CONTINUED FROM SHEET P703

3.8 ADJUSTMENT AND TESTING

A. SITE ACCESS: DURING INSTALLATION OF EQUIPMENT, ARRANGE FOR ACCESS AS NECESSARY FOR INSPECTION OF ISOLATION AND NOISE CONTROL EQUIPMENT BY ENGINEER.

B. INSPECTION:
1. UPON COMPLETING INSTALLATION AND ADJUSTMENT FOR SUITABLE OPERATION OF ALL WORK SPECIFIED UNDER THIS SECTION, NOTIFY ENGINEER IN WRITING, WHO WILL SCHEDULE A REVIEW.
2. THE CONTRACTOR'S LETTER SHALL CERTIFY THAT ALL WORK SPECIFIED UNDER THIS SECTION IS COMPLETE, OPERATIONAL, AND ADJUSTED IN EVERY RESPECT, AND THAT ALL WORK UNDER THIS SECTION IS READY FOR THE COMPLETION CHECKOUT.
3. FOR EACH INSPECTION, WORKMEN SHALL BE FURNISHED TO PERFORM SUCH FUNCTIONS AS ARE NECESSARY FOR INSPECTION OF THE EQUIPMENT.
4. MEASUREMENT OF BACKGROUND NOISE LEVELS BY THE ENGINEER REQUIRES THAT THERE BE A MINIMUM OF EXTRANEOUS NOISE.
5. SUCH MEASUREMENTS MUST BE SCHEDULED DURING LATE-NIGHT HOURS WHEN THERE IS NO WORK TAKING PLACE ON THE SITE.
6. WORKMEN SHALL BE EMPLOYED DURING THE TESTING PROCEDURE TO TURN ON AND OFF ALL MECHANICAL AND ELECTRICAL EQUIPMENT FOR SUCH BACKGROUND NOISE LEVEL TESTING.

END OF SECTION 22 05 48

SECTION 22 05 73 - TESTING AND CLEANING OF PLUMBING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.

1.2 SUMMARY

A. THIS SECTION INCLUDES PROVIDING TESTING AND CLEANING SERVICES AND THE MAJOR ITEMS LISTED BELOW:
1. PROVIDE ALL PUMPS, GAGES, VALVES AND OTHER EQUIPMENT AND MATERIAL NECESSARY TO PROPERLY CONDUCT TESTS AND PERFORM CLEANING.
2. ARRANGE AND PAY FOR ALL COSTS OF UTILITIES AND CHEMICALS REQUIRED FOR THE WORK.
3. REPAIR AND RESTORE ALL WORK DAMAGED:
a. BY TESTS.
b. BY CUTTING REQUIRED IN CONNECTION WITH THE TESTS.

1.3 SUBMITTALS

A. FLUSHING AND CLEANING:
1. SUBMIT CERTIFICATES FOR ALL CODE-REQUIRED INSPECTIONS.
2. SUBMIT ALL WATER SAMPLE ANALYSIS REPORTS AS REQUIRED IN PART 3 OF THESE SPECIFICATIONS.

B. PRESSURE TEST REPORTS:
1. SUBMIT WITHIN 1 WEEK AFTER EACH SYSTEM PRESSURE TEST.
2. LIST TIME, DATE AND PERSONS PRESENT FOR THE FOLLOWING FOR EACH SYSTEM:
a. INITIAL TESTS.
b. FINAL TEST.
3. INCLUDE REPORT INDICATING:
a. TEST TYPE AND DURATION.
b. INITIAL PRESSURE.
c. FINAL PRESSURE.
4. INDICATE THAT NECESSARY REPAIRS AND FINAL TESTS WERE SATISFACTORILY COMPLETED.

1.4 QUALITY ASSURANCE

A. COMPLY WITH ALL APPLICABLE CODES.

B. SECURE STATE HEALTH DEPARTMENT APPROVAL FOR POTABLE WATER SYSTEMS.

C. TESTING AND CLEANING AGENCY:
1. MINIMUM 15 YEARS EXPERIENCE IN PROVIDING CLEANING CHEMICALS FOR WATER SYSTEMS USE.
2. PROVIDE REGIONAL LABORATORY SUPPORT SERVICES.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. CLEANING AGENTS:
1. AQUA-CHEM.
2. AQUATROL.
3. ENERCO.
4. NALCO.

PART 3 - EXECUTION

3.1 PIPING SYSTEM PRESSURE TEST

A. GENERAL:
1. PERFORM ALL TESTS BEFORE PIPING IS PAINTED, COVERED, CONCEALED OR BACKFILLED.
2. BEFORE TESTING, REMOVE OR OTHERWISE PROTECT FROM DAMAGE, CONTROL DEVICES, AIR VENTS, FIXTURES, METERS, OR OTHER PARTS WHICH ARE NOT DESIGNATED TO WITHSTAND TEST PRESSURES.

B. TEST PROCEDURES:
1. AIR TEST:
a. CHARGE WITH AIR TO THE TEST PRESSURE SPECIFIED.
b. WHEN POSSIBLE, PERFORM TEST WHEN AMBIENT AIR TEMPERATURE IS CONSTANT.
2. SOAP TEST:
a. CHARGE WITH AIR, WATER OR CARBON DIOXIDE TO PRESSURE SPECIFIED.
b. EXAMINE ALL JOINTS FOR LEAKS WITH A SOAP SUDS SOLUTION.
3. WATER TEST:
a. CHARGE WITH WATER TO THE PRESSURE SPECIFIED.
b. EXTERIOR SURFACE OF PIPE AND FITTINGS:
• SHOW NO CRACKS OR OTHER FORM OF LEAKS.
• COMPLETELY DRIP DRY.

C. PRESSURE TEST CRITERIA:
1. TEST CRITERIA BELOW ARE MINIMUM REQUIREMENTS. IN ADDITION, THE REQUIREMENTS OF STATE AND LOCAL CODES HAVING JURISDICTION SHALL BE MET:

PIPING SYSTEM	TYPE	TEST PRESSURE	ALLOWABLE PRESSURE DROP	MINIMUM TEST DURATION
DRAINAGE SYSTEM	WATER	5 PSIG	0 PSI	30 MINUTES
VENT SYSTEM	WATER	5 PSIG	0 PSI	30 MINUTES
WATER (DOMESTIC)	WATER	100 PSIG	0 PSI	4 HOURS

3.2 FLUSHING AND CLEANING PROCEDURES

A. DOMESTIC, FIRE PROTECTION AND OTHER OPEN WATER PIPING SYSTEMS: FLUSH WITH CLEAN WATER UNTIL ALL FOREIGN MATTER IS REMOVED.

B. REMOVE AND CLEAN ALL STRAINERS AFTER FLUSHING IS COMPLETE.

C. DRAIN COMPLETELY AND REFILL AFTER FLUSHING.

3.3 DOMESTIC WATER SYSTEM STERILIZATION PROCEDURES

A. GENERAL:
1. STERILIZE WITH CHLORINE PRIOR TO ACCEPTANCE FOR OPERATION.
2. ARRANGE AND PAY FOR ALL REQUIRED EQUIPMENT, MATERIALS, UTILITIES, TESTS AND INSPECTIONS.

B. PROCEDURE:
1. PUMP CHLORINE SOLUTION INTO DISTRIBUTION PIPING:
a. AFTER PIPING SYSTEM HAS BEEN FLUSHED AND PRESSURE TESTED.
b. AT A CONSTANT RATE WHILE BLEEDING OFF WATER AT EXTREME ENDS OF PIPING SYSTEM.
c. AS REQUIRED TO ACHIEVE RESIDUAL-FREE CHLORINE LEVELS NOT LESS THAN 50 PPM.
2. RETAIN CHLORINATED CONDITION FOR 16 HOURS MINIMUM AND ENSURE COMPLETE DISINFECTION.
3. FLUSH SYSTEM WITH CLEAN WATER AND SUBMIT WATER SAMPLE TO STATE HEALTH DEPARTMENT FOR TEST AND APPROVAL.

END OF SECTION 22 05 73

SECTION 22 07 19 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.

1.2 SUMMARY

A. THIS SECTION INCLUDES THE FURNISHING AND INSTALLATION OF PIPING INSULATION.

1.3 REFERENCES

A. EXCEPT AS HEREIN SPECIFIED OR AS INDICATED ON THE DRAWINGS, THE WORK OF THIS SECTION SHALL COMPLY WITH THE FOLLOWING:
1. ASTM SPECIFICATIONS:
a. B209 - ALUMINUM AND ALUMINUM ALLOY SHEET AND PLATE.
b. C534 - PREFORMED FLEXIBLE ELASTOMERIC CELLULAR THERMAL INSULATION IN SHEET AND TUBULAR FORM.
c. C547 - MINERAL FIBER PREFORMED PIPE INSULATION.
d. C552 - CELLULAR GLASS BLOCK AND PIPE THERMAL INSULATION.
2. ASTM STANDARD TEST METHODS: E84 - SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS.
3. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) PUBLICATIONS: NFPA 255 - SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS: 25, 50, 50 FLAME SPREAD, FUEL, SMOKE.
4. ASHRAE: 90A - ENERGY CONSERVATION IN NEW BUILDING DESIGN, CURRENT EDITION.

1.4 SUBMITTALS

A. MANUFACTURER'S LITERATURE: FOR PIPING INSULATION:
1. FOR EACH TYPE USED:
a. NAME OF MANUFACTURER.
b. DETAILS OF CONSTRUCTION AND INSTALLATION.
c. MANUFACTURER'S DATA (DENSITY, K-FACTOR).
2. FOR EACH APPLICATION:
a. THICKNESS.
b. TOTAL "R" VALUE.
c. JACKET MATERIAL.

1.5 QUALITY ASSURANCE

A. FABRICATION AND INSTALLATION PERSONNEL QUALIFICATIONS:
1. TRAINED AND EXPERIENCED IN THE FABRICATION AND INSTALLATION OF THE MATERIALS AND EQUIPMENT.
2. KNOWLEDGEABLE OF THE DESIGN AND THE REVIEWED SHOP DRAWINGS.

1.6 DELIVERY, STORAGE AND HANDLING

A. DELIVER MATERIALS IN ORIGINAL, UNBROKEN, BRAND MARKED CONTAINERS OR WRAPPING AS APPLICABLE. HANDLE AND STORE MATERIALS IN A MANNER WHICH WILL PREVENT DETERIORATION AND CONTAMINATION WITH FOREIGN MATTER.

B. REJECT DAMAGED, DETERIORATED, OR CONTAMINATED MATERIALS AND IMMEDIATELY REMOVE FROM THE SITE. REPLACE REMOVED MATERIALS AT NO ADDITIONAL COST TO OWNER.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. INSULATION:
1. OWENS-CORNING.
2. CERTAINTEED.
3. ARMACELL.
4. KNAUF.
5. [illegible]

B. JACKETING:
1. CEEL-CO.
2. O'BRIEN.
3. ZESTON.

C. ADHESIVES:
1. BENJAMIN FOSTER.
2. CHILDERS.
3. VIMASCO.

2.2 TYPES OF INSULATION MATERIALS

A. RIGID MOLDED GLASS FIBER - GENERAL (FG):
1. ALL-SERVICE JACKET (ASJ) TYPE FACTORY APPLIED JACKETING.
2. 3 LBS/CU FT MINIMUM DENSITY.
3. K FACTOR OF 0.23 AT 75 DEGREES F MEAN.
4. 50 DEGREE F SERVICE TEMPERATURE.
5. OWENS-CORNING TYPE SSL II; OR EQUAL.
6. TYPICAL FOR APPLICATION ON PIPES 16 INCHES AND UP.

B. RIGID MOLDED GLASS FIBER - HIGH DENSITY (HFG):
1. ALL-SERVICE JACKET (ASJ), FACTORY-APPLIED JACKETING.
2. 6 LBS/CU FT MINIMUM DENSITY.
3. K FACTOR OF 0.31 MAXIMUM AT 200 DEGREES F MEAN.
4. 850 DEGREE F SERVICE TEMPERATURE.
5. OWENS-CORNING TYPE SSL II; OR EQUAL.
6. TYPICAL FOR APPLICATIONS ON PIPES BELOW 16 INCHES (NORMAL).

C. FLEXIBLE ELASTOMERIC THERMAL PIPE INSULATION (E):
1. DENSITY OF 5.0 LBS/CUBIC FOOT.
2. K FACTOR OF 0.27 AT 75 DEGREES F MEAN.
3. MAXIMUM WATER VAPOR TRANSMISSION OF 0.17 PER INCH.
4. MUST BE LISTED FOR 25/50 FLAME/SMOKE SPREAD FOR THICKNESS USED.
5. ARMACELL ARMAFLEX AP; OR EQUAL.

2.3 PIPE AND FITTING COVERS

A. POLYVINYL CHLORIDE (PVC) COVERS:
1. ULTRAVIOLET RESISTANT.
2. 0.030-INCH MINIMUM THICKNESS.
3. PREFORMED TO MATCH OUTER DIAMETER OF INSULATION.
4. PREFORMED FITTING COVERS, MINIMUM 10 MIL.
5. CEEL-TITE 330; OR EQUAL, BY TOPLINE OR ZESTON.

B. ALUMINUM COVERS (A):
1. ASTM B209, ALLOY 3003 MINIMUM.
2. 0.016-INCH THICKNESS.
3. BRIGHT ANODIZED OR ACRYLIC-COATED SMOOTH FINISH ON EXPOSED SIDE.
4. 2-PIECE TEE AND RIBLESS ELBOW COVERS IN MINIMUM 0.016-INCH, PREFORMED.
5. PROVIDE MOISTURE BARRIER BACKING AND BUTT-JOINT WITH MASTIC SEAL FOR JOINING OF ADJACENT SECTIONS.
6. CHILDERS PRODUCTS COMPANY; OR AS APPROVED.

PART 3 - EXECUTION

3.1 INSTALLATION

A. GENERAL:
1. INSTALL PIPING INSULATION:
a. IN CONFORMANCE WITH THE DRAWINGS, THESE SPECIFICATIONS, AND THE MANUFACTURER'S RECOMMENDATIONS.
b. AFTER PIPING SYSTEM HAS BEEN SATISFACTORILY TESTED.
c. OVER CLEAN, DRY PIPING SYSTEM.
d. TO THE FOLLOWING THICKNESS:
• AS SPECIFIED HEREIN OR AS INDICATED ON THE DRAWINGS.
• IF NOT SPECIFIED HEREIN OR INDICATED ON THE DRAWINGS, IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS FOR THE SPECIFIC APPLICATION.
e. CONTINUOUS THROUGH WALLS, CEILINGS AND SLEEVES EXCEPT AT FIRE STOPS.
2. FILL ALL CRACKS AND VOIDS WITH INSULATING CEMENT CAREFULLY TROWELED TO LEAVE A SMOOTH FINISH.
3. REPAIR OR REPLACE INSULATION DAMAGED BY:
a. DEMOLITION.
b. MAKING CONNECTIONS TO PIPING OR EQUIPMENT.
c. WATER OR MILDEW.
4. INSULATE BUNDLES OF PIPES OUT-OF-DOORS WITH COMPLETE WRAP OF INSULATION 1-1/2 INCHES THICK AND OF SUITABLE DIAMETER TO CONTAIN BUNDLE, WITH OUTER WRAP.
5. PIPE SIZES 12-INCH AND LARGER: HOLD EACH 3-FOOT SECTION OF INSULATION IN PLACE WITH AT LEAST 3 SEPARATE LOOPS OF NO. 14 AWG STRANDED ANNEALED WIRE.

B. JOINTS AND FITTINGS:
1. BLOCK INSULATE VALVES AND FLANGES WITH REUSABLE INSULATION SYSTEM.
2. INSULATE ELBOWS, TUBE TURNS, SWEEPS AND BENDS WITH MITERED SECTIONS OR PREMOLDED FITTINGS. MATCH PIPE COVERING MATERIAL WHERE USED.
3. FIT JOINTS TIGHTLY TOGETHER.
4. SEAL JOINTS WITH SEALING COMPOUND AND PREFORMED ALUMINUM BANDS.

3.2 JACKETS AND FINISH

A. GENERAL:
1. PROVIDE MOISTURE BARRIER BETWEEN THE INSULATION AND THE JACKETING IN A CONTINUOUS, UNBROKEN SEAL.
2. HOLD JACKETING IN PLACE BY A CONTINUOUS SEALED JOINT, PROVIDING A POSITIVE WEATHERPROOF SEAL ALONG THE ENTIRE LENGTH OF THE JACKET.
3. CAP OFF ENDS WITH CAPS.
4. ON COLD LINES, CUT CAPS TO THE EXACT SIZE OF THE PIPE AND SEAL WITH A RECOMMENDED SILICONE CALKING.
5. PROVIDE SLIP JOINTS A MINIMUM OF EVERY 25 FEET OR AS NEEDED FOR EXPANSION.
6. LOCATE LONGITUDINAL JACKET SEAMS ON INDOOR EXPOSED PIPING OUT OF VIEW.

B. PVC:
1. CENTER A PREFORMED STRAP (SNAP-STRAP) CONTAINING A PERMANENTLY WEATHERPROOF PLASTIC SEALANT OVER EACH CIRCUMFERENTIAL JOINT AND SECURE BY TIGHTENING ON A CLIP, OR BY USE OF A SEPARATE STAINLESS STEEL BANDING.
2. DESIGN SNAP-STRAP TO TAKE CARE OF NORMAL EXPANSION.
3. COVER ALL PIPE INSULATION AND PREFORMED INSULATION FITTINGS.
4. WELD LONGITUDINAL SEAMS TOGETHER WITH WELDING ADHESIVE AS SUPPLIED BY COVER MANUFACTURER.
5. OVERLAP ADJACENT JACKETING 3/4-INCH AND WELD CIRCUMFERENTIAL SEAMS TOGETHER WITH WELDING ADHESIVE.
6. OVERLAP FITTING COVERS TO ADJACENT PIPE INSULATION JACKETING. WELD LONGITUDINAL AND CIRCUMFERENTIAL SEAMS TOGETHER WITH ADHESIVE.

C. ATTACHMENT:
1. FOR SYSTEMS OPERATING AT 50 DEGREES F AND ABOVE: MAY BE STAPLED USING OUTWARD CLINCH STAPLES SPACED 3 INCHES APART AT LEAST 1/4-INCH FROM THE LAP EDGE.
2. FOR SYSTEMS OPERATING BELOW 50 DEGREES F: VAPOR SEAL LAPS USING SELF-SEALING LAP, LAP SEAL TAPE GUN OR ADHESIVE SUCH AS BENJAMIN FOSTER 530.

D. TAPER AND SEAL INSULATION ENDS REGARDLESS OF SERVICE.

E. FITTING AND PIPE JACKETS TO HAVE MATCHING FINISHES READY FOR PAINTING.

F. FOR INSULATION WITHOUT FACTORY APPLIED JACKET:
1. FINISH WITH 8-OUNCE GLASS MESH AND MASTIC.
2. USE BREATHER MASTIC ON PIPING OPERATING AT TEMPERATURES GREATER THAN 50 DEGREES F.

3.3 PIPING INSULATION APPLICATION SCHEDULE

A. BASIS OF THICKNESS CHART:
1. THICKNESSES SHOWN ARE BASED ON PRODUCTS HAVING A MAXIMUM "K" FACTOR OF 0.26 AT A MEAN TEMPERATURE OF 75 DEGREES F.
2. THESE THICKNESSES:
a. CAN BE REDUCED FOR PRODUCTS HAVING SIGNIFICANTLY LOWER "K" VALUES.
b. SHALL BE INCREASED FOR PRODUCTS HAVING HIGHER "K" VALUES IN ORDER TO PRODUCE EQUIVALENT OR GREATER THERMAL RESISTANCE.

B. FLAME/SMOKE RATINGS: LOCAL REQUIREMENTS FOR FLAME AND SMOKE RATINGS MUST BE MET AND MAY EXCLUDE SOME OPTIONS LISTED HEREIN.

C. JACKETS AND FINISH APPLICATION:
1. PROVIDE PVC JACKET ON INSULATED EXPOSED PIPING WITHIN 7 FEET OF THE FLOOR.
2. PROVIDE PVC JACKET ON INSULATED PIPING LOCATED OUTSIDE.

D. THICKNESS CHART (IN INCHES):
1. KEY: INSULATION TYPE (REFER TO PARAGRAPH 2.2 OF THIS SECTION):
a. FG = RIGID FIBERGLASS.
b. HFG = HIGH DENSITY RIGID FIBERGLASS.
c. E = FLEXIBLE ELASTOMERIC.

3.3 PIPING INSULATION APPLICATION SCHEDULE

A. BASIS OF THICKNESS CHART:
1. THICKNESSES SHOWN ARE BASED ON PRODUCTS HAVING A MAXIMUM "K" FACTOR OF 0.26 AT A MEAN TEMPERATURE OF 75 DEGREES F.
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b. SHALL BE INCREASED FOR PRODUCTS HAVING HIGHER "K" VALUES IN ORDER TO PRODUCE EQUIVALENT OR GREATER THERMAL RESISTANCE.

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1. PROVIDE PVC JACKET ON INSULATED EXPOSED PIPING WITHIN 7 FEET OF THE FLOOR.
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D. THICKNESS CHART (IN INCHES):
1. KEY: INSULATION TYPE (REFER TO PARAGRAPH 2.2 OF THIS SECTION):
a. FG = RIGID FIBERGLASS.
b. HFG = HIGH DENSITY RIGID FIBERGLASS.
c. E = FLEXIBLE ELASTOMERIC.

			PIPE SIZE					
	PIPING SYSTEM TYPE	TEMP. (°F) RANGE	LESS THAN 1"	1" TO [illegible]	[illegible] TO 3"	[illegible] TO 6"	8" & UP	*TYPE OF INSULATION
1.	DOMESTIC HOT WATER	[illegible]	1.0	[illegible]	1.0	1.5	1.5	FG, HFG, E
2.	MISCELLANEOUS	[illegible]	0.5	0.5	1.0	1.0	1.0	FG, HFG, E
3.	ROOF [illegible] OVERFLOW DRAINAGE**	[illegible]	--	--	1.0	1.0	1.0	FG, HFG, E
4.	DOMESTIC COLD WATER	40-[illegible]	0.5	0.5	1.0	1.0	1.0	FG, HFG, E
5.	NON-POTABLE COLD WATER	40-80	0.5	0.5	1.0	1.0	1.0	FG, HFG, E
6.	COOLING COIL DRAIN	--	0.5	0.5	0.5	1.0	--	FG, HFG, E
	* SEE "PART 2 - PRODUCTS ARTICLE 2.2 TYPES" FOR TYPES OF INSULATION. TYPE HFG TO BE USED WHENEVER TYPE FG OR HFG IS INDICATED. ** DOWNSPOUTS, INCLUDING SUMP, HORIZONTAL PIPING AND FIRST 2 FEET OF VERTICAL.							

END OF SECTION 22 07 19

SECTION 22 10 00 - PLUMBING PIPING AND PUMPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.

1.2 SUMMARY

A. THIS SECTION INCLUDES THE FURNISHING AND INSTALLATION OF ALL MATERIALS, LABOR, EQUIPMENT, SUPERVISION, FEES, AND SERVICES INCIDENTAL TO PROPER COMPLETION OF ALL PLUMBING SYSTEM WORK:
1. DOMESTIC COLD WATER SYSTEM.
2. DOMESTIC HOT WATER SYSTEM.
3. INTERIOR WASTE AND VENT PIPING TO 5'-0" OUTSIDE BUILDING.

1.3 REFERENCES

A. EXCEPT AS HEREIN SPECIFIED OR AS INDICATED ON THE DRAWINGS, THE WORK OF THIS SECTION SHALL COMPLY WITH THE FOLLOWING:
1. ANSI/ASME STANDARDS:
a. A112.19.2 - V.T. CHINA PLUMBING FIXTURES.
b. A112.1.2 - AIR GAPS IN PLUMBING SYSTEMS.
c. A112.21.1 - FLOOR DRAINS.
d. A112.36.2M - CLEANOUTS.
e. A112.26.1 - WATER HAMMER ARRESTERS.
2. ASSE (AMERICAN SOCIETY OF SANITARY ENGINEERING) STANDARDS:
a. 1001 - PIPE APPLIED ATMOSPHERIC TYPE VACUUM BREAKERS.
b. 1003 - WATER PRESSURE REDUCING VALVES.
c. 1011 - HOSE CONNECTION VACUUM BREAKERS.
d. 1012 - BACKFLOW PREVENTERS WITH INTERMEDIATE ATMOSPHERIC VENT.
e. 1013 - REDUCED PRESSURE PRINCIPAL BACKFLOW PREVENTER.
f. 1016 - INDIVIDUAL THERMOSTATIC PRESSURE BALANCING, AND COMBINATION PRESSURE BALANCING AND THERMOSTATIC CONTROL VALVES FOR INDIVIDUAL FIXTURE FITTINGS.
g. 1017 - TEMPERATURE ACTUATED MIXING VALVES FOR HOT WATER DISTRIBUTION SYSTEMS.
h. 1018 - TRAP SEAL PRIMER VALVES - POTABLE WATER SUPPLIED.
i. 1044 - TRAP SEAL PRIMER VALVES - DRAINAGE TYPE.
3. ASTM STANDARDS:
a. A53 - STEEL PIPE, BLACK AND HOT-DIPPED, ZINC-COATED, WELDED AND SEAMLESS.
b. A74 - CAST IRON SOIL PIPE AND FITTINGS.
c. A181 - CARBON STEEL FORGINGS FOR GENERAL PURPOSE PIPING.
d. A194 - CARBON AND ALLOY STEEL NUTS FOR BOLTS FOR HIGH-PRESSURE AND HIGH-TEMPERATURE SERVICE.
e. A234 - PIPING FITTINGS OF WROUGHT CARBON STEEL AND ALLOY STEEL FOR MODERATE AND ELEVATED TEMPERATURES.
f. A307 - CARBON STEEL BOLTS AND STUDS, 60,000 PSI TENSILE STRENGTH.
g. A395 - FERRITIC DUCTILE IRON PRESSURE-RETAINING CASTINGS FOR USE AT ELEVATED TEMPERATURES.
h. A518 - CORROSION-RESISTANT HIGH SILICON IRON CASTINGS.
i. B88 - SEAMLESS COPPER WATER TUBE.
j. B306 - COPPER DRAINAGE TUBE (DWV).
k. C76 - REINFORCED CONCRETE CULVERT, STORM DRAIN, AND SEWER PIPE.
l. C564 - RUBBER GASKETS FOR CAST IRON SOIL PIPE AND FITTINGS.
m. D2136 - TEST METHOD FOR COATED FABRICS - LOW TEMPERATURE BEND TEST.
n. D2657 - PRACTICE FOR HEAT FUSION JOINING OF POLYOLEFIN PIPE AND FITTINGS.
o. D2665 - POLY(VINYL CHLORIDE) (PVC) PLASTIC DRAIN, WASTE, AND VENT PIPE AND FITTINGS.
p. D2751 - ACRYLONITRILE-BUTADIENE-STYRENE (ABS) SEWER PIPE AND FITTINGS.
q. D3034 - TYPE PSM POLY(VINYL CHLORIDE) (PVC) SEWER PIPE AND FITTINGS.
r. D4101 - PROPYLENE PLASTIC INJECTION AND EXTRUSION MATERIALS.
s. F789 - TYPE PS-46 AND PS-115 POLY(VINYL CHLORIDE) (PVC) PLASTIC GRAVITY FLOW SEWER PIPE AND FITTINGS.
4. AWWA STANDARDS:
a. C500 - GATE VALVES FOR WATER AND SEWERAGE SYSTEMS.
b. M20 - WATER CHLORINATION PRINCIPLES AND PRACTICES.
5. PDI (PLUMBING AND DRAINAGE INSTITUTE) STANDARD: WH-201 - WATER HAMMER ARRESTERS.
6. ARI STANDARD: 1010 - DRINKING FOUNTAINS AND MECHANICALLY REFRIGERATED DRINKING WATER COOLERS.

1.4 SUBMITTALS

A. MANUFACTURER'S LITERATURE: FOR ALL PRODUCTS REQUIRED IN PART 2 OF THIS SECTION:
1. REQUIRED INFORMATION:
a. GENERAL:
• NAME OF MANUFACTURER.
• MODEL NUMBER.
• DIMENSIONS.
• DETAILS OF CONSTRUCTION AND INSTALLATION.
b. PERFORMANCE DATA:
• HEAT TRANSFER DEVICES.
• PUMPS.
2. NOT REQUIRED FOR PIPING OR HANGERS AND SUPPORTS.

1.5 QUALITY ASSURANCE

A. FABRICATION AND INSTALLATION PERSONNEL QUALIFICATIONS:
1. TRAINED AND EXPERIENCED IN THE FABRICATION AND INSTALLATION OF THE MATERIALS AND EQUIPMENT.
2. KNOWLEDGEABLE OF THE DESIGN AND THE REVIEWED SHOP DRAWINGS.

B. REGULATORY AGENCIES REQUIREMENTS:
1. ALL STATE AND LOCAL CODES AND ORDINANCES SHALL HAVE JURISDICTION.
2. ALL RELATED ELECTRICAL DEVICES SHALL BE HOUSED IN SUITABLE ENCLOSURES AS DEFINED BY THE NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION (NEMA).
3. ALL GAS-FIRED APPLIANCES AND INSTALLATION SHALL BE IN ACCORDANCE WITH AMERICAN GAS ASSOCIATION (AGA) GUIDELINES.

PART 2 - PRODUCTS

2.1 PIPE AND PIPE FITTINGS

A. COMPLY WITH THE REQUIREMENTS OF DIVISION 22 SECTIONS "CAST IRON PIPE AND FITTINGS FOR PLUMBING," "PLASTIC PIPE AND FITTINGS FOR PLUMBING" (BELOW FLOOR SLAB ONLY), AND "COPPER PIPE AND FITTINGS FOR PLUMBING."

B. REFER TO SCHEDULES IN PART 3 OF THIS SPECIFICATION FOR SPECIFIC APPLICATIONS OF PIPE MATERIALS TO PLUMBING SYSTEMS.

C. REFER TO DIVISION 22 SECTION "HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT" AND [illegible] SCHEDULE IN PART 3 OF THIS SECTION FOR HANGER AND SUPPORT REQUIREMENTS FOR PLUMBING SYSTEM PIPING.

2.2 VALVES

A. ABOVE GROUND VALVES: REFER TO DIVISION 22 SECTION "GENERAL DUTY VALVES FOR PLUMBING" FOR VALVE CONSTRUCTION AND MATERIAL REQUIREMENTS.

B. ASSE 1070 POINT OF USE THERMOSTATIC CONTROL VALVE:
1. CERTIFIED FOR COMPLIANCE WITH ASSE 1070 FOR INDIVIDUAL FIXTURE TEMPERATURE CONTROL.
2. SHALL USE A WAX FILLED THERMOSTATIC ELEMENT TO SENSE INCOMING TEMPERATURE [illegible]IONS AND MAINTAIN LEAVING WATER TEMPERATURE 3 DEGREES F OF SETPOINT FOR FLOWS DOWN TO [illegible].
3. CONSTRUCTION:
a. CAST BRONZE BODY.
b. STAINLESS STEEL INTERNAL COMPONENTS.
c. 125 PSIG RATED WORKING PRESSURE.
4. PROVIDE TAMPER RESISTANT SETPOINT ADJUSTMENT.
5. PROVIDE WITH INTEGRAL CHECK VALVES.
6. WATTS USG-B.

C. WATER PRESSURE REGULATORS:
1. MANUFACTURERS:
a. CLA-VAL COMPANY.
b. CONBRACO INDUSTRIES, INC.
c. FLOMATIC CORPORATION.
d. HONEYWELL BRAUKMANN.
e. WATTS INDUSTRIES, INC.; WATER PRODUCTS DIVISION.
f. ZURN INDUSTRIES, INC.; WILKINS DIVISION.
2. GENERAL: ASSE 1003, WATER REGULATORS, RATED FOR INITIAL WORKING PRESSURE OF 200 PSIG MINIMUM. INCLUDE INTEGRAL FACTORY INSTALLED OR SEPARATE FIELD INSTALLED, Y-PATTERN STRAINER:
a. NPS 2 AND SMALLER: BRONZE BODY WITH THREADED ENDS.
• GENERAL DUTY SERVICE: SINGLE SEATED, DIRECT OPERATED, UNLESS OTHERWISE INDICATED.
• BOOSTER HEATER WATER SUPPLY: SINGLE SEATED, DIRECT OPERATED WITH INTEGRAL BYPASS.
b. NPS 2-1/2 AND LARGER: BRONZE [illegible] BODY WITH FLANGED ENDS. INCLUDE AWWA C550 OR FDA APPROVED, INTERIOR EPOXY COATING FOR REGULATORS WITH CAST IRON BODY:
• TYPE: SINGLE SEATED, DIRECT OPERATED.
3. INTERIOR COMPONENTS: CORROSION RESISTANT MATERIALS.
4. EXTERIOR FINISH: POLISHED CHROME PLATE IF USED IN CHROME PLATED PIPING SYSTEM.

2.3 SPECIALTIES

A. SHOCK ABSORBERS:
1. FURNISH AND INSTALL WHERE INDICATED OR WHEREVER QUICK CLOSING VALVES (INCLUDING FLUSH VALVES) ARE UTILIZED. SHOCK ABSORBERS SHALL BE LOCATED AND SIZED IN ACCORDANCE WITH STANDARD PDI-WH-201.
2. MANUFACTURER: JOSAM, WADE, OR ZURN.

B. TRAP SEAL PRIMER VALVES:
1. FOR APPLICATIONS WITH INFREQUENT FAUCET OR FLUSH VALVE CYCLES, MOUNT REMOTE FROM TRAPS:
a. ETP-1: PROVIDE PRECISION PLUMBING PRODUCTS (PPP) MODEL PT-4 FLUSH MOUNTED CONTROLLER.
b. ETP-2: PROVIDE PRECISION PLUMBING PRODUCTS (PPP) MODEL PT-12 FLUSH MOUNTED CONTROLLER.
c. 115V, INCLUDING SOLENOID VALVE, REQUIRED DISTRIBUTORS, TIMER, AIR GAP, CONTROL PANEL.
d. MUST COMPLY WITH ASSE 1044.

2.4 BACKFLOW PREVENTER

A. DESCRIPTION: FURNISH AND INSTALL APPROVED BACKFLOW PREVENTER(S) AS INDICATED ON DRAWINGS. INCLUDE A SAFE WASTE DRAIN FOR DRIP FROM PREVENTER VALVES PIPED TO FLOOR DRAIN AND INSTALL STRAINERS AHEAD OF FIRST GATE VALVE.

2.5 CLEANOUTS

A. DESCRIPTION:
1. FURNISH AND INSTALL CLEANOUTS WHERE INDICATED ON DRAWINGS IN ACCORDANCE WITH THE FOLLOWING TABLE. WADE MODEL NUMBERS ARE FOR REFERENCE ONLY.
2. SERIES FLOOR CLEANOUT WITH NH SPIGOT OUTLET OR TY-SEAL OUTLET CONNECTION, THREADED ADJUSTABLE HOUSING, FLANGED FERRULE WITH TAPERED BRASS PLUG AND ROUND OR SQUARE NICKEL BRASS OR DUCTILE IRON VANDAL RESISTANT SECURED TOP FOR FLOOR FINISHES AS FOLLOWS:

CLEANOUTS	
LOCATION	WADE NUMBER
UNFINISHED CONCRETE (SCORIATED XH DI TOP)	W-6000-Z
CARPET (TEXTURED NB TOP WITH CARPET MAKER)	W-6000-CM
ASPHALT AND VINYL TILE (RECESSED NB TOP)	W-6000-TS
CERAMIC AND QUARRY TILE (SCORIATED NB TOP)	W-6000-XS
TERRAZZO (DEEP RECESSED NB TOP)	W-6000-U
OTHER LT DUTY FINISHES (TEXTURES NB TOP)	W-6000
OTHER XH DUTY FINISHES (SCORIATED XH NB TOP)	W-6000-X
EXTERIOR AREAS (SCORIATED XH DI TOP)	W-6000-Z
VERTICAL ROUGH PIPING (EXPOSED)	W-8560-E
CONCEALED PIPING IN WALLS	W-8560-E WITH -8480 - ROUND S.S. COVER

2.6 FLOOR DRAINS AND SINKS

A. FURNISH AND INSTALL FLOOR DRAINS AT LOW POINT OF SLOPED FLOOR.
1. PROVIDE 4-INCH DEEP SEAL TRAPS ON FLOOR DRAINS.
2. PROVIDE TAPPING FOR CONNECTION OF TRAP SEAL PRIMER LINE ON FLOOR DRAINS.
3. REFER TO PLUMBING FIXTURE SCHEDULE FOR SPECIFICATIONS.

2.7 GREASE INTERCEPTOR OR TRAP:

A. PROVIDE AND INSTALL GREASE INTERCEPTOR OR TRAP: PER FLOOR PLANS AND SCHEDULE.

B. INTERCEPTOR SHALL BE TESTED AND CERTIFIED TO THE P.D.I. STANDARD PDI-G101 AND ALSO BE MARKED.

C. FIELD VERIFY AND MATCH EXISTING GREASE INTERCEPTOR FLOW RATE AND GREASE HOLDING CAPACITY.

PART 3 - EXECUTION

3.1 WATER SUPPLY SERVICE SYSTEM

A. DESCRIPTION: INTERCONNECT INTO WATER SERVICE MAIN TERMINATING 5'-0" OUTSIDE BUILDING AND EXTEND INTO BUILDING AS REQUIRED. FURNISH AND INSTALL WATER METERS OF SIZE INDICATED ON THE DRAWINGS.

B. FEES, PERMITS, INSPECTION AND TESTS: PAY FOR ALL FEES, PERMITS, INSPECTIONS, AND TESTS RELATED TO THE WATER METER INSTALLATION.

C. PIPE AND FITTINGS: CAST IRON IN ACCORDANCE WITH DIVISION 22 SECTION "CAST IRON PIPE AND FITTINGS FOR PLUMBING."

3.2 DOMESTIC COLD AND HOT WATER SYSTEMS

A. DESCRIPTION: PROVIDE AS INDICATED ON THE DRAWINGS AND AS REQUIRED TO COMPLY WITH ALL APPLICABLE CODES AND REGULATIONS, COMPLETE SYSTEM OF PIPING, FITTINGS, VALVES, AUXILIARIES AND ACCESSORIES AS REQUIRED TO CONNECT COLD AND HOT WATER TO ALL ITEMS REQUIRING COLD OR HOT WATER.

B. PIPE AND FITTINGS:
1. ABOVE GRADE: TYPE L AND DRAWN COPPER IN ACCORDANCE WITH ASTM B88. EXPOSED PIPE AND FITTINGS AT FIXTURES SHALL BE CHROME PLATED.
2. BELOW GRADE: DUCTILE IRON IN ACCORDANCE WITH ANSI 16.9 A234 WPA AND DIVISION 22 SECTION "CAST IRON PIPE AND FITTINGS FOR PLUMBING." TYPE K SOFT TEMPER COPPER IN ACCORDANCE WITH ASTM B88 AND DIVISION 22 SECTION "COPPER PIPE AND FITTINGS FOR PLUMBING."
3. PROVIDE UNIONS AT EACH SCREWED VALVE, UNIONS, AND AT ALL POINTS IN THE PIPING SYSTEM WHERE NECESSARY TO FACILITATE DISMANTLING.

C. INSTALLATION:
1. ALL INTERIOR PIPING SHALL BE RUN SQUARE AND STRAIGHT WITH THE BUILDING.
2. PIPING IN FINISHED AREAS SHALL BE CONCEALED WITHIN WALLS, CHASES, ENCLOSURES, ETC.
3. PIPING IN EXPOSED AREAS SHALL BE RUN AS HIGH AS POSSIBLE WITHIN JOISTS AND BEAM SPACES, OR BELOW THE FLOOR AS INDICATED ON THE DRAWINGS.
4. PIPING SHALL FOLLOW APPROVED PATHS AS SHOWN OR INDICATED ON THE DRAWINGS. CONNECT TO EXISTING LINES WHERE REQUIRED OR TO EQUIPMENT IN AN APPROVED MANNER. LOCATE PIPES, VALVES AND EQUIPMENT ACCESSIBLE FOR MAINTENANCE, MINIMUM OBSTRUCTION OF PASSAGE AND WORK SPACES.
5. INSTALL DRAIN VALVES AT ALL LOW POINTS IN PIPING SYSTEM.
6. INSTALL ALL REQUIRED TRAP PRIMER SYSTEMS AND PIPING.

3.3 BUILDING SANITARY DRAINAGE SYSTEM

A. DESCRIPTION: FURNISH AND INSTALL THE ENTIRE BUILDING SANITARY DRAINAGE SYSTEM AS INDICATED ON THE DRAWINGS. SYSTEM INCLUDES, BUT IS NOT NECESSARILY LIMITED TO, THE FOLLOWING ITEMS: WASTE AND VENT PIPING FOR ALL PLUMBING, FIXTURES REQUIRING SAME, FLOOR DRAINS, CLEANOUTS.

B. MATERIAL:
1. ABOVE AND BELOW GROUND PIPING AS DEFINED IN PART 2 OF THIS SECTION.
2. DRAINS AND CLEANOUTS AS DEFINED IN PART 2 OF THIS SECTION.

C. INSTALLATION:
1. GENERAL RUNS OF SANITARY SEWER ARE INDICATED ON DRAWINGS DIAGRAMMATICALLY AND EVERY BEND, OFFSET, ETC., IS NOT NECESSARILY INDICATED, ALL OF WHICH MUST BE INSTALLED TO PROPERLY DRAIN ALL STACKS, FIXTURES, VENTS, ETC.
2. RUN HORIZONTAL WASTE LINES AT A MINIMUM SLOPE OF 1/8-INCH PER FOOT.
3. CONNECTIONS BETWEEN MAINS AND LATERALS SHALL BE MADE WITH WYES AND 1/8 BENDS.
4. CHANGES IN DIRECTION SHALL BE WITH LONG RADIUS ELLS EXCEPT IN STACKS WHERE SANITARY TEES AND SHORT RADIUS 1/4 BENDS MAY BE USED IN CHANGES FROM HORIZONTAL TO VERTICAL.
5. FLASH ALL VENT STACKS AT THE ROOF.
6. CLEANOUTS SHALL BE INSTALLED WHERE REQUIRED BY CODE AND AS INDICATED ON THE DRAWINGS AND SPECIFIED HEREIN. THEY SHALL BE ACCESSIBLY LOCATED, SET FLUSH WITH FINISH SURFACE OR FINISH GRADE, AND SHALL BE SAME NOMINAL PIPE SIZE AS LINE SERVED, BUT NO LARGER THAN 4 INCHES. STAINLESS STEEL COVER PLATES REQUIRED FOR WALL ACCESSED CLEANOUTS.
7. CLEANOUTS INDICATED FOR LINES OUTSIDE OF BUILDING SHALL BE INSTALLED WITH A Y CONNECTION AND A 4 DEGREES ELBOW EXTENDING TO GRADE WITH BELL SET IN CONCRETE COLLAR NOT LESS THAN 12 INCHES SQUARE AND 12 INCHES THICK.
8. PROVIDE CLEANOUTS LOCATED IN WATERPROOF ABOVE GRADE FLOORS WITH FLASHING FLANGE AND CLAMP DEVICE. FLASH WITH 60 MIL PVC MEMBRANE MINIMUM 4-FOOT SQUARE.
9. FURNISH AND INSTALL STACK BASE FITTINGS AT THE BASE OF EACH RISER SET ON A CONCRETE OR BRICK BASE ON FIRM SOIL. ALL VERTICAL RISERS SHALL BE SUPPORTED AT FLOORS.
10. PITCH VENT LINES TO GRAVITY DRAIN TO WASTE PIPE.

3.4 NATURAL GAS

A. DESCRIPTION: PROVIDE AS INDICATED ON THE DRAWINGS AND AS REQUIRED TO COMPLY WITH ALL APPLICABLE CODES AND REGULATIONS, COMPLETE SYSTEM OF PIPING, FITTINGS, VALVES, AUXILIARIES AND ACCESSORIES AS REQUIRED TO CONNECT NATURAL GAS TO ALL ITEMS REQUIRING NATURAL GAS.

B. MATERIAL:
1. PIPE - SCHEDULE 40 BLACK STEEL WITH THREADED OR WELDED FITTINGS. POLYETHYLENE 265 PSI COILED TUBING WITH HEAT FUSION JOINTS MAY BE UTILIZED UNDERGROUND.
2. VALVES - PLUG COCKS, ROCKWELL 142 OR 143. SOLENOID, UL LISTED FOR GAS SERVICE. EXPLOSION PROOF OPERATOR.

REGULATOR, FISHER TYPE 3.
FLEX CONNECTORS, FLEXONICS 360.

3. ALL UNDERGROUND STEEL GAS PIPING IN DIRECT CONTACT WITH THE EARTH SHALL BE WRAPPED AND TARRED TO PROVIDE MAXIMUM CORROSION PROTECTION, AND LAID IN A SAND BED, WITH A MINIMUM OF 6" COVER AROUND PIPE. AT THE OPTION OF THE CONTRACTOR, "X-TRU-COAT" PIPE MAY BE USED. FIELD JOINTS SHALL BE MADE OF EQUIVALENT PRIMER AND TYPE.
4. GAS PIPING IN RETURN AIR PLENUM, WHERE PERMITTED SHALL BE WELDED, ONE PIECE.

C. INSTALLATION:
1. ALL INTERIOR PIPING SHALL BE RUN SQUARE AND STRAIGHT WITH THE BUILDING.
2. PIPING IN FINISHED AREAS SHALL BE CONCEALED WITHIN WALLS, CHASES, ENCLOSURES, ETC.
3. PIPING IN EXPOSED AREAS SHALL BE RUN AS HIGH AS POSSIBLE WITHIN JOISTS AND BEAM SPACES, OR BELOW THE FLOOR AS INDICATED ON THE DRAWINGS.
4. PIPING SHALL FOLLOW APPROVED PATHS AS SHOWN OR INDICATED ON THE DRAWINGS. CONNECT TO EXISTING LINES WHERE REQUIRED OR TO EQUIPMENT IN AN APPROVED MANNER. LOCATE PIPES, VALVES AND EQUIPMENT ACCESSIBLE FOR MAINTENANCE, MINIMUM OBSTRUCTION OF PASSAGE AND WORK SPACES.
5. INSTALL DIRT LEGS AT ALL LOW POINTS IN PIPING SYSTEM AND WHERE [illegible] BY CODE.
6. FLASH ALL PENETRATIONS AT THE ROOF.

3.5 CLEANING, TESTING, CHLORINATION

A. AS PIPING MATERIAL IS ERECTED, THE INSIDE OF ALL PIPING SHALL BE THOROUGHLY CLEANED OF FOREIGN MATERIAL. FLUSH AND TEST PIPING BEFORE OPERATION IN ACCORDANCE WITH DIVISION 22 SECTION "TESTING AND CLEANING OF PLUMBING SYSTEMS."

B. ON COMPLETION OF THE DOMESTIC WATER PIPING SYSTEMS, CHLORINATE THE SYSTEM USING METHODS ACCEPTABLE TO AND APPROVED BY ENGINEER. FURNISH ALL CHLORINE AND CHLORINATING EQUIPMENT.

C. AFTER SYSTEM CHLORINATION IS COMPLETE, SUBMIT WATER SAMPLES TO THE [illegible] HEALTH DEPARTMENT FOR TESTING. TAKE SAMPLES AS DIRECTED BY ENGINEER, AND PROVIDE ENGINEER WITH [illegible] FROM THE GOVERNING HEALTH DEPARTMENT [illegible]TING TEST RESULTS.

3.6 SCHEDULES

STORM AND SANITARY					
BELOW GROUND					
SANITARY - MINIMUM SIZE 2"					
SYSTEM	SCHD.	MATERIAL	SPECIFICATIONS		REMARKS
SANITARY / VENT		CAST IRON	ASTM A74		BELL & SPIGOT WITH ELASTOMERIC COMPRESSIVE GASKET
SANITARY / VENT		CAST IRON	ASTM C564, A888		NO HUB WITH HEAVY DUTY COUPLINGS
SANITARY / VENT		STAINLESS STEEL	ASME A112.3.1		SOCKET AND SPIGOT
ABOVE GROUND					
SYSTEM	SCHD.	MATERIAL	SPECIFICATIONS		REMARKS
SANITARY / VENT		CAST IRON	ASTM A74		BELL & SPIGOT WITH ELASTOMERIC COMPRESSIVE GASKET
SANITARY / VENT		CAST IRON	ASTM C564, A888		NO HUB WITH HEAVY DUTY COUPLINGS
SANITARY / VENT		STAINLESS STEEL	ASME A112.3.1		SOCKET AND SPIGOT
DWV		COPPER	ASTM B306		ANSI B16.23 SOLDERED
DOMESTIC WATER - 125 PSI MAXIMUM PRESSURE					
BELOW GROUND					
PIPE SIZE	SCHD.	MATERIAL	SPECIFICATIONS		REMARKS
1/2" - 2"	TYPE K	SOFT COPPER	ASTM B88		FLARED FITTINGS
2 1/2" - 12"	TYPE K	DUCTILE IRON	ASTM 16.9 A234 WPA		ANSI A21.11 MECH. JOINT
ABOVE GROUND					
PIPE SIZE	SCHD.	MATERIAL	SPECIFICATIONS	GRADE	REMARKS
1/4" - 6"	TYPE L	COPPER	ASTM B88	-	SOLDER 95/5 SOLDERED

VALVES			
VALVE TYPE	SIZE	DESCRIPTION	ENDS
SHUTOFF	1/2" - 2"	150 LB. BRONZE GATE	SCREWED
SHUTOFF	1/2" - 2"	150 LB. BRONZE BALL	SOLDER / SCREWED
SHUTOFF	2 1/2" - 4"	125 LB. IBBM OS&Y GATE	FLANGED
CHECK	1/2" - 1 1/2"	125 LB. BRONZE SWING CHECK	SOLDER / SCREWED
CHECK	2 - 6"	125 LB. IBBM SWING CHECK	FLANGED

END OF SECTION 22 10 00

SECTION 22 40 00 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND DIVISION 01 SPECIFICATION SECTIONS, APPLY TO THIS SECTION.

1.2 SUMMARY

A. THIS SECTION INCLUDES THE FURNISHING AND INSTALLATION OF PLUMBING FIXTURES.

B. DIVISION OF WORK:
1. IN ACCORDANCE WITH THE GENERAL CONDITIONS, CONTRACTOR IS RESPONSIBLE FOR DIVIDING THE WORK AMONG THE SUBCONTRACTORS AND SUPPLIERS AND FOR DELINEATING THE WORK TO BE PERFORMED BY SPECIFIC TRADES.
2. THE FOLLOWING ARE SUGGESTIONS AS TO HOW THE WORK MAY BE DIVIDED. THIS IS NOT A COMPLETE LIST OF ALL THE WORK.
a. GENERAL CONTRACTOR: INSTALL OR ARRANGE FOR INSTALLATION OF ALL FIXTURE SUPPORTS AND CARRIERS AS DIRECTED BY MECHANICAL SUBCONTRACTOR.
b. MECHANICAL SUBCONTRACTOR:
• FURNISH ALL REQUIRED FIXTURE SUPPORTS AND CARRIERS.
• INSTRUCT GENERAL CONTRACTOR REGARDING LOCATION AND INSTALLATION OF SUPPORTS AND CARRIERS.
• BE RESPONSIBLE FOR PROPER ROUGH-IN LOCATIONS AND DIMENSIONS.

1.3 REFERENCES

A. EXCEPT AS HEREIN SPECIFIED OR AS INDICATED ON THE DRAWINGS, THE WORK OF THIS SECTION SHALL COMPLY WITH THE FOLLOWING:
1. ANSI STANDARD:
a. A112.18.1 - FINISHED AND ROUGH BRASS PLUMBING FIXTURE FITTINGS.
b. A112.19.2 - VITREOUS CHINA PLUMBING FIXTURES.
c. A112.19.3 - STAINLESS STEEL PLUMBING FIXTURES.
d. A112.19.5 - TRIM FOR WATER CLOSET BOWLS, TANKS & URINALS.
e. A117.1 - BUILDINGS AND FACILITIES - PROVIDING ACCESSIBILITY AND USABILITY FOR PHYSICALLY HANDICAPPED PEOPLE.
f. Z358.1 - STANDARD FOR EMERGENCY EYEWASH AND SHOWER EQUIPMENT.
2. ADA - AMERICANS WITH DISABILITIES ACT.
3. ASSE - AMERICAN SOCIETY OF SANITARY ENGINEERS.

1.4 SUBMITTALS

A. MANUFACTURER'S LITERATURE: FOR FIXTURES.
1. MODEL NUMBER/NAME.
2. MANUFACTURER'S NAME.
3. DIMENSIONS.
4. COLOR/FINISH.

1.5 QUALITY ASSURANCE

A. INSTALLING PERSONNEL SHALL BE ADEQUATELY TRAINED AND EXPERIENCED IN THE INSTALLATION OF THE MATERIALS AND EQUIPMENT.

B. REGULATORY REQUIREMENTS:
1. COMPLY WITH 2015 INTERNATIONAL PLUMBING CODE.
2. INSTALLATION SHALL COMPLY WITH AMERICANS WITH DISABILITY ACT (ADA) REGARDING TYPE OF FIXTURES AND TRIM, HEIGHT AND CLEARANCE REQUIREMENTS, AND SAFETY COMPONENTS AND SYSTEMS.
3. COMPLY WITH AMERICANS FOR DISABILITY LAWS.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. FIXTURES: TOTO, ELKAY SINKS, AND HAWS.

B. FLUSH VALVES: TOTO.

C. ADA DRAIN AND WATER LINE SAFETY COVERS AT LAVATORIES AND SINKS:
1. HANDY SHIELD SAFETY COVERS, PLUMBEREX SPECIALTY PRODUCTS, CATHEDRAL CITY, CA.
2. HANDI LAV-GUARD, TRUEBRO, INC., ELLINGTON, CT.

D. FAUCETS: TOTO.

E. FIXTURE CARRIERS: WADE, JOSAM, ZURN, SIOUX CHIEF, WATTS.

2.2 GENERAL

A. TRAPS:
1. EQUIP FIXTURES WITH TRAPS (WITH CLEANOUTS) UNLESS INDICATED OTHERWISE, OF THE SAME SIZE AS THE FIXTURE CONNECTION.
2. P-TRAPS (ABOVE GRADE): CAST BRASS, ADJUSTABLE, WITH A CLEANOUT PLUG AND 17 GAGE TUBING OUTLET, CHROME PLATED.
3. SIZE BRANCH LINES AS INDICATED.

B. ASSEMBLIES:
1. WHERE FIXTURES ARE DESCRIBED BY A MANUFACTURER'S ASSEMBLY NUMBER, FURNISH THE COMPLETE ASSEMBLY.
2. ADDITIONAL ITEMS NOT ORDINARILY FURNISHED IN THE ASSEMBLY WILL BE INDICATED OR NOTED.

C. WHERE ROUGHING-IN OR INSTALLING FIXTURES AND EQUIPMENT FURNISHED BY OTHER TRADES, PROVIDE REQUIRED STOPS, SUPPLIES AND TRAPS, AS WELL AS ROUGH-IN, INSTALLATION, AND CONNECTING WORK.

D. FINISHES:
1. VITREOUS CHINA FIXTURES: WHITE, UNLESS SPECIFICALLY NOTED OTHERWISE.
2. STAINLESS STEEL FIXTURES: 20 GAGE MINIMUM, TYPE 302, NICKEL BEARING STAINLESS STEEL, UNLESS OTHERWISE NOTED.
3. TRIM, FITTINGS, TRAPS, ETC., WHERE EXPOSED TO VIEW: HEAVY CHROME PLATED.

2.3 WATER CLOSETS, URINALS AND LAVATORIES

A. REFER TO THE SCHEDULES ON THE DRAWINGS FOR SPECIFIC APPLICATIONS AND THE BASIS OF DESIGN SELECTIONS.

B. FIXTURE CARRIERS:
1. MANUFACTURER: WADE, ZURN JOSAM, JAY R. SMITH, OR WATTS.
2. REQUIREMENTS:
a. SECURE WALL MOUNTED LAVATORIES INTO POSITION BY MEANS OF CARRIERS SPECIFICALLY MANUFACTURED FOR THE FIXTURE INSTALLED.
b. CARRIERS SHALL BE OF PROPER SIZE TO FIT WITHIN THE SPACE ALLOTTED.
3. SUPPORTS: PROVIDE ADEQUATE INTERNAL SUPPORTS FOR WALL MOUNTING BRACKETS.

C. BARRIER FREE SPECIAL TRIM:
1. LAVATORY FAUCET ACTIVATES WATER FLOW ONLY WHEN THE USER'S HANDS ENTER INFRARED DETECTION ZONE.
2. FAUCET TURNS ITSELF OFF AFTER THE HANDS ARE REMOVED FROM DETECTION ZONES.
3. INCOMING WATER SHALL BE TEMPERED WITH THERMOSTATIC MIXING VALVE.
4. TEMPERED WATER SHALL NOT EXCEED 105 DEGREES F.
5. BARRIER FREE LAVATORIES SHALL HAVE WATER SUPPLY TEMPERED WITH AN A.S.S.E. 1016 DEVICE.
6. ADA APPROVED DRAIN AND WATER SAFETY COVERS ARE REQUIRED ON ALL EXPOSED PIPING UNDER BARRIER FREE LAVATORIES.

2.4 SERVICE SINKS AND SINKS

A. REFER TO SCHEDULES ON THE DRAWINGS FOR SPECIFIC APPLICATIONS AND THE BASIS OF DESIGN SELECTION.

PART 3 - EXECUTION

3.1 INSTALLATION

A. INSTALL FIXTURES AT PROPER HEIGHTS IN ACCORDANCE WITH APPLICABLE CODES AND AS INDICATED ON THE DRAWINGS.

B. POINT UP AROUND FIXTURES WHERE THEY ABUT [illegible] UNLESS SO DIRECTED BY ENGINEER.

C. SECURELY FASTEN FIXTURES TO THE FLOOR, WALL, OR COUNTER. FIXTURES SHALL BE LEVEL AND SQUARE.

D. FOLLOW MANUFACTURER'S INSTRUCTIONS FOR FIXTURE INSTALLATION, ESPECIALLY FOR GROUTING AND CALKING.

3.2 INSPECTION

A. INSPECT EACH FIXTURE AND UNIT FOR DAMAGE TO FINISH.

B. REMOVE AND REPLACE CRACKED, DENTED UNITS AND UNITS OR ITEMS UNABLE TO BE REPAIRED OR RESTORED TO A CONDITION ACCEPTABLE TO ENGINEER.

3.3 CLEANING

A. THOROUGHLY CLEAN BY WASHING WITH SOAP AND DISINFECTANT SOLUTION ON ALL PLUMBING FIXTURES.

B. REMOVE, CLEAN, AND REINSTALL AERATORS.

END OF SECTION 22 40 00

GEORGIA REGISTERED PROFESSIONAL ENGINEER No. PE033498 TIM L SCOTT

4-22-18

SIGNATURE DATE:

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SHEET LEGEND

G000's	GENERAL INFORMATION & SCOPE OF WORK
N100's	EGRESS / ADA PLANS & DETAILS
A100's	FLOOR PLANS & CEILING PLANS
A200's	EXTERIOR & INTERIOR ELEVATIONS
A300's	BUILDING SECTIONS
A400's	ENLARGED PLANS
A500's	EXTERIOR & INTERIOR DETAILS
A600's	DOOR SCHEDULE, DOOR DETAILS, FINISH SCHEDULE, FINISH PLANS
Q100's	AUDITORIUM SIGHT LINE SECTIONS
Q120's	AUDITORIUM SEATING PLAN
S's	STRUCTURAL
M's	MECHANICAL
P's	PLUMBING
E's	ELECTRICAL
WF's	WAYFINDING DETAILS
FS's	CASEWORK & EQUIPMENT

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11500 Ash Street
Leawood, KS 66211

No.	Date	Description

Project Issue Date:

KEY PLAN:

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SHEET TITLE:
PLUMBING SPECIFICATIONS

SHEET NUMBER:
P704

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