIVE NAMEPLATES.

DUCTWORK SYSTEMS

THE DUCTWORK AND ACCESSORIES SHALL BE GALVANIZED STEEL AND SHALL BE INSTALLED IN STRICT ACCORDANCE WITH A.S.H.R.A.E. AND S.M.A.C.N.A. STANDARDS FOR METHODS OF SUSPENSION, JOINTS, REINFORCEMENT, CROSS BREAKING, INSULATION AND MATERIAL GAUGES FOR THE REQUIRED FAN SYSTEM OPERATING PRESSURES. FITTINGS SHALL BE FABRICATED WITH SMOOTH TRANSITIONS, PROPER SMAONCA RADII AND TRANSITION ANGLES AND QUALITY BALANCING DEVICES. SEAL ALL DUCT SYSTEM JOINTS WITH DUCTMATE E2-SEAL WATER BASED PRESSURE DUCT SEALER.

CIRCULAR DUCTWORK SHALL BE FACTORY FABRICATED GALVANIZED SPIRAL SEAM WITH FABRICATED FITTINGS.

1. ALL BRANCH TAKE OFFS TO BE 45 DEG. CONICAL LATERALS.
2. SLEEVE TYPE COUPLING JOINTS ALL SEALED WITH FLEXIBLE MEDIUM PRESSURE DUCT SEALANT AND SCREWS.

FIRE SEPARATIONS

SUPPLY AND INSTALL ALL FIRE DAMPERS AND FIRE STOP FLAPS C/W FUSIBLE LINKS AND ACCESS PLATES AS REQUIRED UNDER THE ONTARIO BUILDING CODE. DAMPERS SHALL BE TYPE 'B', 100% FREE AREA UNLESS NOTED AND BE U.L.C. LISTED FOR THE SPECIFIC APPLICATION AND INSTALLATION ORIENTATION.

GRILLES AND DIFFUSERS

GRILLES, REGISTERS AND DIFFUSERS SHALL BE THE PRODUCT OF ONE MANUFACTURER FOR GENERAL TYPE, EG. GRILLES AND REGISTERS BY ONE, DIFFUSERS BY ONE, OR SAME, REFER TO THE SCHEDULE ON THE DRAWINGS: BASE BID: E.H. PRICE

DUCTWORK INSULATION

RECTANGULAR DUCTWORK DESCRIBED IN THE SCOPE OF WORK BELOW SHALL BE INSULATED WITH 25 THICK FIBREGLASS RIGID, EMBOSSED FOIL FACED VAPOUR SEALED DUCT INSULATION APPLIED OVER SPOT WELDED PINS ON 85 M CENTRES, WITH INSULATION CAPPED WITH SPRING CLIP WASHERS OF 25 DIAMETER. SEAL ALL JOINTS, PLUNOTURES AND BREAKS WITH 100 MM WIDE STRIPS OF ALUMINUM FOIL VAPOUR BARRIER TAPE ADHERING WITH SUITABLE FLINTKOTE FIRE RETARDANT ADHESIVE. ROUND DUCTWORK SHALL BE INSULATED WITH FLEX 40 THICK FOIL FACED SEALED DUCT INSULATION WITH ALL JOINTS TAPED VAPOUR TIGHT.

SURFACE FINISH OF ALL INSULATION, OTHER THAN THAT WHICH IS CONCEALED IN CEILING SPACES, PIPE SHAFTS AND FURRINGS, SHALL BE COVERED WITH AN ADDITIONAL LAYER OF 8 OZ. U.L.C. THERMO CANVAS APPLIED WITH A COMPLETE BASE COAT OF BENJAMIN-FOSTER 30-36.

INSULATE THE FOLLOWING:

1. SUPPLY AIR DUCTWORK.
2. OUTDOOR AIR PLENUMS AND DUCTS.
3. EXHAUST DUCTS WITHIN 1500 MM OF EXTERIOR WALLS.

PIPE SYSTEMS

ALL PIPING SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE ANSI/ASME B31-1, UNLESS OTHERWISE SPECIFIED HEREIN. PROVIDE INSERTS, SLEEVES AND ANCHORS WHERE NECESSARY AND COORDINATE WITH OTHER TRADES TO THE FULLEST EXTENT IN THE PROVISION OF OPENINGS, CHASSES, ETC. TO ACCOMMODATE THE PIPING SYSTEMS.

PIPE EXPANSION AND CONTRACTION

ALL PIPING SHALL BE INSTALLED IN SUCH A MANNER AS TO AVOID UNDE STRESS AND DISTORTION DUE TO EXPANSION AND CONTRACTION. PROVIDE FOR EXPANSION AND CONTRACTION BY THE USE OF EXPANSION LOOPS FOR LONG OFFSETS. EXPANSION LOOPS SHALL BE INSTALLED IN THE LINE IN A COLD SPRUNG POSITION WITH PROPER ANCHORS AND GUIDES. STAINLESS BRAIDED EXPANSION LOOPS "METRALOOP" BY METRAFLEX INC.

PIPE HANGERS AND SUPPORTS

FABRICATE HANGERS, SUPPORTS AND SWAY BRACES IN ACCORDANCE WITH ANSI/ASME B31.1. SUPPORT FROM STRUCTURAL MEMBERS. WHERE STRUCTURAL BEARINGS DO NOT EXIST OR INSERTS ARE NOT IN SUITABLE LOCATIONS, SUSPEND HANGERS FROM STEEL CHANNELS OR ANGLES. DIVISION 15 SHALL PROVIDE SUPPLEMENTARY STRUCTURAL MEMBERS. DO NOT SUSPEND FROM METAL DECK. ANCHORING OF PIPING AND EQUIPMENT SHALL BE TO MANUFACTURER'S RECOMMENDATIONS. SUBMIT ANCHORAGE SYSTEM, ARRANGEMENT AND TYPE OF HANGERS SUPPORTS WITH CALCULATIONS FOR REVIEW.

SLEEVES AND ESCUTCHEONS

PIPE SLEEVES: AT POINTS WHERE PIPES PASS THROUGH MASONRY OR CONCRETE. SLEEVES OF: MINIMUM 0.8 MM THICK GALVANIZED SHEET STEEL WITH LOCK SEAM JOINTS. USE CAST IRON SLEEVE OR STEEL PIPE SLEEVES WITH ANNUULAR FN CONE WELDED AT MIDPOINT:

1. THROUGH FOUNDATION WALLS.
2. WHERE SLEEVE EXTENDS ABOVE FINISHED FLOOR; EXTEND UP 50 MM, CAULK AND SEAL WHEN PIPE IS INSTALLED.

FIRESTOPPING

WHERE PIPES AND DUCTS PASS THROUGH FIRE RATED WALLS, FLOORS AND PARTITIONS, PACK SPACE WITH MATERIALS HAVING APPROVAL OF AUTHORITIES HAVING JURISDICTION.

DIVISION 15 TO PROVIDE ALL MATERIALS AND LABOUR TO COMPLETE U.L.C. FIRESTOPPING FOR DIVISION 15 WORK.

PIPING MATERIALS

EXT-EXTERIOR BUR-BURIED PIPING A.G.-ABOVE GRADE

	EXT	INT	BUR	A.G.	MATERIAL	CODE	
SANITARY SEWERS- ALL SIZES	✓	✓	✓	✓	CAST IRON IPEX PSM	CSA B70	MECH. JOINTS, TARRED
	✓	✓	✓	✓	COPPER DW/ASTM B42	CSA B182-1	HIGH LEVEL ALARM
	✓	✓	✓	✓	ABS	CSA B181.1	SOLDERED JOINTS
	✓	✓	✓	✓	PVC	CSA B181.2	SOLVENT WELD JOINTS
VENTING	✓	✓	✓	✓	CAST IRON	CSA B70	MECH. JOINTS
	✓	✓	✓	✓	TYPE L COPPER	ASTM B88	SEAMLESS SOLDERED JOINTS
	✓	✓	✓	✓	CAST IRON ABS	CSA B70	MECH. JOINTS
	✓	✓	✓	✓	CAST IRON ABS	CSA B181	SOLVENT WELD JOINTS
COLD WATER	✓	✓	✓	✓	COPPER DW/ASTM B206	ASTM B206	SEAMLESS SOLDERED JOINTS
	✓	✓	✓	✓	CAST IRON	CSA B70	MECH. JOINTS
DOMESTIC HOT WATER	✓	✓	✓	✓	SOFT K COPPER	ASTM B88	NO JOINTS
	✓	✓	✓	✓	DUCTILE IRON CLASS 52	ANSI/AWWA C151/A21.51	TYTON JOINTS CEMENT LINED C.I. FITTINGS CEMENT LINED
	✓	✓	✓	✓	IPEX PVC	CSA B182-1	T&G, GASKET JOINTS
HEATING/CHILLED WATER TO 50 DIA	✓	✓	✓	✓	TYPE L COPPER	ASTM B88	WROUGHT FITTINGS LEAD FREE
	✓	✓	✓	✓	STEEL	ASTM A53	GRADE B, SCHEDULE 40 THREADED

HEATING SYSTEMS

GATE VALVES: NPS 1/2 TO NPS 2 CRANE 428
NPS 2 1/2 TO NPS 12 CRANE 465 1/2

GLOBE VALVES: NPS 1/2 TO NPS 2 CRANE 5
NPS 2 1/2 TO NPS 12 CRANE 351

CIRCUIT BALANCING VALVES

1. INSTALL ON ALL PIPING AND FOR ALL BRANCH LINES AND AS INDICATED ON PIPING SCHEMATICS WHERE BALANCE VALVES (C.B.V.) ARE SHOWN.
2. ACCEPTABLE PRODUCTS SHALL BE BY TOUR AND ANDERSON.

PIPING INSULATION

ALL WATER LINES INDICATED IN THE SCOPE OF WORK ITEM 3 BELOW SHALL BE INSULATED WITH 25 MM THICK DUAL TEMPERATURE GLASS FIBRE PIPE INSULATION. INSULATION SHALL BE MANUFACTURED BY FIBREGLASS OF CANADA.

THIS INSULATION SHALL BE SUPPLIED COMPLETE WITH FLAME RETARDANT VAPOUR BARRIER JACKET CONSISTING OF GLASS FIBRE, REINFORCED LAMINATE OF ALUMINUM FOIL AND KRAFT PAPER. LONGITUDINAL SEAMS OF THE VAPOUR BARRIER JACKET SHALL BE SEALED WITH VAPOUR-PROOF ADHESIVE. FLINTKOTE TYPE 32. INSULATE AND TAPE ALL VALVES AND FITTINGS. EXPOSED PIPING INSULATION TO BE FINISHED WITH 8 OZ. FATFAL U.L.C. LISTED CANVAS AND CHILDERS LAGGING. NON-U.L.C. LISTED CANVAS WILL NOT BE ACCEPTED.

INSULATE THE FOLLOWING:

1. HOT WATER HEATING PIPING.
2. INTERIOR RAIN WATER LEADERS ABOVE GRADE

CLOSE-OUT DOCUMENTS AND INSTRUCTIONS

1. AS-BUILT DRAWINGS.
2. ALL TEST REPORTS.
3. WARRANTIES.
4. THREE (3) COPIES OF MAINTENANCE MANUALS.
5. INSTRUCT OWNER IN THE OPERATION OF ALL EQUIPMENT AND MAKE FAMILIAR WITH SYSTEM.

SEWAGE PUMPING SYSTEMS

GENERAL - FURNISH AND INSTALL A COMPLETE PUMP SYSTEM CONSISTING OF SUBMERSIBLE PUMP, VALVES, CONTROLS, ACCESS COVER AND ALL OTHER APPURTENANCES TO MAKE A COMPLETE SYSTEM.

COMPONENTS - EACH SYSTEM SHALL CONSIST OF: A DUCTILE IRON DISCHARGE BASE, ALL EXPOSED NUTS, BOLTS, AND FASTENERS SHALL BE OF 300 SERIES STAINLESS STEEL.

LIFTING CHAIN - AN ADEQUATE LENGTH OF GALVANIZED STEEL LIFTING CHAIN SHALL BE SUPPLIED FOR REMOVING THE PUMP. THE CHAIN SHALL BE OF SUFFICIENT LENGTH AND SHALL INCLUDE AN ADEQUATE NUMBER OF LIFTING STRIPS FOR EASY REMOVAL.

PUMP MODEL - PUMP SHALL BE OF THE CENTRIFUGAL TYPE EQUAL WITH AN INTEGRALLY BUILT-IN AND SUBMERSIBLE TYPE MOTOR. DISCHARGE SHALL BE STANDARD 2" NPT.

OPERATING CONDITIONS - PUMP SHALL HAVE A CAPACITY OF 50 USGPM AT 15 FOOT OF HEAD AND AS NOTED ON THE DRAWING SCHEDULES.

MOTOR - PUMP MOTOR SHALL BE OF THE TOTALLY ENCLOSED, SUBMERSIBLE, SOUUREL CAGE INDUCTION TYPE AT 1625 RPM, 60 HZ.

STATOR WINDING SHALL BE OF THE OPEN TYPE WITH CLASS B INSULATION GOOD FOR 180 DEG. C. (356 DEG. F.) MAXIMUM OPERATING TEMPERATURE. WINDING HOUSING SHALL BE FILLED WITH A CLEAN HIGH DIELECTRIC OIL THAT LUBRICATES BEARINGS AND SEALS AND TRANSFERS HEAT FROM WINDINGS AND ROTOR TO OUTER SHELL. AIR-FILLED MOTORS WHICH DO NOT HAVE THE SUPERIOR HEAT DISSIPATING CAPABILITIES OF OIL-FILLED MOTORS SHALL NOT BE CONSIDERED EQUAL.

MOTOR SHALL HAVE TWO HEAVY DUTY BALL BEARINGS TO SUPPORT PUMP SHAFT AND TAKE RADIAL AND THRUST LOADS AND A SLEEVE GUIDE BUSHING DIRECTLY ABOVE THE LOWER SEAL TO TAKE RADIAL LOAD AND ACT AS FLAME PATH FOR SEAL CHAMBER. BALL BEARINGS SHALL BE DESIGNED FOR 50,000 HOURS B-10 LIFE. STATOR SHALL BE HEAT SHRUNK INTO MOTOR HOUSING.

THE COMMON MOTOR PUMP AND PUM SHAF SHALL BE OF #416 STAINLESS STEEL THREADED TO TAKE PUMP IMPELLER.

SEALS - MOTOR SHALL BE PROTECTED BY TWO MECHANICAL SEALS MOUNTED IN TANDEM WITH A SEAL CHAMBER BETWEEN THE SEALS. SEAL CHAMBER SHALL BE OIL FILLED TO LUBRICATE SEAL FACE AND TO TRANSMIT HEAT FROM SHAFT TO OUTER SHELL. SEAL FACE SHALL BE CARBON AND CERAMIC AND ROTOR TO OUTER SHELL. A LIGHT BAND, A DOUBLE ELECTRODE SHALL BE MOUNTED IN THE SEAL CHAMBER TO DETECT ANY WATER ENTERING THE CHAMBER THROUGH THE LOWER SEAL. WATER IN THE CHAMBER SHALL CAUSE A RED LIGHT TO TURN ON AT THE CONTROL BOX. THIS SIGNAL SHALL NOT STOP MOTOR BUT SHALL ACT AS A WARNING ONLY, INDICATING SERVICE IS REQUIRED.

PUMP IMPELLER - THE PUMP IMPELLER SHALL BE OF THE RECESSED MYERS TYPE TO PROVIDE AN OPEN UNOBSTRUCTED PASSAGE THROUGH THE VOLUTE FOR THE GROUND SOLIDS. IMPELLER SHALL BE OF 85-5-5-5 BRONZE AND SHALL BE THREADED ONTO STAINLESS STEEL SHAFT. ENCLOSED OR SEMI-OPEN PUMP IMPELLERS WHICH MIGHT BECOME OBSTRUCTED DURING GRINDING OR ADD EXCESSIVE RADIAL LOADS SHALL NOT BE CONSIDERED AS EQUAL.

CORROSION PROTECTION - ALL IRON CASTINGS SHALL BE PRE-TREATED WITH PHOSPHATE AND CHROMIC RISE AND TO BE PAINTED BEFORE MACHINING AND ALL MACHINED SURFACES EXPOSED TO THE SEWAGE WATER TO BE RE-PAINTED. ALL FASTENERS TO BE 302 STAINLESS STEEL.

BEARING END CAP - UPPER MOTOR BEARING CAP SHALL BE A SEPARATE CASTING FOR EASY MOUNTING AND REPLACEMENT.

POWER CABLES - POWER CORD AND CONTROL CORD SHALL BE DOUBLE SEALED. THE POWER AND CONTROL CONDUCTOR SHALL BE SINGLE STRAND SEALED WITH EPOXY PUTTING COMPOUND AND THEN CLAMPED IN PLACE WITH RUBBER SEAL BUSHING TO SEAL OUTER JACKET AGAINST LEAKAGE AND TO PROVIDE FOR STRAIN PULL. CORDS SHALL WITHSTAND A PULL OF 300 POUNDS TO MEET U.L.C. REQUIREMENTS. INSULATION OF POWER AND CONTROL CORDS SHALL BE TYPE SOW / SOW-A. BOTH CONTROL AND POWER CORDS SHALL HAVE A GREEN CARRIER GROUND CONDUCTOR THAT ATTACHES TO MOTOR FRAME.

TESTS - THE PUMP SHALL BE TESTED FOR PROPER OPERATION AT RATED POWER SUPPLY VALVES AND FOR ELECTRICAL AND MECHANICAL INTEGRITY PRIOR TO SHIPMENT.

SYSTEM ACCESSORIES

1. MECHANICAL FLOAT SWITCHES:
 1. HIGH LEVEL ALARM
 2. PUMPS ON
 3. HIGH HIGH LEVEL C/W CABTIRE CABLES, LENGTH TO SUIT, TYPE SJOW NEOPRENE
2. C/200 BALL CHECK VALVES.
 - 2" DIA. GATE VALVES.

BASE BID: MYERS ALTERNATE: I.T.T BELL AND GOSSETT

CONTROLLER AND PANEL

1. CONTROLLER FOR PUMPS, 1 PHASE, 60 HERTZ, FOR FLOAT INPUT OPERATION COMPLETE AS FOLLOWS:
 1. INTERLOCKED MAIN DISCONNECT ON DOOR, FUSED
 2. MAGNETIC STARTERS
 3. 4" PANEL MOUNTED HIGH LEVEL ALARM
 4. PANEL MOUNTED HIGH LEVEL ALARM
 5. RUN LIGHTS FOR EACH PUMP
 6. HAND-OFF AUTO SWITCH FOR EACH PUMP
 7. RESET BUTTONS FOR PUMPS
 8. ALARM SILENCE RESET BUTTON
2. THE CONTROL SHALL BE EQUIPPED WITH A TERMINAL BOARD RELAYING ALARMS, POWER SUPPLY, PUMP WIRING AND FLOW WIRING. THE TERMINAL BOARD SHALL BE LOCATED AT THE BOTTOM OF THE PANEL. ALL WIRING SHALL BE CLEARLY IDENTIFIED AND NUMBERED.
3. ALL WIRING SHALL BE NUMBERED AND IDENTIFIED AT BOTH ENDS TO FACILITATE SERVICE AND TROUBLESHOOTING.
4. THE FLOATS SHALL BE EQUIPPED WITH INTRINSICALLY SAFE, CSA APPROVED RELAYS.
5. AN ALARM CIRCUIT SHALL BE PROVIDED WITH THE PANEL. THIS CIRCUIT WILL ENERGIZE AN ALARM BUZZER MOUNTED ON THE PANEL DOOR.
6. PROVIDE ALARM CONTACTS FOR REMOTE ANNUNCIATION OF ALARM TO THE BAS SYSTEM.

SPRINKLER SPECIFICATIONS

GENERAL REQUIREMENTS

THIS CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF ALL SECTIONS OF THE SPECIFICATIONS. ALL EQUIPMENT AND ACCESSORIES SHALL BE ULC LISTED AND FM APPROVED.

ALL SYSTEMS SHALL BE DESIGNED AND INSTALLED TO CURRENT NFPA STANDARDS. PROVIDE ALL LABOUR, MATERIALS, TOOLS, AND EQUIPMENT REQUIRED TO COMPLETE THE WORK AS SHOWN ON THE DRAWINGS AND AS CALLED FOR IN THE SPECIFICATIONS FOR THE FIRE PROTECTION SYSTEMS. OBTAIN LOCAL AUTHORITY APPROVALS.

VISIT THE SITE TO THOROUGHLY EXAMINE AND DETERMINE EXISTING CONDITIONS. NO EXTRAS WILL BE ALLOWED FOR FAILING TO DO SO.

APPROVALS SYSTEMS SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH THE PROVINCIAL BUILDING CODE, LATEST EDITIONS OF NFPA STANDARDS, REQUIREMENTS OF THE AUTHORITIES AND AS SPECIFIED HEREIN.

WHERE WORK AS DESCRIBED ON THE DRAWINGS OR IN THE SPECIFICATIONS OR RECOMMENDED STANDARDS CONFLICTS WITH THE REQUIREMENTS OF THE AUTHORITIES, THE REQUIREMENTS OF THE AUTHORITIES SHALL TAKE PRECEDENCE.

PREPARE NOT LESS THAN (6) SETS OF WORKING PLANS (SHOP DRAWINGS WITH DETAILED CALCULATIONS) AND SUBMIT DIRECTLY TO IAO AND THEN TO THE BURLINGTON FIRE DEPARTMENT FOR APPROVAL. THE FULLY APPROVED COPIES SHALL THEN BE SUBMITTED TO THE CONSULTANTS FOR REVIEW. NO WORK SHALL PROCEED ON THE SYSTEMS UNLESS THESE WORKING PLANS ARE APPROVED BY ALL OF THE AUTHORITIES AND REVIEWED BY THE CONSULTANT.

APPLY AND PAY FOR ALL PERMITS AND INSPECTIONS REQUIRED FOR FINAL ACCEPTANCE OF THE FIRE PROTECTION SYSTEMS. ALL MATERIALS, EQUIPMENT, VALVES AND DEVICES SUPPLIED AND INSTALLED UNDER THIS SECTION SHALL BE LISTED AND APPROVED FOR USE IN A FIRE PROTECTION AND INSTALLATION AND SHALL CONFORM TO THE CODES AND STANDARDS NAMED IN THE SPECIFICATION.

REFER TO UNDERWRITERS LABORATORIES - APPROVED FIRE PROTECTION EQUIPMENT LIST; ULC AND FM APPROVAL GUIDES FOR ACCEPTABLE DEVICES AND EQUIPMENT.

ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE FOLLOWING: NFPA 13 (LATEST EDITIONS), NFPA 14 AND NFPA 20. NFPA STANDARDS IN PARTICULAR, NFPA 13, NFPA 14 AND NFPA 20. CITY OF HAMILTON BUILDING AND FIRE DEPARTMENT REQUIREMENTS. ONTARIO BUILDING CODES NATIONAL FIRE CODE

WORKING PLANS FOR SPRINKLERS SHALL BE REVIEWED AND APPROVED BY IAO PRIOR TO INSTALLATION. FINAL APPROVAL OF WATER BASED FIRE PROTECTION SYSTEM SHALL BE LISTED AND APPROVED AFTER INSPECTION AND TESTING BY IAO.

CONTRACTOR QUALIFICATIONS FIRE PROTECTION SYSTEMS AS SHOWN, AND AS DESCRIBED HEREINAFTER, SHALL BE SUPPLIED AND INSTALLED BY A FULLY QUALIFIED AND RECOGNIZED FIRM REGULARLY ENGAGED IN, AND HAVING AN ESTABLISHED REPUTATION FOR THIS TYPE OF WORK. THE CONTRACTOR SHOULD BE A MEMBER IN GOOD STANDING OF THE CANADIAN AUTOMATIC SPRINKLER ASSOCIATION.

SCOPE OF WORK PROVIDE ALL LABOUR, SUPERVISION, MATERIALS, TOOLS AND EQUIPMENT REQUIRED TO COMPLETE THE WORK AS SHOWN ON THE DRAWINGS.

PREPARATION OF ENGINEERED COMBINED SPRINKLER LAYOUT SHOP DRAWINGS, HYDRAULIC CALCULATIONS AND PERFORM ALL NECESSARY WATER FLOW TESTS.

OBTAIN FIRE DEPARTMENT AND ALL LOCAL AUTHORITY APPROVALS. VISIT SITE TO DETERMINE EXISTING CONDITIONS.

CO-ORDINATION OF ALL TRADES ON SITE WITHIN THIS CONTRACT AND CO-OPERATION WITH OTHER TRADES INVOLVED WITH THE BUILDING RENOVATIONS AND ADDITIONS.