

## PLUMBING

### SECTION 220516 - EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPING

- 1.1 REQUIREMENTS
  - A. PROVIDE FOR EXPANSION OF PLUMBING PIPING IN ACCORDANCE WITH INDUSTRY STANDARDS AND GOOD INSTALLATION PRACTICES.

END OF SECTION 220516

## PLUMBING

### SECTION 220517 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

- 1.1 SLEEVE-SEAL SYSTEMS
  - A. FIELD-ASSEMBLED, MODULAR SEALING-ELEMENT UNIT FOR FILLING ANNULAR SPACE BETWEEN PIPING AND SLEEVE.
    1. SEALING ELEMENTS: NBR
    2. PRESSURE PLATES: STAINLESS STEEL
    3. CONNECTING BOLTS AND NUTS: STAINLESS STEEL
- 1.2 SLEEVE AND SLEEVE-FITTINGS
  - A. MANUFACTURED PLASTIC, SLEEVE-TYPE, PLASTIC OR RUBBER WATERSTOP ASSEMBLY MADE FOR IMBEDDING IN CONCRETE SLAB OR WALL.
- 1.3 GROUT
  - A. NONSHRINK, FACTORY PACKAGED.
- 1.4 SLEEVE AND SLEEVE-SEAL SCHEDULE
  - A. EXTERIOR CONCRETE WALLS ABOVE GRADE:
    1. PIPING SMALLER THAN NPS 6 (DN 150): CAST-IRON WALL SLEEVES
  - B. EXTERIOR CONCRETE WALLS BELOW GRADE:
    1. PIPING SMALLER THAN NPS 6 (DN 150): CAST-IRON WALL SLEEVES WITH SLEEVE-SEAL SYSTEM
  - C. CONCRETE SLABS-ON-GRADE:
    1. PIPING SMALLER THAN NPS 6 (DN 150): CAST-IRON WALL SLEEVES WITH SLEEVE-SEAL SYSTEM
  - D. CONCRETE SLABS ABOVE GRADE:
    1. PIPING SMALLER THAN NPS 6 (DN 150): GALVANIZED-STEEL-PIPE SLEEVES OR PVC-PIPE SLEEVES
  - E. INTERIOR PARTITIONS:
    1. PIPING SMALLER THAN NPS 6 (DN 150): GALVANIZED-STEEL-PIPE SLEEVES OR PVC-PIPE SLEEVES

END OF SECTION 220517

## PLUMBING

### SECTION 220523 - GENERAL DUTY VALVES FOR PLUMBING PIPING

- 1.1 DOMESTIC HOT- AND COLD-WATER VALVES
  - A. PIPE NPS 2 (DN 50) AND SMALLER:
    1. TWO-PIECE, BRASS BALL VALVES WITH FULL PORT, BRASS TRIM, AND LEAD FREE.
  2. THREE-PIECE, BRASS BALL VALVES WITH FULL PORT, BRASS TRIM, AND LEAD FREE.
  3. BRONZE SWING CHECK VALVES, CLASS 150, BRONZE DISC WITH THREADED END CONNECTIONS, AND LEAD FREE.
  4. BRONZE GATE VALVES, CLASS 150 WITH THREADED ENDS, AND LEAD FREE.

END OF SECTION 220523

## PLUMBING

### SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING

- 1.1 COMPONENTS
  - A. METAL PIPE HANGERS AND SUPPORTS: FACTORY FABRICATED WITH GALVANIZED COATING, NON-METALLIC COATED FOR HANGERS IN DIRECT CONTACT WITH COPPER TUBING.
  - B. THERMAL-HANGER SHIELD INSERTS: ASTM C 552, TYPE II CELLULAR GLASS.
  - C. FASTENER SYSTEMS: POWDER-ACTUATED FASTENERS
  - D. PIPE POSITIONING SYSTEMS: IAPMO PS 42, POSITIONING SYSTEM OF METAL BRACKETS, CLIPS, AND STRAPS.
  - E. SUPPORTS FOR PEX PIPING SHALL BE MANUFACTURER APPROVED.
  - F. PROVIDE TRACE WIRE FOR ALL PLASTIC UNDERGROUND PIPING SO THAT UNDERGROUND PIPING MAY BE LOCATED IN THE FUTURE. TRACE WIRE: NO. 12, COPPER 600 V, THHN INSULATION

END OF SECTION 220529

## PLUMBING

### SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

- 1.1 PRODUCTS
  - A. EQUIPMENT LABELS: PLASTIC
  - B. WARNING SIGNS AND LABELS: 1/16 (1.6 MM) INCH THICK AND NOT LESS THAN 2-1/2 BY 3/4 INCH (64 BY 19 MM) SIZE WITH ADHESIVE LETTER SIZE NOT LESS THAN 1/4 INCH WITH ADHESIVE LETTER SIZE NOT LESS THAN 1/4 (6.4 MM) INCH FOR NAME OF UNITS IF VIEWING DISTANCE IS LESS THAN 24 INCHES, 1/2 INCH FOR VIEWING DISTANCES UP TO 72 INCHES (1830 MM), AND PROPORTIONATELY LARGER LETTERING FOR GREATER VIEWING DISTANCES. INCLUDE SECONDARY LETTERING TWO-THIRDS TO THREE-QUARTERS THE SIZE OF PRINCIPAL LETTERING.
  - C. PIPE LABELS: SELF-ADHESIVE LETTER SIZE NOT LESS THAN 1/2 INCH (13 MM) FOR VIEWING DISTANCES UP TO 72 INCHES (1830 MM) AND PROPORTIONATELY LARGER LETTERING FOR GREATER VIEWING DISTANCES.
  - D. STENCILS: ALUMINUM, LETTER SIZE NOT LESS THAN 1/2 INCH (13 MM) FOR VIEWING DISTANCES UP TO 72 INCHES (1830 MM) AND PROPORTIONATELY LARGER LETTERING FOR GREATER VIEWING DISTANCES.
  - E. VALVE TAGS: STAINLESS STEEL, 0.025-INCH (0.64-MM) MINIMUM THICKNESS.

END OF SECTION 220553

## PLUMBING

### SECTION 220719 - PLUMBING PIPING INSULATION

- 1.1 QUALITY ASSURANCE
  - A. SURFACE-BURNING CHARACTERISTICS: FLAME-SPREAD INDEX OF 25, AND SMOKE-DEVELOPED INDEX OF 50 FOR INSULATION INSTALLED INDOORS ACCORDING TO ASTM E 84.
- 1.2 PIPING INSULATION SCHEDULE, GENERAL
  - A. ITEMS NOT INSULATED: UNLESS OTHERWISE INDICATED, DO NOT INSTALL INSULATION ON THE FOLLOWING:
    1. DRAINAGE PIPING LOCATED IN CRAWL SPACES.
    2. BELOW-GRADE DRAINAGE PIPING.
    3. CHROME-PLATED PIPES AND FITTINGS UNLESS THERE IS A POTENTIAL FOR PERSONNEL INJURY.
- 1.3 INDOOR PIPING INSULATION SCHEDULE
  - A. DOMESTIC COLD WATER: FLEXIBLE ELASTOMERIC, MINERAL-FIBER, PREFORMED PIPE INSULATION, TYPE I OR PHENOLIC.
  - B. DOMESTIC HOT AND RECIRCULATED HOT WATER: FLEXIBLE ELASTOMERIC, MINERAL-FIBER, PREFORMED PIPE INSULATION, TYPE I OR PHENOLIC.
  - C. STORMWATER AND OVERFLOW: 1/2" MINIMUM, CELLULAR GLASS, FLEXIBLE ELASTOMERIC, MINERAL-FIBER, PREFORMED PIPE INSULATION, TYPE I, PHENOLIC OR POLYOLEFIN.
  - D. ROOF DRAIN AND OVERFLOW DRAIN BODIES: 1/2" MINIMUM, CELLULAR GLASS, FLEXIBLE ELASTOMERIC, MINERAL-FIBER, PREFORMED PIPE INSULATION, TYPE I, PHENOLIC OR POLYOLEFIN.
  - E. EXPOSED SANITARY DRAINS, DOMESTIC WATER, AND DOMESTIC HOT WATER: FLEXIBLE ELASTOMERIC OR MINERAL-FIBER, PREFORMED PIPE INSULATION, TYPE I.
  - F. EXPOSED FLOOR DRAIN BODIES, TRAPS, AND SANITARY DRAIN PIPING WITHIN 10 FEET (3 M) OF DRAIN RECEIVING CONDENSATE AND EQUIPMENT DRAIN WATER BELOW 60 DEG F (16 DEG C); 3/4" MINIMUM, FLEXIBLE ELASTOMERIC, MINERAL-FIBER, PREFORMED PIPE INSULATION, TYPE I, PHENOLIC OR POLYOLEFIN.
  - G. HOT SERVICE DRAINS: CELLULAR GLASS OR MINERAL-FIBER, PREFORMED PIPE, TYPE I OR II.
  - H. ICE BIN DRAIN: INSULATE DRAIN LINES WITH 1/2" (13MM) THICK SELF-SEALING, SECTIONAL, CLOSED CELL FOAM.
  - I. DOMESTIC COLD AND HOT WATER IN CASEWORK AND BAR AREAS: FLEXIBLE ELASTOMERIC, MINERAL-FIBER, PREFORMED PIPE INSULATION, TYPE I OR PHENOLIC.
  - J. HVAC HOT AND CHILLED WATER PIPING INCLUDING LOW PRESSURE STEAM: 1-1/2" (38MM) MINIMUM THICKNESS (OR THICKER PER LOCAL CODE) CELLULAR GLASS OR MINERAL FIBER, PREFORMED PIPE, TYPE I OR II.

- 1.4 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE
  - A. DOMESTIC WATER PIPING: FLEXIBLE ELASTOMERIC, MINERAL-FIBER, PREFORMED PIPE INSULATION, TYPE I OR PHENOLIC.
  - B. HOT SERVICE DRAINS: CELLULAR GLASS OR MINERAL-FIBER, PREFORMED PIPE, TYPE I.
  - C. HOT SERVICE VENTS: CELLULAR GLASS OR MINERAL-FIBER, PREFORMED PIPE INSULATION, TYPE II.

END OF SECTION 220719

## PLUMBING

### SECTION 221116 - DOMESTIC WATER PIPING

- 1.1 INFORMATIONAL SUBMITTALS
  - A. SYSTEM PURGING AND DISINFECTING ACTIVITIES REPORT.
  - B. FIELD QUALITY-CONTROL REPORTS.
- 1.2 FIELD CONDITIONS
  - A. INTERRUPTION OF EXISTING WATER SERVICE: DO NOT INTERRUPT WATER SERVICE TO FACILITIES OCCUPIED BY OWNER OR OTHERS UNLESS PERMITTED UNDER THE FOLLOWING CONDITIONS AND THEN ONLY AFTER ARRANGING TO PROVIDE TEMPORARY WATER SERVICE ACCORDING TO REQUIREMENTS INDICATED:
    1. NOTIFY CONSTRUCTION MANAGER NO FEWER THAN TWO DAYS IN ADVANCE OF PROPOSED INTERRUPTION OF WATER SERVICE.
    2. DO NOT INTERRUPT WATER SERVICE WITHOUT CONSTRUCTION MANAGER'S WRITTEN PERMISSION.
- 1.3 PIPING MATERIALS
  - A. POTABLE-WATER PIPING AND COMPONENTS SHALL COMPLY WITH NSF 14 AND NSF 61 ANNEX G. PLASTIC PIPING COMPONENTS SHALL BE MARKED WITH "NSF-PW".
- 1.4 UNDER-BUILDING-SLAB, DOMESTIC WATER, BUILDING SERVICE PIPING
  - A. PIPE NPS 3 (DN 80) AND SMALLER:
    1. SOFT COPPER TUBE; WROUGHT-COPPER; AND BRAZED JOINTS.
    2. OTHER APPROVED PIPING WHEN SOIL IS CORROSIVE.
    3. PROVIDE TRACE WIRE FOR ALL PLASTIC UNDERGROUND PIPING SO THAT UNDERGROUND PIPING MAY BE LOCATED IN THE FUTURE. TRACE WIRE: NO. 12, COPPER 600 V, THHN INSULATION
- 1.5 UNDER-BUILDING-SLAB, DOMESTIC WATER PIPING
  - A. PIPE NPS 2 (DN 50) AND SMALLER:
    1. HARD OR SOFT COPPER TUBE; WROUGHT-COPPER; AND BRAZED JOINTS.
    2. OTHER APPROVED PIPING WHEN SOIL IS CORROSIVE.
    2. PROVIDE TRACE WIRE FOR ALL PLASTIC UNDERGROUND PIPING SO THAT UNDERGROUND PIPING MAY BE LOCATED IN THE FUTURE. TRACE WIRE: NO. 12, COPPER 600 V, THHN INSULATION
- 1.6 ABOVE GROUND DOMESTIC WATER PIPING
  - A. PIPE NPS 2 (DN 50) AND SMALLER:
    1. HARD COPPER TUBE; WROUGHT-COPPER; SOLDER-JOINT FITTINGS; AND SOLDERED JOINTS WITH NON-LEAD, NON-ANTIMONY SOLDER.
    2. PEX TUBE, NPS 1 (DN25) AND SMALLER; FITTINGS FOR PEX TUBE; AND WITH APPROVED/MANUFACTURER COMPATIBLE JOINTS.
    3. PEX-AL-PEX TUBE, NPS 1 (DN 25) AND SMALLER; FITTINGS FOR PEX-AL-PEX TUBE; AND WITH APPROVED/MANUFACTURER COMPATIBLE JOINTS.

END OF SECTION 221116

## PLUMBING

### SECTION 221316 - SANITARY WASTE AND VENT PIPING

- 1.1 PROJECT CONDITIONS
  - A. INTERRUPTION OF EXISTING SANITARY WASTE SERVICE: DO NOT INTERRUPT SERVICE TO FACILITIES OCCUPIED BY OWNER OR OTHERS UNLESS PERMITTED UNDER THE FOLLOWING CONDITIONS AND THEN ONLY AFTER ARRANGING TO PROVIDE TEMPORARY SERVICE ACCORDING TO REQUIREMENTS INDICATED:
    1. NOTIFY CONSTRUCTION MANAGER NO FEWER THAN TWO DAYS IN ADVANCE OF PROPOSED INTERRUPTION OF SANITARY WASTE SERVICE.
    2. DO NOT PROCEED WITH INTERRUPTION OF SANITARY WASTE SERVICE WITHOUT CONSTRUCTION MANAGER'S WRITTEN PERMISSION.
- 1.2 MATERIALS
  - A. HUB-AND-SPIGOT, SERVICE- CLASS, CAST-IRON SOIL PIPE AND FITTINGS BELOW GRADE WHERE REQUIRED BY LOCAL CODE.
  - B. HUBLESS, CAST-IRON SOIL PIPE AND CISPI, CAST-IRON, HUBLESS PIPING COUPLINGS.
  - C. SOLID-WALL SCHEDULE 40 ABS PIPE WITH ABS SOCKET FITTINGS MAY BE USED ABOVE AND BELOW GRADE IF ALLOWED BY LOCAL CODE.
  - D. PE-FILM ENCASMENT FOR UNDERGROUND METAL PIPING.
  - E. SCHEDULE 40 PVC PIPE WITH PVC SOCKET FITTING MAY BE USED BELOW GRADE IF ALLOWED BY LOCAL AUTHORITY.
- 1.3 ADHESIVES
  - A. ADHESIVES SHALL NOT EXCEED A VOC CONTENT OF 510G/L FOR PVC AND 325 G/L FOR ABS.

END OF SECTION 221316

## PLUMBING

### SECTION 221319 - SANITARY WASTE PIPING SPECIALTIES

- 1.1 ACTION SUBMITTALS
  - A. PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED, INCLUDE RATED CAPACITIES, OPERATING CHARACTERISTICS, AND ACCESSORIES FOR THE FOLLOWING:
    1. FOG DISPOSAL SYSTEMS.
    2. GREASE INTERCEPTORS.
    3. GREASE REMOVAL DEVICES.
    4. WIRING DIAGRAMS: POWER, SIGNAL, AND CONTROL WIRING.
- 1.2 QUALITY ASSURANCE
  - A. QUALITY STANDARD FOR PLASTIC PIPING: NSF 14.
- 1.3 PRODUCTS
  - A. BACKWATER VALVES: HORIZONTAL, CAST IRON
  - B. CLEANOUTS:
    1. EXPOSED: COUNTERSUNK BRASS CLOSURE PLUG
    2. CERAMIC TILE AND CARPETED FLOORS: SQUARE, ADJUSTABLE WITH NICKEL BRONZE TOP.
    3. RESILIENT (VINYL) FLOOR: SQUARE, ADJUSTABLE, NICKEL BRONZE TOP WITH COMPATIBLE FLANGE
    4. WALL: ROUND, DEEP, CHROME-PLATED BRONZE COVER PLATE WITH ROUND, CHROME PLATED, SCREW WALL ACCESS.
  - C. FLOOR DRAINS:
    1. CAST-IRON FLOOR DRAINS, WITH STRAINER, BODY STYLE AND OPTIONS AS SPECIFIED IN PLUMBING SCHEDULE.
    2. PROVIDE TRAP PRIMER CONNECTIONS WHERE NEEDED.
  - D. TRENCH DRAINS TO BE AS SPECIFIED IN PLUMBING SCHEDULE.
  - E. THROUGH-PENETRATION FIRESTOP ASSEMBLIES: LISTED AND LABELED ASSEMBLY OF SLEEVE AND STACK FITTING WITH FIRESTOPPING PLUG.
  - F. MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES:
    1. OPEN DRAINS, SHOP OR FIELD FABRICATE FROM SERVICE CLASS, HUB-AND-SPIGOT, CAST-IRON, SOIL-PIPE FITTINGS.
    2. CAST-IRON OR BRONZE DEEP-SEAL TRAPS.
    3. FLOOR-DRAIN, TRAP-SEAL PRIMER FITTINGS.
    4. AIR-GAP FITTINGS.
    5. COUNTERFLASHING-TYPE, CAST-IRON STACK FLASHING FITTINGS.
    6. CAST-IRON BODY VENT CAPS.
    7. FROST-RESISTANT VENT TERMINALS.
    8. EXPANSION JOINTS.
- 1.4 MANUFACTURED UNITS
  - A. FOG DISPOSAL SYSTEMS AS SPECIFIED IN PLUMBING SCHEDULE.
  - B. GREASE INTERCEPTORS AS SPECIFIED IN PLUMBING SCHEDULE.
  - C. GREASE REMOVAL DEVICES AS SPECIFIED IN PLUMBING SCHEDULE.
  - D. SOLIDS INTERCEPTORS: FACTORY FABRICATED INTERCEPTOR MADE FOR REMOVING AND RETAINING SEDIMENT OR COFFEE GROUNDS FROM WASTEWATER AS SPECIFIED IN PLUMBING SCHEDULE.

END OF SECTION 221319

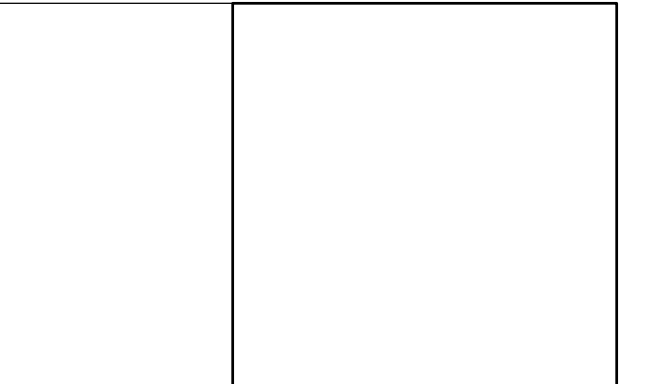
## PLUMBING

### SECTION 223000 - DOMESTIC-WATER HEATERS

- 1.1 QUALITY ASSURANCE
  - A. PERFORMANCE EFFICIENCY: ASHRAE/IESNA 90.1 AND ASHRAE 90.2.
  - B. ASME COMPLIANCE: ASME BOILER AND PRESSURE VESSEL CODE: SECTION VIII, DIVISION 1.
  - C. NSF COMPLIANCE: NSF 61 ANNEX G, "DRINKING WATER SYSTEM COMPONENTS - HEALTH EFFECTS."
- 1.2 COMMERCIAL, ELECTRIC, DOMESTIC-WATER HEATERS
  - A. COMMERCIAL, LIGHT-DUTY, STORAGE, ELECTRIC, DOMESTIC-WATER HEATERS:
  - B. SEE PLUMBING SCHEDULE FOR MAKE, MODEL, CAPACITY, AND RECOVERY RATE.
- 1.3 COMMERCIAL, GAS-FIRED, STORAGE, DOMESTIC-WATER HEATERS
  - A. COMMERCIAL, GAS FIRED, HIGH-EFFICIENCY STORAGE, DOMESTIC-WATER HEATER AS SPECIFIED IN PLUMBING SCHEDULE:
- 1.4 DOMESTIC-WATER HEATER ACCESSORIES
  - A. DRAIN PANS: CORROSION-RESISTANT METAL WITH RAISED EDGE.
  - B. PIPING-TYPE HEAT TRAPS.
  - C. HEAT-TRAP FITTINGS.
  - D. GAS SHUTOFF VALVES.
  - E. GAS PRESSURE REGULATORS: PRESSURE RATING TO MATCH GAS SUPPLY
  - F. AUTOMATIC GAS VALVES.
  - G. PRESSURE-REDUCING VALVES.
  - H. COMBINATION TEMPERATURE-AND-PRESSURE RELIEF VALVES.
  - I. PRESSURE RELIEF VALVES.
  - J. VACUUM RELIEF VALVES.
  - K. SHOCK ABSORBERS.
  - L. DOMESTIC-WATER HEATER STANDS.
  - M. DOMESTIC-WATER HEATER MOUNTING BRACKETS.
  - N. EXPANSION TANK

END OF SECTION 223000

ISSUED FOR CONSTRUCTION - 08/23/2017



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STARBUCKS TEMPLATE VERSION I2016.12.23

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PROJECT NAME:  
**RENOVATION OF STARBUCKS COFFEE PORTLAND, 1080 FOREST AVE.**  
PROJECT ADDRESS:  
1080 FOREST AVENUE  
PORTLAND, ME 04103  
CUMBERLAND COUNTY

STORE #: 11917  
PROJECT #: 37548-037  
ISSUE DATE: 08/04/2017  
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PRODUCTION DESIGNER: E. VEGA  
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Revision Schedule			
Rev	Date	By	Description

SHEET TITLE:  
**PLUMBING OUTLINE SPECIFICATIONS**  
SCALE: AS SHOWN

SHEET NUMBER:  
**P-0002**

