15010 GENERAL MECHANICAL PROVISIONS

1.1 CONFORMANCE

CONFORM TO TERMS AND CONDITIONS OF THE GENERAL CONTRACT DOCUMENT.

1.2 SCOPE

.1 PROVIDE COMPLETE, FULLY TESTED AND OPERATIONAL MECHANICAL SYSTEMS TO MEET THE REQUIREMENTS DESCRIBED HEREIN AND IN COMPLETE ACCORDANCE WITH APPLICABLE CODES AND ORDINANCES.

.2 CONTRACT DOCUMENTS OF THIS DIVISION AND DRAWINGS ARE DIAGRAMMATIC AND APPROXIMATELY TO SCALE UNLESS DETAILED OTHERWISE. THEY ESTABLISH SCOPE, MATERIAL AND INSTALLATION QUALITY AND ARE NOT DETAILED INSTALLATION INSTRUCTIONS.

.3 FOLLOW MANUFACTURER'S RECOMMENDED INSTALLATION DETAILS AND PROCEDURES FOR EQUIPMENT, SUPPLEMENTED BY REQUIREMENTS OF CONTRACT DOCUMENTS.

.4 INSTALL EQUIPMENT GENERALLY IN LOCATIONS AND ROUTES SHOWN CLOSE TO BUILDING STRUCTURE WITH MINIMUM INTERFERENCE WITH OTHER SERVICES OR FREE SPACE. REMOVE AND REPLACE IMPROPERLY INSTALLED EQUIPMENT TO SATISFACTION OF THE CONSULTANT AT NO EXTRA COST.

.5 THE DRAWINGS INDICATE THE GENERAL LOCATION AND ROUTE TO BE FOLLOWED BY THE PIPING AND DUCTWORK. WHERE DETAILS ARE NOT SHOWN ON THE DRAWINGS OR ONLY SHOWN DIAGRAMMATICALLY, THE PIPES AND DUCTWORK SHALL BE INSTALLED IN SUCH A WAY AS TO CONSERVE HEAD ROOM AND INTERFERE AS LITTLE AS POSSIBLE WITH THE FREE USE OF SPACE THROUGH WHICH THEY PASS. SERVICE LINES SHALL RUN PARALLEL TO BUILDING LINES. ALL DUCT AND PIPES AT CEILING SHALL BE KEPT AS TIGHT AS POSSIBLE TO BEAMS OR OTHER LIMITING MEMBERS AT HIGH END. ALL PIPES AND DUCTS SHALL BE COORDINATED IN ELEVATION TO ENSURE THAT THEY ARE CONCEALED IN THE CEILING SPACE PROVIDED UNLESS DETAILED AND DIMENSIONED OTHERWISE ON DRAWINGS AND PERMITTED OTHERWISE BY THE CONSULTANT.

.6 CONNECT TO EQUIPMENT SPECIFIED IN OTHER SECTIONS AND TO EQUIPMENT SUPPLIED AND INSTALLED BY OTHER CONTRACTORS OR BY THE OWNER. UNCRATE EQUIPMENT, MOVE IN PLACE AND INSTALL COMPLETE; START-UP AND TEST.

.7 PROVIDE SEISMIC RESTRAINTS FOR ALL EQUIPMENT, PIPING AND DUCTWORK WHEN REQUIRED BY CODE. PROVIDE CONSULTANT WITH DETAILED CONSTRUCTION SHOP DRAWINGS.

.8 FIELD VERIFY ALL BUILDING AND SITE DIMENSIONS PRIOR TO ANY FABRICATION AND INSTALLATION OF EQUIPMENT OR MATERIALS. NO ADDITIONAL CHARGE SHALL BE ENTERTAINED FOR FAILURE TO VERIFY THESE DIMENSIONS ON SITE.

.9 IDENTIFY ALL OPENING AND HOLES REQUIRED FOR THE PASSAGE OF MECHANICAL SERVICES THROUGH STRUCTURES AND DIVIDING WALLS TO THE GENERAL CONTRACTOR. SUCH IDENTIFICATION SHALL BE VIA MARKED UP DRAWINGS SHOWING OPENING LOCATIONS, SIZES, AND LEVELS. IF REQUIRED, THE CONTRACTOR IS TO CLEARLY MARK ON SITE THE INTENDED OPENINGS FOR REVIEW BY THE STRUCTURAL ENGINEER.

.10 THE WORK SHALL INCLUDE BUT NOT LIMIT TO THE FOLLOWING:
- .1 COMPLETE HEATING / VENTILATING INSTALLATION.
- .2 COMPLETE PLUMBING INSTALLATION.
- .3 COMPLETE AUTOMATIC CONTROL AND RELATED WIRING INSTALLATION.
- .4 COMMISSIONING AND BALANCING.

1.3 MATERIALS

.1 MATERIALS AND EQUIPMENT INSTALLED SHALL BE NEW, FULL WEIGHT AND OF QUALITY SPECIFIED. USE SAME BRAND OR MANUFACTURER FOR EACH SPECIFIED APPLICATION.

.2 EACH MAJOR COMPONENT OF EQUIPMENT SHALL BEAR MANUFACTURER'S NAME, ADDRESS, CATALOG AND SERIAL NUMBER.

.3 STATICALLY AND DYNAMICALLY BALANCE ROTATING EQUIPMENT FOR MINIMUM VIBRATION AND LOW OPERATING NOISE LEVEL.

1.4 CUTTING AND PATCHING

.1 PROVIDE HOLES AND SLEEVES, CUTTING AND FITTING REQUIRED FOR MECHANICAL WORK. RELOCATE IMPROPERLY LOCATED HOLES AND SLEEVES.

.2 DRILL FOR EXPANSION BOLTS, HANGER RODS, BRACKETS, AND SUPPORTS.

.3 OBTAIN WRITTEN APPROVAL FROM STRUCTURAL CONSULTANT BEFORE CUTTING OR BURNING STRUCTURAL MEMBERS. THIS WORK SHALL BE CARRIED OUT BY THE SPECIALIST TRADE ONLY.

.4 PROVIDE OPENINGS AND HOLES REQUIRED IN PRECAST MEMBERS FOR MECHANICAL WORK. CAST HOLES LARGER THAN 100MM IN DIAMETER TIGHT TO COLUMNS SHALL NOT EXCEED 200MM IN DIAMETER. CAST OR FIELD CUT HOLES SMALLER THAN 100MM.

.5 REPAIR BUILDING WHERE DAMAGED FROM EQUIPMENT INSTALLATION, IMPROPERLY LOCATED HOLES, ETC., BY THIS SECTION OF THE WORK. THIS REPAIR WORK SHALL BE CARRIED OUT BY THE SPECIALIST TRADE AT THE EXPENSE OF THIS SECTION OF WORK. USE MATCHING MATERIALS AS SPECIFIED IN THE RESPECTIVE SECTIONS.

1.5 SHOP DRAWINGS

.1 PROVIDE SHOP DRAWINGS AS INDICATED IN ACCORDANCE WITH THE MCA-BC STANDARDS FOR SHOP DRAWINGS.

.2 IDENTIFY MATERIALS AND EQUIPMENT BY MANUFACTURER, TRADE NAME AND MODEL NUMBER. INCLUDE COPIES OF APPLICABLE BROCHURE OR CATALOG MATERIAL.

.3 CLEARLY MARK SUBMITTAL MATERIAL USING ARROWS, UNDERLINING OR CIRCLING TO SHOW DIFFERENCES FROM SPECIFIED, EG. RATINGS, CAPABILITIES AND OPTIONS BEING PROPOSED. CROSS OUT NON-APPLICABLE MATERIAL. SPECIFICALLY NOTE ON THE SUBMITTAL SPECIFIED FEATURES SUCH AS SPECIAL TANK LININGS, PUMPS, SEALS, MATERIAL, OR PAINTING.

.4 INCLUDE DIMENSIONAL AND TECHNICAL DATA SUFFICIENT TO CHECK IF EQUIPMENT MEETS REQUIREMENTS. INCLUDE WIRING, PIPING, AND SERVICE CONNECTION DATA AND MOTOR SIZES.

.5 INSTALLED MATERIALS AND EQUIPMENT SHALL MEET SPECIFIED REQUIREMENTS REGARDLESS OF WHETHER OR NOT SHOP DRAWINGS ARE REVIEWED BY THE CONSULTANT.

.6 DO NOT ORDER EQUIPMENT OR MATERIAL UNTIL THE CONSULTANT HAS REVIEWED AND RETURNED APPROVED SHOP DRAWINGS.

.7 SHOP DRAWINGS SHALL BE ENDORSED BY THE GENERAL CONTRACTOR AND MECHANICAL SUB-CONTRACTOR INDICATING THAT THE SHOP DRAWINGS HAVE BEEN REVIEWED AND SUBMITTED WITHOUT QUALIFICATIONS.

.8 SUBMIT A MINIMUM OF (4) COPIES OF SHOP DRAWINGS FOR APPROVAL PRIOR TO ORDERING EQUIPMENT.

.9 SUBMIT WEIGHTS OF ALL MAJOR EQUIPMENT FOR REVIEW SUCH THAT THE LOADS CAN BE REVIEWED BY THE APPROPRIATE CONSULTANT.

.10 SUBMIT LIST OF ALL ELECTRICAL MOTORS AND POWER REQUIREMENTS TO ELECTRICAL CONSULTANT AND CONTRACTOR.

1.6 STANDARDS OF MATERIALS, EQUIPMENT AND INSTALLATION

.1 REQUESTS FOR CHANGES TO THE SPECIFICATION IN STANDARDS, MATERIALS, EQUIPMENT OR INSTALLATION TECHNIQUES SHALL BE SUBMITTED FOR REVIEW SEVEN (7) WORKING DAYS PRIOR TO CLOSE OF TENDERS, AND IF APPLICABLE WILL BE INCORPORATED IN AN ADDENDUM TO THE SPECIFICATION.

.2 EQUIPMENT USED SHALL NOT EXCEED SPACE LIMITATIONS IN ANY DIMENSION. REPLACE ANY EQUIPMENT OR APPARATUS WHICH DOES NOT MEET THIS SPECIFICATION AT NO COST. ASSUME FULL RESPONSIBILITY FOR THE EXPENSE OF REDESIGN AND ADJUSTMENT TO OTHER PARTS OF THE BUILDING WHEN PROPOSING THE USE OF APPROVED EQUAL OR ALTERNATE EQUIPMENT.

.3 SUBMIT SAMPLES, IN ADDITION TO DRAWINGS, OF ALL ITEMS WHICH IN THE CONSULTANT'S JUDGMENT, CAN BE BETTER EXAMINED FOR CAPACITY, QUALITY, FINISH OR DETAIL BY SAMPLE RATHER THAN BY DRAWINGS. SAMPLES SHALL BE SUBMITTED BEFORE EQUIPMENT IS ORDERED.

.4 PROVIDE EQUIPMENT FROM THE SPECIFIED MANUFACTURERS. ALL MECHANICAL EQUIPMENT SHALL HAVE THE APPROVED MANUFACTURERS NAME PERMANENTLY AFFIXED TO IT.

.5 EQUIPMENT ON ALTERNATE & APPROVED MANUFACTURERS LIST MUST BE EQUAL IN QUALITY AND PERFORMANCE TO THE MODEL SPECIFIED. EQUIPMENT WHICH IS NOT EQUAL WILL BE REPLACED WITH THE SPECIFIED EQUIPMENT AT NO COST TO THE OWNER.

.6 IF SHOP DRAWINGS ARE REJECTED TECHNICALLY AFTER 3 SUBMISSIONS. THE CONTRACTOR, AT NO ADDITIONAL EXPENSE TO THE OWNER, SHALL REVERT THE SPECIFIED PRODUCT AND MANUFACTURER FOR THIS PROJECT.

.7 THE EQUIPMENT MANUFACTURER SHALL ENSURE THAT THE STRENGTH AND ANCHORAGE OF THE INTERNAL COMPONENTS OF THE EQUIPMENT EXCEEDS THE FORCE LEVEL USED TO RESTRAIN AND ANCHOR THE UNIT ITSELF TO THE SUPPORTING STRUCTURE.

.8 PROVIDE THE FOLLOWING WHEN REQUIRED:

ITEM	APPROVED MANUFACTURERS
ACCESS DOORS	ACUDOR, E.H. PRICE, MAXAM, STEEL BROTHERS, MILCOR
AUTOMATIC AIR VENT	HOFFMAN, BRAUKMAN, SARCO, ARMSTRONG, MAID-O-MIST
BACKFLOW PROTECTION	WATTS, FEBCO, CLAYTON, BEECO, WILKINS
CONTROLS (ELECTRIC)	HONEYWELL, JOHNSON, RELIABLE, BARBER COLEMAN
DAMPER - LOW LEAKAGE	AMERICAN WARMING, TAMCO
DOMESTIC HOT WATER HEATER	JOHN WOOD, ELCO, STATE, A.O. SMITH, P.V.I., RUDD
DUCT SEAM SEALER	DURO DYNE S-2, ROBSON'S DUCT SEAL
DUCT SPIRAL AND FITTINGS	UNITED SHEET METAL, B.C. VENTILATING, SPIRO-LOK
EXPANSION JOINTS	FLEXONICS, HYSPAN, UNIROYAL, KEFLEX, MASON, GOODALL
FANS, CEILING MOUNTED	GREENHECK, DELHI, PENN, BROAN, COOK, NUTONE, CARNES
FAN COIL UNIT	CARRIER, TRANE, ENGAIR
FILTERS	FARR, CONTINENTAL, CAMBRIDGE, AAF
FLEXIBLE AIR DUCT	THERMOFLEX, WIREMOLD, FLEXMASTER
GRILLES, DIFFUSERS AND REGISTERS	E.H. PRICE, KRUEGER, TITUS, CARNES
INSULATION - DUCT/PIPING	FIBERGLAS, KNAUF, JOHNS-MANVILLE, ATLAS, PPG, MANSON, ARMSTRONG, ARMAFLEX
JACKETING MATERIAL	CHILDERS, FIBERGLAS, JOHNS-MANVILLE
LOUVRES	AIROLITE, PENN, WESTVENT, ALUMAVENT, RUSKIN
PIPE FITTINGS AND FLANGES	CRANE, GRINNELL, JENKINS, VICTAULIC
PIPE SUPPORTS AND HANGERS	CRANE, UNISTRUT, MYATT, LE. TAYLOR, GRINNELL, SARCO
PLUMBING DRAINAGE ACCESSORIES	SMITH, ENPOCO, ZURN, ANCON
PLUMBING TRIM (REFER TO OWNER REQUIREMENTS)	AMERICAN STANDARD, CRANE, CAMBRIDGE, KOHLER, ELJER, ALSONS, BRADLEY, POWERS, SYMMONS, MOEN, DELTA, BRASSCRAFT, T&S BRASS, EMCO, ACORN, LEONARD, BRIGGS
PLUMBING FIXTURES (ALL TO BE CSA APPROVED) (REFER TO OWNER REQUIREMENTS)	CRANE, KILL, FIAT, KOHLER, ELJER, AMERICAN STANDARD, WILLIAMS, HAWS, ARISTANEUMAN, ELKAY, AQUARIUS, JUCUZZI, SUNROC, WESTERN, SUAN, BRADLEY, SPEAKMAN, VALLEY, HYTEC, WATROUS, BRIGGS
PRESSURE GAUGES	WEISS, AMETEK, TRERICE, WINTERS
RELIEF VALVES	CROSBY, SARCO, WATTS
SOUND ATTENUATION	IAC, VIBRON, VIBRO ACOUSTICS
STRAINERS	RED & WHITE, CRANE, SARCO, ARMSTRONG, KITZ, MUELLER, PLENTY
TESTING & BALANCING AGENTS	K.D. ENGINEERING, WESTERN MECHANICAL SERVICES, WAMCO, M.D.T., H.V.A.C. BALANCING
THERMOMETERS	TRERICE, WEISS, WEKSLER, WINTERS
TOILET SEATS	BENEKE, BEMIS, OLSONITE, MOLDEX, SPERZE
VALVES - BALL	RED & WHITE, GRINNELL, WATTS, HILLS MCCANNA
VALVES - GATE & GLOBE	RED & WHITE, CRANE, JENKINS, GRINNELL, KITZ
VALVES - BUTTERFLY	CENTERLINE, KEYSTONE, GRINNELL
VALVES - BALANCING/FLOW METER	TOUR / ANDERSON, BELL & GOSSETT, ARMSTRONG
VALVES - CHECK SPRING LOADED	MISSION, MOYES & GROVES
VIBRATION CONTROL EQUIPMENT	VIBRO-ACOUSTICS, LO-REZ, VIBRON, KORFUND, MASON
WATER TREATMENT	DEARBORN, CALGON, IPAC, PACE
WATER PRESSURE REDUCING VALVES	WILKINS, SLINGER, WATTS, CLAYTON, BERMAD

1.7 PERFORMANCE VERIFICATION OF INSTALLED EQUIPMENT

.1 INSTALLED MECHANICAL EQUIPMENT WHOSE PERFORMANCE IS QUESTIONED BY THE CONSULTANT, MAY BE SUBJECT TO PERFORMANCE VERIFICATION AS SPECIFIED HEREIN.

.2 WHEN PERFORMANCE VERIFICATION IS REQUESTED, EQUIPMENT SHALL BE TESTED TO DETERMINE COMPLIANCE WITH SPECIFIED PERFORMANCE REQUIREMENTS.

.3 THE CONSULTANT WILL DETERMINE BY WHOM TESTING SHALL BE CARRIED OUT. WHEN REQUESTED, THE CONTRACTOR SHALL ARRANGE FOR SERVICES OF AN INDEPENDENT TESTING AGENCY.

.4 TESTING PROCEDURES SHALL BE APPROVED BY THE CONSULTANT.

.5 MAINTAIN BUILDING COMFORT CONDITIONS WHEN EQUIPMENT IS REMOVED FROM SERVICE FOR TESTING PURPOSES.

.6 PROMPTLY PROVIDE THE CONSULTANT WITH ALL TEST REPORTS.

.7 SHOULD TEST RESULTS REVEAL THAT ORIGINALLY INSTALLED EQUIPMENT MEETS SPECIFIED PERFORMANCE REQUIREMENTS, OWNER WILL PAY ALL COSTS RESULTING FROM PERFORMANCE VERIFICATION PROCEDURE.

.8 SHOULD TEST RESULTS REVEAL THAT EQUIPMENT DOES NOT MEET SPECIFIED PERFORMANCE REQUIREMENTS, EQUIPMENT WILL BE REJECTED AND THE FOLLOWING SHALL APPLY:
- .1 REMOVE REJECTED EQUIPMENT. REPLACE WITH EQUIPMENT WHICH MEETS REQUIREMENTS OF CONTRACT DOCUMENTS INCLUDING SPECIFIED PERFORMANCE REQUIREMENTS.
- .2 REPLACEMENT EQUIPMENT WILL BE SUBJECT TO PERFORMANCE VERIFICATION AS WELL, USING SAME TESTING PROCEDURES ON ORIGINALLY INSTALLED EQUIPMENT.
- .3 CONTRACTOR SHALL PAY ALL COSTS RESULTING FROM PERFORMANCE VERIFICATION PROCEDURE.

1.8 OPERATING AND MAINTENANCE DATA

.1 INSTRUCT THE BUILDING OPERATORS IN THE OPERATION AND PREVENTATIVE MAINTENANCE OF EACH PIECE OF EQUIPMENT AND SYSTEM SUPPLIED AND INSTALLED. COMPLETE AND TURN OVER DOCUMENTATION PRIOR TO SUBSTANTIAL PERFORMANCE.

.2 SUBMIT 2 SET O & M MANUALS IN 3-RING BINDERS, TO INCLUDE THE FOLLOWING:
- NAME OF ENGINEER AND MECHANICAL CONTRACTOR AND PHONE NUMBER.
- DESCRIPTION OF OPERATION OF ALL MECHANICAL SYSTEMS.
- SHOP DRAWING OF ALL EQUIPMENT.
- LIST OF TAGGED VALVES.
- EXTENDED WARRANTIES.
- MAINTENANCE AND OPERATION INSTRUCTIONS.
- LIST OF MANUFACTURERS SOURCE AND TRADE NAMES.
- BALANCE REPORT OF AIR & WATER SYSTEMS.
- COPY OF RECORD DRAWING.
- LIST OF INSPECTION AND TEST CERTIFICATES.

1.9 RECORD DRAWINGS

.1 SUBMIT "RECORD DRAWINGS" IDENTIFYING LOCATION OF FIRE DAMPERS, MAJOR CONTROL LINES, ACCESS DOORS, TAGGED VALVES AND ACTUAL ROOM NAMES.

.2 THE CONTRACTOR SHALL BE RESPONSIBLE FOR AND KEEP ONE SET OF WHITE PRINTS, INCLUDING REVISION DRAWINGS, IN JOB SITE OFFICE. BACKFILLING WILL NOT BE ALLOWED UNTIL UNDERGROUND SERVICE DIMENSIONS ARE MARKED ON PLANS. SET OF WHITE PRINTS SHALL BE MAINTAINED IN CONSTANT UP-TO-DATE CONDITION BY EACH TRADE (AS-BUILT CONDITIONS MARKED IN RED PENCIL). THE 1 WHITE SET OF PRINTS WILL BE PROVIDED TO THE CONTRACTOR BY THE CONSULTANT AT THE CONTRACTORS COST.

.3 THE "RECORD DRAWINGS" SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING CHANGES AND SHALL BE RECORDED DAILY.
- .1 SIZE, LOCATION, ARRANGEMENT, ROUTE AND EXTENT OF DUCTWORK, PIPING, CONDUIT, TERMINAL UNITS, EQUIPMENT, FIXTURES, CLEANOUTS, VALVES, ROUGH-IN, ETC. ABOVE AND BELOW GRADE INSIDE THE BUILDING, INCLUDING LOCATIONS OF BURIED PIPING.
- .2 SANITARY SEWERS: ALL SANITARY SEWERS. INVERT ELEVATIONS AND LOCATIONS TO BE GIVEN AT EACH CLEAN-OUT.
- .3 STORM DRAINS & SEWERS: ALL STORM DRAINS AND SEWERS. INVERT ELEVATIONS TO BE GIVEN AT EACH MANHOLE, CLEAN OUT, CHANGE OF DIRECTION, JUNCTION, AND AT EVERY 30 M RUN.
- .4 GAS LINES: ALL PIPING OF ANY SIZE. INVERT ELEVATIONS TO BE GIVEN AT EACH JUNCTION, AT ENTRY TO BUILDING, AT CHANGE OF DIRECTION, AT HIGH AND LOW POINTS.
- .5 LOCATION, TAGGING AND NUMBERING OF ALL VALVES EXCEPT INDIVIDUAL PLUMBING FIXTURES OR EQUIPMENT ISOLATION VALVES.

.4 THE AS-BUILT DAILY MARKED-UP PRINTS SHALL CONFORM TO THE STANDARDS OF THE CONTRACT DRAWINGS AND SHALL INCLUDE ALL DETAILS FROM REVISION DRAWINGS, SUPPLEMENTARY DRAWINGS, CHANGE ORDERS, ADDENDA AND SITE REVISIONS, ETC.

.5 AT THE END OF CONSTRUCTION, ALL OF THE ABOVE CHANGES SHALL BE TRANSFERRED BY THE CONSULTANT, AT THE CONTRACTORS COST, TO A SET OF "AUTOCAD" DISKS. THE CADD FILES SHALL BE USED TO PRODUCE 1-SET OF ORIGINALS TURNED OVER TO THE OWNER. THE CONTRACTOR SHALL ALLOW $100.00 / DRAWING IN SET.

1.10 PAINTING AND IDENTIFICATION

.1 CLEAN ALL EXPOSED BARE METAL SURFACES SUPPLIED BY THE MECHANICAL AND PLUMBING TRADE BY REMOVING ALL DIRT, DUST, GREASE AND MILLSCALE.

.2 REPAINT ALL MARRED FACTORY FINISHED EQUIPMENT, WHICH IS NOT SCHEDULED TO BE REPAINTED, TO MATCH THE ORIGINAL FACTORY FINISH.

.3 PIPE MARKERS AND DIRECTION ARROWS - IN ALL EXPOSED AREAS AND IN THE MECHANICAL ROOM:
- .1 PROVIDE COMMERCIALLY AVAILABLE PIPE MARKERS HAVING STANDARD SIZES OF LETTERING AND COLOURS. STANDARD COLOURS DESIGNATE CLASSES OF MATERIALS FOLLOWS, AND ARE CONSISTENT WITH THOSE SPECIFIED BY THE CSA AND THE USASI. PROVIDE MARKERS TO ALL PIPES PROVIDED UNDER THIS CONTRACT.

YELLOW	DANGEROUS MATERIALS
BLUE	PROTECTIVE MATERIALS
GREEN	SAFE MATERIALS

.2 PIPE MARKERS AND DIRECTION ARROWS SHALL BE MADE OF A VINYL FILM MATERIAL THAT BECOMES PERMANENT AFTER CURING IN PLACE FOR 24 HOURS OR A SPRAY ON STENCIL IS ACCEPTABLE.

.3 PIPE MARKERS AND DIRECTION ARROWS SHALL BE SUITABLE FOR CONTINUOUS OPERATING TEMPERATURES BETWEEN -40° AND 120°F.

.4 PIPE MARKER LETTERS ARE TO BE 50MM HIGH FOR PIPES 75MM AND LARGER OUTSIDE DIAMETER (INCLUDING INSULATION) AND NOT LESS THAN 18MM HIGH FOR SMALLER DIAMETERS.

.5 PIPE MARKER DIRECTION ARROWS ARE TO BE 150MM LONG BY 50MM WIDE FOR PIPES 75MM AND LARGER OUTSIDE DIAMETERS (INCLUDING INSULATION) AND 100MM LONG BY 18MM WIDE FOR SMALLER DIAMETERS. MINI-MARKERS ARE TO BE USED FOR VERY SMALL DIAMETER PIPES.

.6 LOCATION OF PIPE MARKERS AND DIRECTION ARROWS
- .1 PIPE MARKER AND DIRECTION ARROW SHALL BE PLACED SIDE BY SIDE IN THE BOTTOM QUARTER OF THE PIPE TO BE IDENTIFIED.
- .2 ADJACENT TO ALL MAJOR CHANGES IN DIRECTION AND AT CONNECTIONS TO EACH PIECE OF EQUIPMENT.
- .3 AT LEAST ONCE IN EACH ROOM THAT THE PIPE PASSES THROUGH.
- .4 WHERE PIPING PASSES THROUGH WALLS, PARTITIONS, OR FLOORS, IDENTIFY PIPING ON BOTH SIDES OF THE SECTION AND AT ENTRY AND EXITS TO SHAFTS.

.7 CEILING ACCESS PANEL IDENTIFICATION THE LOCATION OF TERMINAL UNITS, VALVES, ETC. ABOVE CEILING PANELS SHALL HAVE THEIR LOCATION IDENTIFIED BY MEANS OF A COLOURED TACK OR DATA DOT.

.8 DUCT ACCESS PANEL IDENTIFICATION IDENTIFY THE FUNCTION OF DUCT ACCESS PANELS BY THE FOLLOWING SCHEDULE:

SYMBOL	
CLEANING & SERVICE ACCESS	C.A.
CONTROLS (INCLUDING SENSORS)	C
DAMPERS (BACKDRAFT, BALANCE & CONTROL)	D
FIRE DAMPERS	D
SMOKE DAMPERS	D

.9 VALVE TAGS
- .1 ALL VALVES, EXCEPT CONVECTOR HAND VALVES AND INDIVIDUAL PLUMBING FIXTURE STOP VALVES, SHALL BE PROVIDED WITH 50MM X 30MM BRASS TAGS WITH STAMPED NUMBERS, SECURED BY CHAINS TO THE VALVE CONCERNED. NUMBERS SHALL BE PREFIXED BY THE LETTER "P" OR THE LETTER "H" INDICATING THAT THE VALVE IS ON PLUMBING OR HEATING SERVICE.
- .2 EACH TRADE SHALL PREPARE A LIST DETAILING THE VALVES, LOCATION, NORMAL POSITION, AND PURPOSE SERVED. THE LIST SHALL BE INCLUDED IN THE MAINTENANCE MANUAL.

1.11 TEMPORARY HEATING

.1 DO NOT USE THE PERMANENT SYSTEM FOR TEMPORARY HEATING OR OTHER PURPOSES WITHOUT WRITTEN PERMISSION FROM THE OWNER AND/OR CONSULTANT.

.2 ALL EQUIPMENT USED SHALL BE RETURNED TO NEW CONDITION AND WARRANTIES EXTENDED.

1.12 EQUIPMENT PROTECTION AND CLEAN-UP

.1 PROTECT EQUIPMENT AND MATERIAL IN STORAGE ON SITE AND AFTER INSTALLATION UNTIL FINAL ACCEPTANCE. LEAVE FACTORY COVERS IN PLACE. TAKE SPECIAL PRECAUTIONS TO PREVENT ENTRY OF FOREIGN MATERIAL INTO WORKING PARTS OF PIPING AND DUCT SYSTEMS.

.2 THOROUGHLY CLEAN PIPING, DUCTS AND EQUIPMENT OF DIRT, CUTTINGS, AND OTHER FOREIGN MATERIAL.

.3 PROTECT BEARINGS AND SHAFTS DURING INSTALLATION. GREASE SHAFTS AND SHEAVES TO PREVENT CORROSION. SUPPLY AND INSTALL NECESSARY EXTENDED NIPPLES FOR LUBRICATION PURPOSES.

.4 ENSURE THAT EXISTING EQUIPMENT IS CAREFULLY DISMANTLED AND NOT DAMAGED OR LOST. DO NOT REUSE EXISTING MATERIALS AND EQUIPMENT UNLESS SPECIFICALLY INDICATED.

1.13 SITE UTILITY SERVICES

.1 CO-ORDINATE AND MAINTAIN LIAISON WITH THE OWNER AND/OR CONSULTANT TO INTERRUPT, RE-ROUTE OR CONNECT TO WATER, SEWER, STORM, HEATING OR GAS SYSTEMS, WITH MINIMUM INTERRUPTION OF SERVICE. CONTACT RESPECTIVE UTILITY COMPANIES PRIOR TO STARTING WORK.

.2 BURY OUTSIDE WATER AND DRAINAGE PIPE MINIMUM 1.0 METRES OR AS SHOWN ON THE DRAWINGS.

.3 PROVIDE NEW SANITARY SEWER SERVICES. BEFORE COMMENCING WORK CHECK INVERT ELEVATIONS REQUIRED FOR SEWER CONNECTIONS, CONFIRM INVERTS AND ENSURE THAT THESE CAN BE PROPERLY CONNECTED WITH SUFFICIENT SLOPE FOR DRAINAGE AND ADEQUATE COVER TO AVOID FREEZING.

.4 PROVIDE NEW WATER SERVICE CONNECTIONS COMPLETE WITH VALVES, WATER METER AND BY-PASS VALVES. PROVIDE NECESSARY REINFORCED CONCRETE THRUST BLOCKS ON UNDERGROUND WATER PIPING AS REQUIRED. PROVIDE SLEEVE IN WALL OR FLOOR FOR SERVICE MAIN AND ADEQUATELY SUPPORT AT WALL OR FLOOR WITH REINFORCED CONCRETE BRIDGE. CAULK ENLARGED SLEEVE AND MAKE WATERTIGHT WITH PLIABLE MATERIAL. SECURELY ANCHOR SERVICE MAIN INSIDE TO CONCRETE WALL. (PROVIDE 12 MM GALVANIZED SHEET METAL SLEEVE AROUND SERVICE MAIN TO 150 MM ABOVE FLOOR AND 1.8 M MINIMUM BELOW GRADE. SIZE FOR MINIMUM OF 50 MM LOOSE FILL INSULATION.)

.5 PROVIDE NEW GAS SERVICE COMPLETE WITH GAS METERS AND REGULATORS. PROVIDE REGULATORS ON EACH LINE SERVICING GRAVITY TYPE APPLIANCE, SIZE IN ACCORDANCE WITH EQUIPMENT. (THESE REGULATORS ARE IN ADDITION TO NORMAL CONTROLS.)

1.14 ELECTRICAL MOTORS

.1 PROVIDE MOTORS TO CEMA AND C.S.A. STANDARDS FOR HARD, CONTINUOUS SERVICE, DESIGNED TO LIMIT TEMPERATURE RISE TO 40C FOR OPEN HOUSING AND 50C FOR DRIP PROOF HOUSING, AND OPERATE 1200 OR 1800 RPM, UNLESS OTHERWISE SPECIFIED. DO NOT USE AIR OVER RATINGS.

.2 MOTORS SHALL HAVE BALL OR ROLLER TYPE BEARINGS WITH GREASE LUBRICATION FITTINGS.

.3 ALL BELT-DRIVEN DEVICES SHALL HAVE THE MOTORS MOUNTED ON ADJUSTABLE BASES WITH ADJUSTING SCREWS SO THAT PROPER BELT TENSION CAN BE OBTAINED.

.4 WHERE EQUIPMENT HAS BEEN SPECIFIED IN DIVISION 15 TO BE COMPLETE WITH STARTERS, DISCONNECTS AND/OR CONTROL PANELS, THIS CONTRACTOR SHALL PROVIDE ANY REQUIRED WIRING AND CONDUIT BETWEEN THE EQUIPMENT AND THE ABOVE ITEMS.

.5 MOTORS OF 15 KW AND GREATER SHALL HAVE CAPACITOR AND THERMISTOR OVER HEAT PROTECTION. MOTOR NOISE CRITERIA SHALL NOT EXCEED NC-60.

1.15 EXCAVATION AND BACKFILLING

.1 PROVIDE ANY EXCAVATIONS NECESSARY FOR THE INSTALLATION OF THE MECHANICAL WORK. NO CUTTING, BORING OR EXCAVATING NECESSARY FOR THIS WORK IN OR ABOUT THE BUILDING WHICH MAY CAUSE INTERFERENCE WITH THE PROGRESS OF THE WORK OR WEAKEN THE STRUCTURE IN ANY WAY, SHALL BE UNDERTAKEN WITHOUT THE APPROVAL OF THE CONSULTANT BEFORE COMMENCING WORK. TRENCHES OR TUNNELS FOR ALL UNDERGROUND PIPING SHALL BE EXCAVATED TO A DEPTH SLIGHTLY MORE THAN REQUIRED AND GRADED SO AS TO SECURE ALL AVAILABLE FALL. SUPPORT EACH LENGTH OF PIPE WITH CONCRETE BLOCKS AND BRICKS, OR BACKFILL THE TRENCH WITH GRAVEL TO THE REQUIRED DEPTH AND GRADE. SANITARY AND STORM LINES OUTSIDE OF THE BUILDING SHALL BE KEPT AS DEEP AS PRACTICAL. SEE SECTION 02200 FOR EXCAVATION REQUIREMENTS.

.2 BACKFILLING IN ALL TRENCHES SHALL BE WITH SAND OR PEA GRAVEL WHERE APPROVED, 150 MM BELOW PIPE AND UP TO 150 MM OVER TOP OF PIPING, THEN FLUSHED WITH WATER SO AS TO ENSURE THE TOTAL LENGTH OF EACH PIPE IS RESTING ON SOLID FOOTING. REMAINDER OF ALL TRENCHES SHALL BE FILLED BY THE GENERAL CONTRACTOR. SEE SECTION 02200 FOR BACKFILLING REQUIREMENTS.

.3 WHERE SEWER, WATER OR STORM PIPES PASS UNDER A GRADE BEAM OR FOOTING THE TRENCH AROUND THE PIPING UP TO AND IN CONTACT WITH THE FOOTING, PROVIDE A 450 KG CONCRETE GROUTING SO AS TO SEAL THE OUTSIDE TRENCHING FROM NORMAL STORM RUNOFF AND BACKFLOW OF RAIN WATER THROUGH THE TRENCHING AND INTO THE CRAWL SPACE AND/OR UNDER THE BASEMENT FLOOR.

.4 WHERE SEWER, WATER OR STORM PIPES PASS THROUGH EXTERIOR WALLS BELOW GRADE, THE GENERAL CONTRACTOR SHALL INSTALL CORBELS ON THE EXTERIOR WALLS AND RUN BRIDGING FROM CORBEL TO UNDISTURBED SOIL FOR THE SUPPORT OF THE PIPES. ONE INCH THICK WATERPROOF MASTIC SHALL BE APPLIED AROUND THE PIPES WHICH PASS THROUGH THE WALL.

.5 REPAIR CONCRETE WALLS, PAVEMENT, WALKS, LOUVRES, ETC, WHERE THESE HAVE BEEN DAMAGED BY THE MECHANICAL CONTRACTOR.

1.16 ACCESS DOORS AND PANELS

.1 PROVIDE ACCESS PANELS REQUIRED IN BUILDING CONSTRUCTION INCLUDING IN ARCHITECTURAL WALLS AND CEILINGS FOR ACCESS TO ANY CONCEALED MECHANICAL EQUIPMENT WHICH, IN THE CONSULTANT'S OPINION, REQUIRES MAINTENANCE OR ADJUSTMENT. ACCESS PANEL SHALL MATCH WALL/ CEILING FINISH. OBTAIN APPROVAL FROM ARCHITECT PRIOR TO INSTALLATION.

.2 SUCH PANELS SHALL BE MANUFACTURED PANELS, WITH FASTENING DEVICES, APPROPRIATE TO THE CONSTRUCTION INVOLVED, PROVIDE ACCESS PANEL (12"X 12" FOR HAND ACCESS, OTHERWISE 18"X 18" MIN.) IN WALL / CEILING TO ALL MECHANICAL SYSTEM (SUCH AS VALVE, DAMPER) REQUIRING ACCESS. DRY WALL SURFACE: MILCOR STYLE DW FLUSH PANEL ACCESS DOOR; MASONRY TILE SURFACE: MILCOR STYLE M; PLASTERED WALL: MILCOR STYLE K.

1.17 ACCESS OF EQUIPMENT

.1 MAKE ALL ARRANGEMENTS TO ENSURE THAT ADEQUATE ACCESS IS AVAILABLE FOR ALL MECHANICAL EQUIPMENT. DO ALL HOISTING AND RIGGING INTO PLACE OF ALL SPECIFIED EQUIPMENT AND BE RESPONSIBLE FOR ANY DAMAGES INCURRED THERE FROM.

.2 CONTRACTOR TO DEMONSTRATE REASONABLE ACCESS TO ALL EQUIPMENT SERVICE LOCATIONS.

1.18 LIABILITY

.1 ASSUME FULL RESPONSIBILITY FOR LAYING OUT THE WORK AND FOR ANY DAMAGE CAUSED TO THE OWNER OR OTHER TRADES BY IMPROPER LOCATION, OR CARRYING OUT OF THE WORK.

.2 BE RESPONSIBLE FOR PROMPT INSTALLATION OF HIS WORK IN ADVANCE OF CONCRETE POURING OR SIMILAR WORK. PROVIDE AND SET SLEEVES WHERE REQUIRED. SHOULD ANY CUTTING OR REPAIRING OF EITHER UNFINISHED OR FINISHED WORK BE REQUIRED, THIS CONTRACTOR SHALL DIRECT THE PARTICULAR SUB-CONTRACTOR WHOSE WORK IS INVOLVED TO DO SUCH CUTTING AND REPAIRING WITHOUT EXPENSE TO THE OWNER BEFORE BEING UNDERTAKEN, SUCH WORK SHALL BE LAID OUT FOR THE CONSULTANT'S REVIEW.

.3 EXAMINE THE SITE AND THE LOCAL CONDITIONS AFFECTING WORK UNDER THIS CONTRACT. EXAMINE CAREFULLY THE MECHANICAL, ELECTRICAL, STRUCTURAL AND ARCHITECTURAL DRAWINGS AND CONFIRM THAT THE WORK UNDER THIS CONTRACT CAN BE SATISFACTORILY CARRIED OUT WITHOUT CHANGES TO THE BUILDING AS SHOWN ON THESE PLANS BEFORE COMMENCING THE WORK. EXAMINE THE WORK OF THE OTHER TRADES AND REPORT AT ONCE ANY DEFECT OF INTERFERENCE AFFECTING THE WORK OF THIS SECTION, OF THE GUARANTEE OF SAME. NO EXTRAS WILL BE SUBSEQUENTLY ALLOWED TO COVER ANY SUCH ERROR, OMISSION OR OVERSIGHT ON THE THOROUGH INSPECTION OF THE GROUNDS, BUILDING, CONDITIONS, ETC.

.4 ARRANGE WORK IN CO-OPERATION WITH OTHER TRADES IN THE BUILDING IN SUCH A MANNER AS NOT TO INTERFERE WITH OTHER WORK BEING CARRIED ON IN THE BUILDING AND PLACES WHERE OTHER PIPES AND EQUIPMENT BE INSTALLED ALONG WITH THE PIPES AND DUCTS PERTAINING TO THIS TRADE. CO-OPERATE WITH THE OTHER TRADES TO GET ALL THE PIPES, DUCTS, CONDUIT, ETC., INSTALLED TO THE BEST ADVANTAGE. WHEN OPEN WEB STRUCTURAL JOISTS ARE USED, MUST OBTAIN STRUCTURAL SHOP DRAWINGS TO ENSURE SPACE AVAILABLE FOR INSTALLATION OF PIPES AND DUCTWORK.

.5 WHERE ANY PIPES, DUCTS AND EQUIPMENT MUST BE BUILT INTO THE WORK OF OTHER TRADES SUCH AS MASONRY, STRUCTURAL, OR PLASTERING, BE RESPONSIBLE FOR SUPPLYING THE EQUIPMENT TO BE BUILT IN OR MEASUREMENTS TO ALLOW THE NECESSARY OPENINGS TO BE LEFT. ALL PIPES AND DUCTS WHICH ARE TO BE CONCEALED SHALL BE INSTALLED NEATLY AND CLOSELY TO THE BUILDING STRUCTURE SO THAT THE NECESSARY FURRING CAN BE KEPT AS SMALL AS POSSIBLE. ANY PIPES, DUCTS, OR OTHER WORK WHICH ARE NOT, IN THE OPINION OF THE CONSULTANT, INSTALLED AS THEY SHOULD BE, SHALL BE TAKEN OUT AND REPLACED WITHOUT COST TO THE OWNER.

.6 PROTECT FINISHED AND UNFINISHED WORK FROM DAMAGE DUE TO THE CARRYING OUT OF HIS WORK, GIVING SPECIAL ATTENTION TO THE PROTECTION OF BUILDING VAPOUR BARRIERS, WATERPROOF MEMBRANES, ETC. COVER FLOORS AND OTHER PARTS OF THE BUILDING WITH TARPAULINS, ETC. AND REPAIR ALL DAMAGE TO THE SATISFACTION OF THE OWNER AND THE CONSULTANT. DURING FREEZING WEATHER, PROTECT ALL HIS MATERIALS IN SUCH A MANNER THAT NO HARM CAN BE DONE TO THE INSTALLATION ALREADY MADE AND/OR TO MATERIALS AND EQUIPMENT ON THE JOB.

.7 BE RESPONSIBLE FOR THE CONDITION OF ALL MATERIALS AND EQUIPMENT SUPPLIED AND SHALL PROVIDE ALL NECESSARY PROTECTION FOR SAME.

.8 BE RESPONSIBLE FOR THE PROTECTION AND MAINTENANCE OF THE WORK OF THIS SECTION UNTIL THE BUILDING HAS BEEN COMPLETED AND ACCEPTED BY THE OWNER, AND BE RESPONSIBLE FOR THE SORTING OF HIS MATERIAL INSIDE AND OUT OF THE WAY, AND TO CLEAN UP ALL REFUSE CAUSED BY HIS WORK TO MEET CONSULTANT'S REVIEW.

.9 ON COMPLETION OF THE WORK, ALL TOOLS AND SURPLUS AND WASTE MATERIALS SHALL BE REMOVED AND THE WORK LEFT IN A CLEAN AND PERFECT CONDITION.

1.19 LIABILITY INSURANCE

.1 THIS CONTRACTOR SHALL MAINTAIN SUCH INSURANCE AS WILL FULLY PROTECT BOTH THE OWNER AND HIMSELF FROM ANY AND ALL CLAIMS, ALL AS NOTED WITHIN THE GENERAL CONDITIONS AND SUPPLEMENTARY GENERAL CONDITIONS. WHEN REQUESTED THE CONTRACTOR SHALL PROVIDE AND SHOW PROOF OF, AT HIS EXPENSE, COMPREHENSIVE GENERAL LIABILITY INSURANCE OF NOT LESS THAN $2,000,000.00 INCLUDING NON-OWNED CAR COVERAGE, CONTRACTUAL LIABILITY AND CONTAINING A CROSS LIABILITY CLAUSE. COVERAGE SHALL INCLUDE LOSS OR DAMAGE THE CONTRACTOR MAY CAUSE TO ANY WORK, BUILDING, EQUIPMENT, STRUCTURAL, ON THE OWNER'S PROPERTY. THE INSURANCE MAY CONTAIN A DEDUCTIBLE CLAUSE NOT TO EXCEED $500.00.

.2 THE CONTRACTOR SHALL CARRY FULL EMPLOYEE'S LIABILITY INSURANCE FOR THE WHOLE OF THE WORK IN ACCORDANCE WITH THE WORKERS' COMPENSATION ACT.

1.20 GUARANTEE WARRANTY

.1 THIS CONTRACTOR SHALL FURNISH A WRITTEN WARRANTY STATING THAT ALL WORK EXECUTED UNDER THIS DIVISION WILL BE FREE FROM DEFECTS OF MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF SUBSTANTIAL PERFORMANCE, WHICH SHALL INCLUDE ONE (1) COMPLETE SUMMER AND ONE (1) COMPLETE WINTER OF UNINTERRUPTED OPERATION. WARRANTY SHALL INCLUDE ANY PART OF EQUIPMENT, UNITS OR STRUCTURES FURNISHED HEREUNDER THAT SHOW DEFECTS IN THE WORKS UNDER NORMAL OPERATING CONDITIONS AND/OR FOR THE PURPOSE OF WHICH THEY WERE INTENDED.

.2 THE CONTRACTOR SHALL AT HIS OWN EXPENSE PROMPTLY INVESTIGATE ANY MECHANICAL OR CONTROL MALFUNCTION, AND REPAIR OR REPLACE ALL SUCH DEFECTIVE WORK, AND ALL OTHER DAMAGES THEREBY WHICH BECOMES DEFECTIVE DURING THE TIME OF THE GUARANTY-WARRANTY.

1.21 HOISTS AND SCAFFOLDS

.1 PROVIDE INTERIOR MOVABLE OR ROLLER SCAFFOLDS FOR THE INSTALLATION OF THE MECHANICAL WORK. ALL OTHER HOISTS, SCAFFOLDS, TEMPORARY ELEVATORS, LADDERS, RUNWAYS, ETC, SHALL BE REQUESTED BY THIS CONTRACTOR AND ARRANGED WITH THE GENERAL CONTRACTOR.

1.22 PIPE CHASES AND DUCT SHAFTS

.1 UNLESS OTHERWISE INDICATED, CONCEAL PIPING AND DUCTWORK IN THE CONSTRUCTION OF THE WALLS AND CEILINGS, AND IN PIPE CHASES, DUCT SHAFTS AND FURRING. IF IT IS NECESSARY, MOVE THE LOCATION OF PIPES AND DUCTS FROM THOSE INDICATED AND PROVIDED. CONSULT THE CONSULTANT FOR REVIEW BEFORE INSTALLATION OF THIS WORK.

1.23 INSPECTION

.1 THE CONSULTANT OR HIS REPRESENTATIVE MAY CHOOSE TO INSPECT ALL WORK PRIOR TO IT BEING CONCEALED.

.2 THE CONTRACTOR SHALL NOTIFY THE CONSULTANT IN WRITING FOR THE FOLLOWING MINIMUM BUT NOT LIMITED TO, INSPECTIONS: (REQUIRED TO PROVIDE A SCHEDULE 'C' FOR OCCUPANCY)
- .1 BELOW GRADE PIPING PRIOR TO BACKFILL.
- .2 ALL HVAC AND PLUMBING ROUGH-IN PRIOR TO WALL AND CEILING FINISH INSTALLATION.
- .3 FIRE STOPPING OF ALL OPENINGS.
- .4 PRE-OCCUPANCY INSPECTION.
- .5 FINAL OCCUPANCY INSPECTION AND VERIFICATION OF ALL EQUIPMENT BEING FULLY OPERATIONAL.

.3 ALL WORK SHALL BE APPROVED BY ANY OTHER REGULATORY BODY HAVING JURISDICTION WHERE REQUIRED.

.4 THE CONTRACTOR IS TO PROVIDE COPIES OF ALL PERMITS, INSPECTION REPORTS AND CERTIFICATES FOR INSERTION INTO THE MAINTENANCE MANUAL.

.5 THE CONTRACTOR IS TO PROVIDE THE CONSULTANT REASONABLE NOTICE PRIOR TO CALLING AN INSPECTION.

.6 AFTER THE PRE-OCCUPANCY INSPECTION FOR SUBSTANTIAL PERFORMANCE ALL DEFICIENCIES SHALL BE COMPLETED FOR THE FINAL INSPECTION. THE CONTRACTOR WILL BE PERMITTED ONE ADDITIONAL FINAL INSPECTION TO FINISH ALL REMAINING DEFICIENCIES. ANY ADDITIONAL INSPECTIONS AFTER FINAL OCCUPANCY WILL BE AT THE CONTRACTORS COST AND PAID TO THE CONSULTANT, IN ADVANCE, AT $150.00 PER SITE VISIT.

1.24 SUBSTANTIAL PERFORMANCE INSPECTION

.1 PRIOR TO THE CONTRACTOR REQUESTING AN INSPECTION FOR SUBSTANTIAL PERFORMANCE ALL THE FOLLOWING ITEMS MUST BE PROVIDED TO PERMIT BENEFICIAL USE BY THE OWNER
- .1 COMPLY WITH REQUIREMENTS IN GENERAL CONTRACT CONDITIONS.
- .2 MAINTENANCE AND OPERATING MANUALS TO BE SUBMITTED.
- .3 AS-BUILT DRAWINGS SUBMITTED.
- .4 BALANCING REPORTS (AIR AND WATER) IF REQUIRED.
- .5 ALL SYSTEMS SHALL BE CERTIFIED IN WRITING BY THE CONTRACTOR AS COMPLETE AND FULLY OPERATIONAL.
- .6 INSTRUCTIONS TO THE OWNER'S OPERATING PERSONNEL SHALL BE PROVIDED IN ACCORDANCE WITH THE SPECIFICATIONS.
- .7 A COMPLETE LIST OF ITEMS WHICH THE CONTRACTOR HAS NOT FINISHED, OR ARE DEFICIENT SHALL BE PROVIDED. IF, IN THE OPINION OF THE CONSULTANT, THIS LIST INDICATES THE PROJECT IS EXCESSIVELY INCOMPLETE, A SUBSTANTIAL COMPLETION INSPECTION WILL NOT BE PERFORMED.
- .8 THE CONTRACTOR SHALL BE FULLY RESPONSIBLE TO ACCUMULATE ALL NECESSARY DATA FROM HIS SUB-TRADES AND SUPPLIERS AND PRESENT SAME IN THE SPECIFIED FORMAT FOR THE APPROVAL BY THE CONSULTANT.
- .9 ALL LIFE/SAFETY ITEMS SUCH AS FIRE STOPPING, FIRE DAMPERS, PLUMBING AND VENTILATION FIXTURES AND VENTILATION MUST BE OPERATIONAL.

1.25 LAWS, NOTICES, PERMITS AND FEES

.1 GIVE ALL NECESSARY NOTICES, OBTAIN ALL NECESSARY PERMITS AND PAY ALL FEES IN ORDER THAT THE WORK SPECIFIED MAY BE CARRIED OUT, AND FURNISH ANY CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH THE LAW AND REGULATIONS OF ALL AUTHORITIES HAVING JURISDICTION.

.2 ALL WORK SHALL BE IN ACCORDANCE WITH THE REGULATIONS OF THE FOLLOWING AUTHORITATIVE BODIES, THE CODES IN EFFECT AT THE TIME OF TENDER, AND ANY OTHERS HAVING JURISDICTION:
- .1 FIRE MARSHALL
- .2 CANADIAN ELECTRICAL CODE
- .3 B.C. BUILDING CODE AND LOCAL BUILDING BY-LAWS
- .4 WORKER'S COMPENSATION BOARD
- .5 CANADIAN STANDARDS ASSOCIATION
- .6 POLLUTION CONTROL BOARD
- .7 B.C. GAS CODE
- .8 CANADIAN GAS CODE B-149.1
- .9 B.C. PLUMBING CODE
- .10 NATIONAL BUILDING CODE OF CANADA
- .11 B.C. BOILER AND PRESSURE VESSEL ACT.
- .12 NATIONAL FIRE PROTECTION ASSOCIATION
- .14 UNDERWRITERS' LABORATORIES OF CANADA

1.26 DEMONSTRATION AND INSTRUCTION TO OWNER

.1 DEMONSTRATE TO AND INSTRUCT THE REPRESENTATIVE DESIGNATED BY THE OWNER ON THE COMPLETE MECHANICAL SYSTEMS OPERATING AND MAINTENANCE PROCEDURES USING THE ASSISTANCE OF

15090 SUPPORT, ANCHORS & SEALS

.1 PROVIDE ALL NECESSARY SUPPORTS, AND HANGERS TO SECURE MECHANICAL SYSTEMS AND EQUIPMENT.

.2 PROVIDE FIRESTOPPING AT ALL DUCT AND PIPING PENETRATIONS THROUGH RATED FLOORS/WALLS AND SHAFTS.

.3 PROVIDE OVERSIZE HANGERS ON ALL COLD PIPES TO FIT OVER PIPE INSULATION WHERE REQUIRED.

.4 PROVIDE ISOLATION AND PREVENT CONTACT WITH DISSIMILAR METALS.

.5 ALL SLEEVES FOR MECHANICAL PIPING TO EXTEND 1" ABOVE THE FLOOR IN ALL MECHANICAL ROOM, SHAFT AND WET AREAS.

.6 ALL DUCTWORK TO BE SUPPORTED AS PER SMACNA.

.7 ALL EXPOSED PIPING PENETRATIONS SHALL BE PROVIDED WITH ESCUTCHEONS.

15100 VALVES

.1 SCOPE
- .1 PROVIDE VALVES FOR DOMESTIC WATER SYSTEMS.
- .2 PROVIDE GATE, GLOBE, BALL, BUTTERFLY, DRAIN AND CHECK VALVES.
- .3 PROVIDE ALL NECESSARY VALVES SUITABLE FOR THE FLUID AND PIPING SYSTEM.
- .4 ALL VALVES MUST BE SUITABLE FOR A WORKING PRESSURE 1380 KPA AT 121%.

.2 INSTALL ALL VALVES IN UPRIGHT OR HORIZONTAL POSITION.

.3 PROVIDE DRAIN VALVES AT ALL LOW POINTS IN THE PIPING SYSTEM.

.4 PROVIDE ISOLATION VALVE AT EACH PLUMBING FIXTURE.

.5 VALVES PERMITTED:

DOMESTIC HOT & COLD	& 2" DIAMETER	2" DIAMETER &
	GATE, BALL	GATE, BALL, BUTTERFLY

.6 VALVES UP TO 2" DIAMETER CAN BE SWEATED OR SCREWED CONNECTION. VALVES LARGER THAN 2" DIAMETER MUST BE SCREWED, FLANGED OR MECHANICALLY COUPLED TO PIPING SYSTEM.

DATE	REVISIONS

	DATE	ISSUED
1.	NOV. 2 2010	ISSUED FOR BLDG PERMIT
2.	NOV. 29 2011	ISSUED FOR CONSTRUCTION

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PROJECT :
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DRAWING TITLE :
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