

MECHANICAL SPECIFICATIONS

GENERAL CONDITIONS

1. SCOPE OF WORK

THE CONTRACTOR SHALL INCLUDE ALL LABOR, MATERIALS, EQUIPMENT AND ASSOCIATED SERVICES NECESSARY FOR THE INSTALLATION OF COMPLETELY FINISHED, TESTED, BALANCED AND PROPERLY OPERATING MECHANICAL SYSTEMS AS SPECIFIED HEREAFTER AND SHOWN ON THE DRAWINGS. THE INTENTION IS TO PROVIDE FOR FINISHED WORK COMPLETE IN ALL ESSENTIALS AS CALLED FOR BY THE DOCUMENTS AND ACCEPTED GOOD PRACTICE. THE WORK SHALL INCLUDE THE FOLLOWING:

- THIS WORK INCLUDES THE SUPPLY OF ALL SERVICES, LABOUR, MATERIALS AND EQUIPMENT NECESSARY TO COMPLETE THE WORK AS PER DRAWINGS AND SPECIFICATIONS.
- PROVIDE ALL NATURAL GAS PIPING, REGULATORS, VALVES AND ACCESSORIES FOR COMPLETE INSTALLATION; INSTALLATION TO BE IN ACCORDANCE WITH:
 - 1. B149.1-05 NATURAL GAS AND PROPANE INSTALLATION CODE
 - 2. ENBRIDGE GAS NEW BRUNSWICK - TECHNICAL BULLETINS.
- PROVIDE ALL MISCELLANEOUS ARCHITECTURAL AND ELECTRICAL MODIFICATIONS.

- ALL WORK TO BE AS INDICATED ON DRAWINGS. THE WORK INCLUDES THE FOLLOWING:

1. REMOVAL OF EXISTING WATER HEATER AND SYSTEM MADE REDUNDANT BY THIS CONTRACT

2. SUPPLY AND INSTALL:
- THREE (3) NEW BOILERS
 - ONE (1) DOMESTIC WATER STORAGE TANKS
 - NEW PUMPS AND HYDRONIC ACCESSORIES.
 - PIPING, VALVES, FITTINGS AND INSULATION OF COMPLETE SYSTEM.
 - NATURAL GAS PIPING AND VENTING.
 - HEAT EXCHANGERS.
 - ELECTRICAL AND CONTROL WIRING.
 - VENTING.
 - ALL SYSTEMS IDENTIFIED ON PLANS AND SPECIFICATIONS.

3. WHEREVER POSSIBLE ALL EXISTING ABANDONED DEVICES AND WIRING SHALL BE REMOVED AND ALL OPENINGS COVERED, PATCHED AND PAINTED.

4. THE WORK WILL INCLUDE ALL NECESSARY PROVISION OF ELECTRICAL POWER CONNECTIONS TO NEW EQUIPMENT WHERE REQUIRED. THE CONTRACTOR SHALL OBTAIN POWER AS APPROVED BY ENGINEER.

5. IT IS INTENDED THAT THE MECHANICAL CONTRACTOR ACT AS THE GENERAL CONTRACTOR ON THIS PROJECT AND ENGAGE THE SERVICES OF ALL REQUIRED SUB-CONTRACTORS FOR OTHER TRADES INCLUDING ELECTRICAL, AND CONTROLS WHERE REQUIRED.

6. THE WORK WILL REQUIRE STRICT SCHEDULING AND COORDINATION OF ALL WORKS WITH BUILDING MANAGEMENT AND RESIDENTS TO MINIMIZE DISRUPTION. ALL WORK SCHEDULING MUST BE COORDINATED AND APPROVED PRIOR TO COMMENCEMENT.

7. THE CONTRACTOR SHALL SCHEDULE TO PERFORM ALL SUB-TRADE WORK AT THE SAME TIME TO MINIMIZE DISRUPTION.

8. COORDINATE HOOK UP TO NATURAL GAS SERVICE WITH UTILITY.

9. PROVIDE NEW PUMPS AND HEAT EXCHANGERS AS INDICATED ON PLANS AND SPECIFICATIONS.

10. PROVIDE ALL CUTTING/PATCHING, REPAIR UPON COMPLETION.

11. PROVIDE ALL NECESSARY FIRE PROOFING.

2. PERMIT AND BY-LAW

THE CONTRACTOR SHALL ABIDE BY ALL CODES AND BY-LAWS RELATING TO THIS INSTALLATION. PROVIDE NECESSARY NOTICES, OBTAIN PERMITS AND PAY ALL FEES. IN ORDER THAT WORK SPECIFIED MAY BE CARRIED OUT, CHANGES AND ALTERATIONS REQUIRED BY AUTHORIZED INSPECTOR OF THE AUTHORITY HAVING JURISDICTION, TO BE CARRIED OUT WITHOUT CHARGE OR EXPENSE TO OWNER.

3. SITE VISIT

BEFORE TENDERING THE CONTRACTOR SHALL VISIT THE SITE AND FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS AT THE SITE WHERE THE WORK HAS TO BE DONE. NO EXTRA WILL BE ALLOWED DUE TO FAILURE TO TAKE SITE CONDITIONS INTO CONSIDERATION.

4. CO-ORDINATION OF WORK

THIS CONTRACTOR SHALL CO-ORDINATE THEIR WORK WITH ENBRIDGE GAS NEW BRUNSWICK AND WITH ALL OTHER SUB-CONTRACTORS. CO-OPERATE WITH THE OWNER AND ENBRIDGE AS SPECIFIED. WORK SHALL BE EXECUTED IN A MANNER WHERE AS TO CAUSE MINIMUM DISRUPTION. ALL SERVICES INTERRUPTIONS SHALL BE SCHEDULED OUTSIDE NORMAL WORKING HOURS. THIS CONTRACTOR SHALL INCLUDE IN THEIR TENDER, COSTS FOR ALL OVERTIME WORK INVOLVED WITH THE CONSTRUCTION.

5. GUARANTEE

THE CONTRACTOR SHALL GUARANTEE ALL WORK AND NEW EQUIPMENT INSTALLED UNDER THIS SPECIFICATION AGAINST ANY DEFECTS OF WORKMANSHIP AND MATERIAL FOR A PERIOD OF ONE YEAR AFTER ACCEPTANCE OF SAME BY OWNER. REPAIR AND MAKE GOOD ALL DAMAGE TO BUILDING INCURRED AS A RESULT OF FAILURE OF MECHANICAL WORK.

6. DRAWINGS

THE DRAWINGS FOR THE WORK ACCOMPANYING THESE SPECIFICATIONS ARE MADE AS ACCURATELY AS POSSIBLE, BUT ABSOLUTE ACCURACY OF DIMENSIONS CANNOT BE GUARANTEED. NO CLAIM FOR EXTRA PAYMENT ON ACCOUNT OF DIFFERENCE OF ACTUAL AND ESTIMATED DIMENSIONS SHALL BE ALLOWED. IN THE CASE OF DISCREPANCY OF FIGURE DIMENSIONS ON THE DRAWINGS, THE MATTER SHALL BE IMMEDIATELY SUBMITTED TO THE ENGINEER FOR A DECISION. WITHOUT THE DECISION, THE DISCREPANCY SHALL NOT BE ADJUSTED BY THE CONTRACTOR SAVE AT THEIR OWN RISK, AND IN THE SETTLEMENT OF ANY COMPLICATIONS ARISING FROM SUCH ADJUSTING, THE CONTRACTOR SHALL BEAR ALL EXTRA EXPENSE INVOLVED. INTERPRETATION OF ALL DOCUMENTS SHALL BE LEFT TO THE ENGINEER.

7. EXTRA WORK

NO ADDITIONAL MONEY OVER CONTRACT PRICE SHALL BE PAID UNLESS CONTRACTOR RECEIVES A SIGNED APPROVAL IN ACCORDANCE WITH THE GENERAL CONDITIONS. NO ADDITIONAL MONEY SHALL BE PAID FOR USE OF EQUAL PRODUCTS.

8. CUTTING AND PATCHING

THE CONTRACTOR IS TO LOCATE THE EXACT DIMENSIONS AND POSITIONS OF OPENINGS AND HOLES WHERE CUTTING MAY BE REQUIRED IN FLOORS, ROOFS, CEILINGS AND/OR WALLS FOR THE PASSING OF PIPES, DUCTS, ETC. WHERE CUTTING, PATCHING, EXCAVATION AND BACKFILLING IS NECESSARY, IT SHALL BE APPROVED BY ENBRIDGE AND OWNERS REPRESENTATIVES.

9. WALL PENETRATIONS

THE CONTRACTOR IS TO SUPPLY AND SET IN PLACE PIPE PENETRATION SEALANT.

10. SHOP DRAWINGS

CONTRACTOR SHALL SUBMIT, WITHIN TWO WEEKS AFTER BEING AWARDED THE CONTRACT, A MINIMUM OF 6 COPIES OF CERTIFIED SHOP DRAWINGS FOR REVIEW BY THE ENGINEER OF ALL EQUIPMENT AND MATERIAL SPECIFIED AND SHALL NOT PROCEED WITH ANY OF THIS WORK UNTIL THE DRAWINGS HAVE BEEN RETURNED STAMPED AND SIGNED. THIS REVIEW DOES NOT RELIEVE THE CONTRACTOR OF THE OBLIGATION OF CHECKING THE DRAWINGS THEMSELVES OR FURNISHING THE MATERIALS SPECIFIED.

11. CLEANING UP

THE CONTRACTORS SHALL, AT ALL TIMES, KEEP THE SITE NEAT, CLEAN AND FREE FROM ACCUMULATION OF WASTE, MATERIALS AND RUBBISH WHICH ARISE OUT OF THEIR WORK.

12. OPERATING AND MAINTENANCE INSTRUCTIONS

CONTRACTOR SHALL INSTRUCT THE OWNER IN OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND SYSTEMS INSTALLED. ALL SAFETY AND CONTROL FEATURES SHALL BE THOROUGHLY EXPLAINED. THREE COPIES OF OPERATING AND MAINTENANCE INSTRUCTIONS, TOGETHER WITH ALL APPROVED SHOP DRAWINGS AND A SPARE PARTS LIST FASTENED IN A BINDER, SHALL BE SUBMITTED TO THE OWNER.

13. AS BUILT DRAWINGS

CONTRACTOR SHALL MAINTAIN, AT THE JOB SITE, ONE SET OF PLANS ON WHICH THEY SHALL CLEARLY NOTE ALL CHANGES OR DEVIATIONS FROM THE CONTRACT DOCUMENTS, AS THE JOB PROGRESSES. CONTRACTOR SHALL AT THE TIME OF FINAL INSPECTION SUBMIT TO ENBRIDGE, ONE SET OF "AS-BUILT" DRAWINGS.

NATURAL GAS PIPING SYSTEMS

1. GENERAL

CONTRACTOR SHALL CONDUCT AND PAY FOR ALL PIPING TESTS. ALL TESTS SHALL BE CARRIED OUT IN THE PRESENCE OF THE ENGINEER OR THEIR REPRESENTATIVE.

TEST PIPING IN ACCORDANCE WITH CSA/CAN B149.1-05 NATURAL GAS AND PROPANE INSTALLATION CODE.

2. PIPE MATERIAL

PIPE MATERIAL SHALL BE AS SPECIFIED BELOW:

- STEEL PIPE: TO ASTM A53/A 53M-02, SCHEDULE 40, SEAMLESS AS FOLLOWS:
 - 1. NPS 1/2 TO 2, SREWED.
 - 2. NPS 2 AND OVER, PLAIN END.

- JOINTING MATERIAL:
 - 1. SREWED FITTINGS: PULVERIZED LEAD PASTE.
 - 2. WELDED FITTINGS: TO CSA W47.1-92 (R2001).

- INSTALLATION TO BE IN ACCORDANCE WITH B149.1-05.

- INSTALL DRAIN POINTS:
 - 1. AT LOW POINTS IN PIPING SYSTEMS.
 - 2. AT CONNECTIONS TO EQUIPMENT.

- FIELD QUALITY CONROL: TEST SYSTEM IN ACCORDANCE WITH B149.1-05 AND REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.

- PURGING: PURGE AFTER PRESSURE TEST IN ACCORDANCE WITH B149.1-05

- PRE-START-UP INSPECTIONS:

1. CHECK VENTS FROM REGULATORS, CONTROL VALVES, TERMINATE OUTSIDE BUILDING IN APPROVED LOCATION, PROTECT AGAINST BLOCKAGE, DAMAGE.

2. CHECK GAS TRAINS, ENTIRE INSTALLATION IS APPROVED BY AUTHORITY HAVING JURISDICTION.

3. UNIONS

PROVIDE UNIONS ON LINES CONNECTED TO ALL EQUIPMENT.

4. VALVES

PROVIDE ISOLATION VALVES FOR MAINS AND BRANCH PIPING TO FIXTURES AND EQUIPMENT. LUBRICATED BALL VALVES TO PROVINCIAL CODE APPROVAL. INSTALL AT BRANCH TAKE-OFF TO ISOLATE PIECES OF EQUIPMENT, AND AS INDICATED.

5. PIPE SUPPORTS

PIPING SHALL BE SUSPENDED FROM THE BUILDING STRUCTURE WITH GRINNELL, OR EQUAL, PIPE HANGERS AND STEEL RODS ATTACHED TO THE STEEL STRUCTURE. SUPPORTS TO BE IN ACCORDANCE WITH B149.1-05 OR SCHEDULE BELOW, WHICHEVER IS MORE STRINGENT.

HANGER SPACING SHALL BE AS PER THE FOLLOWING SCHEDULE:

PIPE DIA.	MAX. SPACING	STEEL ROD DIA.
12mm (NPS 1/2)	1500mm (5'-0")	9mm (3/8")
19mm (NPS 3/4)	1500mm (5'-0")	9mm (3/8")
25mm (NPS 1)	1800mm (6'-0")	9mm (3/8")
32mm (NPS 1 1/4)	2100mm (7'-0")	9mm (3/8")
37mm (NPS 1 1/2)	2400mm (8'-0")	12mm (1/2")
50mm (NPS 2)	3000mm (10'-0")	12mm (1/2")

6. PAINTING

PROVIDE FINISH PAINTING FOR ALL NEW AND EXISTING PIPING SYSTEMS.

7. IDENTIFICATION

PROVIDE AND INSTALL ON PIPING SYSTEMS, IDENTIFICATION CONSISTING OF DESCRIPTION AND FLOW DIRECTION. TO BE IN ACCORDANCE WITH B149.1-00.

PLUMBING & HEATING SYSTEMS

1. GENERAL

CONTRACTOR SHALL CONDUCT AND PAY FOR ALL PIPING TESTS. ALL TESTS SHALL BE CARRIED OUT IN THE PRESENCE OF THE ENGINEER OR THEIR REPRESENTATIVE.

INSTALL DRAINS AT LOW POINTS IN PIPING SYSTEMS, AT EQUIPMENT AND AT SECTION ISOLATING VALVES.

INSTALL AIR VENTS AT HIGH POINTS IN PIPING SYSTEM AND AS INDICATED.

PROVIDE PRESSURE TEST AND FLUSHING OUT OF NEW SYSTEMS. PROVIDE FLUSHING, CLEANING AND WATER TREATMENT TEST REPORT.

2. PIPE MATERIAL

PIPE MATERIAL SHALL BE SIMILAR TO THE EXISTING INSTALLATION OR AS SPECIFIED BELOW:

- DOMESTIC WATER (INSIDE BUILDING)
- COPPER TYPE 'L' HARD, USE 95-5 LEAD FREE SOLDER

- HEATING WATER (INSIDE BUILDING)
- STEEL PIPE TO ASTM A53/A53M-02 GRADE B, SCHEDULE 40
- 2" AND UNDER: SREWED FITTINGS WITH TEFLON TAPE ABOVE 2": ROLL-GROOVED FITTINGS (VICTAULIC OR APPROVED EQUAL)

3. UNIONS

PROVIDE UNIONS ON HOT AND COLD WATER LINES CONNECTED TO ALL EQUIPMENT.

4. THERMOMETERS AND PRESSURE GAUGES

PROVIDE THERMOMETERS AT INLET AND OUTLET OF SYSTEM.

PROVIDE PRESSURE GAUGES AT MAKE-UP FILL STATION, EXPANSION TANK, INLET AND OUTLET OF PUMPS, BOILERS AND INLET AND OUTLET OF HEAT EXCHANGERS.

5. VALVES

DOMESTIC HOT & COLD WATER:

- GATE VALVE: - CRANE # 1320
- GLOBE VALVE: - CRANE # 1312
- CHECK VALVE: - CRANE # 1343
- BALL VALVE: - CRANE # 9302

6. PIPE SUPPORTS

PIPING SHALL BE SUSPENDED FROM THE BUILDING STRUCTURE WITH GRINNELL, OR EQUAL, PIPE HANGERS AND STEEL RODS ATTACHED TO THE STEEL STRUCTURE BY MEANS OF 'C' CLAMPS.

USE GRINELL FIG. 269 FOR HORIZONTAL HOT AND COLD WATER PIPES, GRINELL FIG. CT-121C FOR VERTICAL HOT AND COLD WATER PIPES, GRINELL FIG. 260 FOR HORIZONTAL CAST IRON PIPES AND GRINELL FIG. 261 FOR VERTICAL CAST IRON PIPES.

HANGER SPACING SHALL BE AS PER THE FOLLOWING SCHEDULE:

PIPE DIA	MAX. SPACING	STEEL ROD DIA.
12mm (NPS 1/2)	1500mm(5'-0")	9mm (3/8")
19mm (NPS 3/4)	1500mm(5'-0")	9mm (3/8")
25mm (NPS 1)	1800mm (6'-0")	9mm (3/8")
32mm (NPS 1 1/4)	2100mm (7'-0")	9mm (3/8")
37mm (NPS 1 1/2)	2400mm (8'-0")	12mm (1/2")
50mm (NPS 2)	2400mm (8'-0")	12mm (1/2")
62mm (NPS 2 1/2)	3000mm (10'-0")	12mm (1/2")
75mm (NPS 3)	3000mm (10'-0")	12mm (1/2")

SUPPORT ALL DRAINAGE PIPES ABOVE GROUND AT EVERY JOINT WITH APPROVED SUPPORTS DESIGNED FOR DRAINAGE.

7. GRADING OF PIPES

DRAINAGE PIPING SHALL BE GRADED IN DIRECTION OF THE FLOW, WITH A PITCH OF NOT LESS THAN 3mm in 300mm UNLESS OTHERWISE INDICATED. ALL HORIZONTAL LINES OF HOT AND COLD WATER SHALL BE PITCHED SO THAT THEY MAY BE COMPLETELY DRAINED THROUGH RISERS OR LOW POINT DRAINS.

8. INSULATION

-INSULATE ALL DOMESTIC WATER PIPING, HEAT EXCHANGERS, HEATING WATER PIPING, VALVES AND FITTINGS WITH 1" THICK OF FIBERGLASS, HEAVY DENSITY PIPE INSULATION WITH PVC JACKET. ALL DOMESTIC WATER PIPING TO BE C/W VAPOR BARRIER. SEAL ALL JOINTS.

-INSULATE ALL DOMESTIC HOT WATER TANKS WITH 2" THICK OF FIBERGLASS, HEAVY DENSITY INSULATION WITH VAPOR BARRIER, SEAL ALL JOINTS.

-ALL INSULATION SYSTEMS TO BE C/W PVC FINISH JACKET.

9. IDENTIFICATION

IDENTIFY CONTENTS BY BACKGROUND COLOR MARKING, PICTOGRAMS (AS NECESSARY), LEGEND, DIRECTION OF FLOW BY ARROWS.

BACKGROUND COLOR MARKING AND LEGENDS FOR PIPING SYSTEMS:

CONTENT	BACKGROUND COLOR MARKING	LEGEND
HEATING HOT WATER SUPPLY	YELLOW	HEATING SUPPLY
HEATING HOT WATER RETURN	YELLOW	HEATING RETURN
DOMESTIC COLD WATER SUPPLY	GREEN	DOM CWS
DOMESTIC HOT WATER SUPPLY	GREEN	DOM HWS
DOMESTIC HOT WATER RECIRC.	GREEN	DOM HW RECIRC

10. REMOVALS

THIS CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND DISPOSAL OF EXISTING EQUIPMENT, PIPING AND ACCESSORIES MADE REDUNDANT BY THIS CONTRACT.

11. HEATING BOILERS (3 SUCH)

SUPPLY AND INSTALL HEATING BOILER B-1, B-2 & B-3 IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND LOCAL CODES. START-UP TO BE COMPLETED BY MANUFACTURERS REPRESENTATIVE. PROVIDE START-UP REPORT AND EFFICIENCY TEST.

- PERFORMANCE DATA: - SPECIFICATION DATA:

- INPUT (Min. Max): 62MBH-310MBH
- NET IBER OUTPUT: 252MBH
- DOE AFUE: 93.3%
- LOW TEMP. SEASONAL EFF: 95.6%
- DIRECT SPARK IGNITION
- VENT SIZE: 4"
- WATER VOLUME: 2.1 GAL
- WEIGHT: 254 lbs
- CAST ALUMINUM BLOCK
- 30 PSI ASME RELIEF VALVE
- DRAIN VALVE
- STAINLESS STEEL BURNER
- VARIABLE SPEED BLOWER ASSEMBLY
- NEGATIVE PRESSURE REGULATOR GAS VALVE
- COMBINATION TEMP. & PRESS. GAUGE
- OUTLET AND RETURN WATER TEMPERATURE SENSOR
- O.A. TEMPERATURE SENSOR
- 12 amp 110V, CIRC. RELAY
- CONTROL MODULE c/w STANDARD ACCESSORIES
- TACO BOILER CIRCULATORS,
- NPS 1-1/2 FLANGES TACO-0011

- ACCEPTABLE PRODUCT: WEIL McLAIN ULTRA 310 OR APPROVED EQUAL

12. HEAT EXCHANGERS

1. DOMESTIC HOT WATER HEAT EXCHANGER, HX-1

- PERFORMANCE DATA:

- OUTPUT: 600,000 BTU/H
- BOILER WATER: 14.5 gpm @ 1.33 PSI PRESSURE DROP
- DHW: 95 gpm @ 3.19 PSI PRESSURE DROP
- DIFFERENTIAL TEMP: 108°F
- MANU/MODEL: SEC - MODEL PL-500

13. BOILER COMBUSTION AIR & VENTING

PROVIDE 4"ø PVC VENTING. TO BE CSA / ULC CERTIFIED

14. DOMESTIC HOT WATER STORAGE TANK (ST-1)

GLFAB 300 IMP GALLON VERTICAL DOMESTIC HOT WATER STORAGE TANKS. FABRICATED TO ASME SECTION VIII, DIV 1 AND CSA-B51. TANK SHALL BEAR CRN LABEL AND HAVE ASME 'U' STAMP. FEATURES AS FOLLOWS:

- GLFAB MODEL OF-4270 VERTICAL HOT WATER STORAGE TANK
- 42" DIA. X 70" HIGH (NOT INCLUDING STAND HEIGHT)
- 125 PSIG DESIGN PRESSURE @ 200 DEG. F.
- SA-516 GR-70 STEEL
- THREE SUPPORT LEGS (8")
- TOTAL TANK HEIGHT (INCLUDING STAND): 78"
- EIGHT STAINLESS STEEL 3000# COUPLINGS
- 12" X 16" MANHOLE
- 3/4" TK. PRECRETE HYDRAULIC CEMENT
- ONE MAGNESIUM ANODE
- SANDBLAST TO SSPC-SP6 AND PRIMER FINISH
- ASME 'U' STAMP
- CRN AND DATA REPORT
- C/W 125 PSI (200°F) T&P RELIEF VALVE
- TWO (2) 2" & ONE (1) 1" CONNECTION AT TOP OF TANK
- TWO (2) 2" CONNECTIONS NEAR BOTTOM & ONE (1) 1" DRAIN AT BOTTOM

15. BACKFLOW PREVENTERS

P-16:MANUFACTURER: WATTS
MODEL: 009QT
SIZE: 2"
C/W AIR GAP
PROVIDE INSPECTION AND TESTING REPORT AS REQUIRED.

P-17:MANUFACTURER: WATTS
MODEL: 009QT
SIZE: 1/2"
C/W AIR GAP
PROVIDE INSPECTION AND TESTING REPORT AS REQUIRED.

HYDRONIC SPECIALTIES

1. PUMPS: INLINE PUMPS, HORIZONTAL, PERMANENTLY LUBRICATED TYPE, ODP MOTORS

BOILER PUMPS: MANUFACTURER/MODEL: SUPPLIED BY BOILER MANUFACTURER
ELECTRICAL: 115V, 1ø, -

P-11: MANUFACTURER/MODEL: BELL & GOSSETT, MODEL PL-130
50 gpm @ 15 ft head
NPS 2 CONNECTION FLANGE - PUMP TO BE CAST CONSTRUCTION
ELECTRICAL: 115V, 1ø, 2/5 HP
APPROVED EQUAL: ARMSTRONG, TACO

P-12: MANUFACTURER/MODEL: BELL & GOSSETT, MODEL PL-130
50 gpm @ 15 ft head
NPS 2 CONNECTION FLANGE - PUMP TO BE CAST CONSTRUCTION
ELECTRICAL: 115V, 1ø, 2/5 HP
APPROVED EQUAL: ARMSTRONG, TACO

P-13: MANUFACTURER/MODEL: BELL & GOSSETT, MODEL PL-130B
50 gpm @ 15 ft head
NPS 2 CONNECTION FLANGE - PUMP TO BE ALL BRONZE.
ELECTRICAL: 115V, 1ø, 2/5 HP
APPROVED EQUAL: ARMSTRONG, TACO

P-14 & P-15: REFER TO BOOK SPEC

2. EXPANSION TANKS

ET-1: EXISTING RE-USED

ET-2: AMTROL THERM-X-TROL
MODEL: ST-5

3. AIR SEPARATOR

EXISTING RE-USED

4. POT FEEDER

-NEPTUNE MODEL VTF-2
-2 GAL BYPASS FEEDER

5. BOILER MAKE-UP WATER ASSEMBLY

MANUFACTURER: WATTS REGULATOR
MODEL: 25AUB-S-DU-23

6. CLEANING AND START-UP OF MECHANICAL PIPING SYSTEMS

- 1.-CLEANING SOLUTIONS: 1. TRI-SODIUM PHOSPHATE: 1 lb PER 30 GAL WATER IN SYSTEM.
2. SODIUM CARBONATE: 1 lb PER 30 GAL WATER IN SYSTEM.
3. LOW-FOAMING DETERGENT: 0.025 lb PER 30 GAL WATER IN SYSTEM.

2.-CLEANING HYDRONIC SYSTEM: 1.-TIMING: 1. SYSTEMS TO BE OPERATIONAL, HYDROSTATICALLY TESTED AND WITH SAFETY DEVICES FUCTIONAL, BEFORE CLEANING IS CARRIED OUT.
2. ISOLATE HEAT EXCHANGERS AND BOILERS PRIOR TO CLEANING.

2.-CLEANING AGENCY: 1. RETAIN QUALIFIED WATER TREATMENT SPECIALIST TO PERFORM SYSTEM CLEANING.

3.-INSTALL INSTRUMENTATION SUCH AS FLOW METERS, FLOW METERING VALVES ONLY AFTER CLEANING IS CERTIFIED AS COMPLETE BY WATER TREATMENT SPECIALIST.

4.-CLEANING PROCEDURES: 1.-PROVIDE DETAILED REPORT OUTLINING PROPOSED CLEANING PROCEDURES AT LEAST 4 WEEKS PRIOR TO PROPOSED STARTING DATE.

REPORT SHALL INCLUDE:
1. CLEANING PROCEDURES, FLOW RATES, ELAPSED TIME.
2. CHEMICALS AND CONCENTRATIONS TO BE USED.
3. INHIBITORS AND CONCENTRATIONS.
4. SPECIFIC REQUIREMENTS FOR COMPLETION OF WORK.
5. SPECIAL PRECAUTIONS FOR PROTECTING PIPING SYSTEMS MATERIALS AND COMPONENTS.
6. COMPLETE ANALYSIS OF WATER TO BE USED TO ENSURE WATER WILL NOT DAMAGE SYSTEMS OR EQUIPMENT.

5.-CONDITIONS AT TIME OF CLEANING OF SYSTEMS:

- 1. SYSTEMS TO BE FREE FROM CONSTRUCTION DEBRIS, DIRT AND OTHER FOREIGN MATERIAL.
- 2. STRAINERS TO BE CLEAN PRIOR TO INITIAL FILL.
- 3. INSTALL TEMPORARY FILTERS ON PUMPS NOT EQUIPPED WITH PERMANENT FILTERS.
- 4. INSTALL PRESSURE GAUGES ON STRAINERS TO DETECE PLUGGING.

6.-REPORT ON COMPLETION OF CLEANING:

1. WHEN CLEANING IS COMPLETED, SUBMIT REPORT, COMPLETE WITH CERTIFICATE OF COMPLIANCE WITH SPECIFICATIONS OF CLEANING COMPONENT SUPPLIER.

7.-HYDRONIC SYSTEMS:

- 1. FILL SYSTEM WITH WATER, ENSURE AIR IS VENTED FROM SYSTEM.
- 2. FILL EXPANSION TANKS 1/3 TO 1/2 FULL. SYSTEM CHARGE WITH COMPRESSED AIR TO AT LEAST 5 PSI.
- 3. USE WATER METER TO RECORD VOLUME OF WATER IN SYSTEM TO +/- 0.5%.
- 4. ADD CHEMICALS UNDER DIRECT SUPERVISION OF CHEMICAL TREATMENT SUPPLIER.
- 5. CLOSED LOOP SYSTEMS: CIRCULATE SYSTEM CLEANER AT 140°F FOR AT LEAST 36 h. DRAIN AS QUICKLY AS POSSIBLE. REFILL WITH WATER AND INHIBITORS. TEST CONCENTRATIONS AND ADJUST TO RECOMMENDED LEVELS.
- 6. FLUSH VELOCITY IN SYSTEM MAINS AND BRANCHES SO AS TO ENSURE REMOVAL OF DEBRIS. SYSTEM PUMPS MAY BE USED FOR CIRCULATING CLEANING SOLUTION PROVIDED THAT VELOCITIES ARE ADEQUATE.
- 7. ADD CHEMICAL SOLUTION TO SYSTEM.
- 8. ESTABLISH CIRCULATION, RAISE TEMPERATURE SLOWLY TO MAXIMUM DESIGN (160°F MINIMUM). CIRCULATE FOR 12 h. ENSURING FLOW IN ALL CIRCUITS. REMOVE HEAT, CONTINUE TO CIRCULATE UNTIL TEMPERATURE IS BELOW 100°F. DRAIN AS QUICKLY AS POSSIBLE. RE-FILL CLEAN WATER. CIRCULATE FOR 6 h AT DESIGN TEMPERATURE. DRAIN AND REPEAT PROCEDURES SPECIFIED ABOVE. FLUSH THROUGH LOW POINT DRAINS IN SYSTEM. REFILL WITH CLEAN WATER ADDING TO SODIUM SULPHITE (TEST FOR RESIDUAL SULPHITE).

3.-START-UP OF HYDRONIC SYSTEMS: 1. AFTER CLEANING IS COMPLETED AND SYSTEM IS FILLED:

- 1. ESTABLISH CIRCULATION AND EXPANSION TANK LEVEL. SET PRESSURE CONTROLS.
- 2. ENSURE AIR IS REMOVED.
- 3. CHECK PUMPS TO BE FREE FROM AIR, DEBRIS, POSSIBILITY OF CAVITATION WHEN SYSTEM IS AT DESIGN TEMPERATURE.
- 4. DISMANTLE SYSTEM PUMPS USED FOR CLEANING, INSPECT,REPLACE WORN PARTS, INSTALL NEW GASKETS AND NEW SET OF SEALS.
- 5. CLEAN OUT STRAINERS REPEATEDLY UNTIL SYSTEM IS CLEAN.
- 6. CHECK WATER LEVEL IN EXPANSION TANK WITH COLD WATER WITH CIRCULATING PUMPS OFF AND AGAIN WITH PUMPS ON.
- 7. REPEAT WITH WATER AT DESIGN TEMPERATURE.
- 8. CHECK PRESSURIZATION TO ENSURE PROPER OPERATION AND TO PREVENT WATER HAMMER, FLASHING, CAVITATION. ELIMINATE WATER HAMMER AND OTHER NOISES.
- 9. BRING SYSTEM UP TO DESIGN TEMPERATURE SLOWLY OVER A 48 h PERIOD.

MECHANICAL SPECIFICATIONS

SCALE: N.T.S.

Contractor must check and verify all dimensions on the job, and report any discrepancies to the Architect before proceeding with the work.

DO NOT SCALE THIS DRAWING.

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General Notes