## PLUMBING SPECIFICATIONS

SECTION 15055 - COMMON PIPING REQUIREMENTS

PART 1 - GENERAL A. SECTION REQUIREMENTS

1. Comply with the requirements of the Building Code and the local authority having jurisdiction.

PART 2 - PRODUCTS 2.1 SUPPORTING DEVICES

A. Hanger and Pipe Attachments: Factory fabricated with galvanized coatings; nonmetallic coated for

hangers in direct contact with copper tubing. Building Attachments: Powder actuated type, drive pin attachments with pullout and shear capacities

appropriate for supported loads and building materials; UL listing and FM approval for fire protection

C. Mechanical Anchor Fasteners: Insert-type attachments with pullout and shear capacities appropriate for supported loads and building materials; UL listing and

PART 3 - EXECUTION

3.1 INSTALLATION

FM approval for fire protection systems.

A. Install piping free of sags and bends.

Install fittings for changes in direction and branch connections. Install sleeves for pipes passing through concrete and masonry walls, gypsum board partitions, and

Exterior Wall, Pipe Penetrations: Mechanical sleeve seals installed in steel or cast iron pipes for wall

Fire Barrier Penetrations: Seal pipe penetrations with through-penetration firestop systems.

Install unions adjacent to each valve and at final connection to each piece of equipment. Install dielectric unions and flanges to connect piping materials of dissimilar metals in gas piping.

Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals in water piping. Provide full ring escutcheons at plumbing penetrations through walls or ceilings. Tightly seal escutcheons

to the adiacent surface. 3.2 HANGERS AND SUPPORTS

A. Install building attachments within concrete or to structural steel. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in

Install powder actuated drive pin fasteners in concrete after concrete is cured. Do not use in lightweight concrete or in slabs less than 4 inches thick.

Install mechanical anchor fasteners in concrete after concrete is cured. Do not use in lightweight concrete

or in slabs less than 4 inches thick.

Support fire protection system piping independent of other piping. Load Distribution: Install hangers and supports so piping live and dead loading and stresses from

movement will not be transmitted to connected equipment.

END OF SECTION 15055

SECTION 15080 - MECHANICAL INSULATION

PART 1 - GENERAL 1.1 SECTION REQUIREMENTS

A. Submittals: None.

B. Quality Assurance: Labeled with maximum flame-spread rating of 25 and maximum smoke developed rating of 50 according to ASTM E 84.

PART 2 - PRODUCTS 2.1 PIPE INSULATION

A. Preformed Glass Fiber Pipe Insulation: ASTM C 547, Class 1, with factory applied, all purpose, vapor

B. Polyolefin Pipe Insulation: Unicellular polyethylene, preformed pipe insulation. Comply with ASTM C 534, Type I, except for density.

PART 3 - EXECUTION 3.1 INSTALLATION

A. Install vapor barriers on insulated pipes with surface operating temperatures below 60 deg F.

B. Insulate fittings, valves, and specialties. C. Seal vapor barrier penetrations for hangers, supports, anchors, and other projections.

D. Coat glass fiber pipe insulation ends with vapor barrier coating.

E. Roof Penetrations: Apply insulation for interior applications to a point even with the top of the roof flashing. F. Exterior Wall Penetrations: For penetrations of below grade exterior walls, terminate insulation flush with

mechanical sleeve seal. G. Interior Walls and Partitions Penetrations: Apply insulation continuously through walls and partitions,

except fire rated walls and partitions. H. Fire Rated Walls and Partitions Penetrations: Terminate insulation at penetrations through fire rated walls

and partitions. Seal around penetration with through penetration firestop systems.

I. Floor Penetrations: Terminate insulation at the underside of the floor assembly and at the floor support at

top of floor. Seal around penetration with through penetration firestop systems. Glass Fiber Insulation Installation: Bond insulation to pipe with adhesive. Seal seams and joints with

vapor barrier compound. K. Interior Piping System Applications: Insulate the following piping systems:

Domestic hot and cold water.

2. Exposed sanitary drains of fixtures for the disabled. Refrigerant piping.

Do not apply insulation to the following systems, materials, and equipment: Flexible connectors.

2. Fire protection piping systems.

3. Sanitary drainage and vent piping. 4. Chrome plated pipes and fittings, except for plumbing fixtures for the disabled.

5. Piping specialties, including air chambers, unions, strainers, check valves, plug valves, and flow

M. Pipe Insulation Thickness Application Schedule: Insulate piping with the following materials and

1. Domestic Hot and Cold Water: 1/2-inch preformed glass fiber pipe insulation.

2. Sanitary Drains: 1/2-inch polyolefin pipe insulation. END OF SECTION 15080

SECTION 15110 - VALVES

PART 1 - GENERAL (Not Applicable)

PART 2 - PRODUCTS

2.1 GENERAL DUTY VALVES

A. End Connections: Threads shall comply with ANSI B1.20.1. Flanges shall comply with ANSI B16.1 for cast iron valves and ANSI B16.24 for bronze valves. Solder-joint connections shall comply with ANSI B16.18.

with bronze body, standard (or regular) port, chrome plated brass ball, replaceable "Teflon" or "TFE" seats and seals, blowout proof stem, and vinyl covered steel handle. C. Plug Valves: Rated at 150 psig WOG; bronze body, with straightaway pattern, square head, and threaded

B. Ball Valves: Rated for 150 psig saturated steam pressure, 400 psig WOG pressure; 2 piece construction;

D. Swing Check Valves: Class 125, cast bronze body and cap; with horizontal swing, Y-pattern, and bronze

E. Valves for Copper Tube: Solder ends, except provide threaded ends for heating hot water and low

pressure steam service.

F. Valves for Steel Pipe: Threaded ends.

PART 3 - EXECUTION 3.1 INSTALLATION

A. Use gate and ball valves for shutoff duty and ball for throttling duty.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves for each fixture and item of equipment.

D. Install valves in horizontal piping with stem at or above center of pipe. E. Install valves in a position to allow full stem movement.

F. Install check valves for proper direction of flow in horizontal position with hinge pin level. END OF SECTION 15110

SECTION 15140 - DOMESTIC WATER PIPING PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. Performance Requirements: Unless otherwise indicated minimum pressure requirements for water piping

1. Service Entrance Piping: 100 psig.

2. Domestic Water Piping: 80 psig.

B. Comply with NSF 14 "Plastic Piping Components and Materials."

C. Comply with NSF 61 "Drinking Water System Components -- Health Effects." PART 2 - PRODUCTS

2.1 PIPES AND TUBES A. Hard Copper Tube: ASTM B 88, Types L and M, water tube, drawn temper.

B. PVC Plastic, Water Pipe: ASTM D 1785, Schedule 80, plain ends.

2.2 FITTINGS

A. Wrought Copper, Solder Joint Pressure Fittings: ASME B 16.22.

B. Cast Copper Alloy, Solder Joint Pressure Fittings: ASME B 16.18.

C. Bronze Flanges: ASME B 16.24, Classes 150 and 300. D. Copper Unions: ASME B 16.18, cast copper alloy body, hexagonal stock, with ball and socket joint, metal

to metal seating surfaces, and solder joint, threaded, or solder joint and threaded ends. Threads complying with ASME B 1.20.1.

E. PVC Plastic, Schedule 80, Socket Type Pipe Fittings: ASTM D 2467.

2.3 JOINING MATERIALS

A. Solder Filler Metal: ASTM B 32, lead free. B. Brazing Filler Metals: AWS A5.8, alloys to suit system requirements.

C. Solvent Cements: As recommended by manufacturer. D. Plastic Pipe Seals: ASTM F 477, elastomeric gasket.

PART 3 - EXECUTION

3.1 VALVE APPLICATIONS A. Install gate valves close to main on each branch and riser serving two or more plumbing fixtures or

equipment connections and where indicated. B. Install gate or ball valves on inlet to each plumbing equipment item, on each supply to each plumbing

fixture not having stops on supplies, and elsewhere as indicated. C. Install drain valve at base of each riser, at low points of horizontal runs, and where required to drain water

distribution piping system.

D. Install swing check valve on discharge side of each pump and elsewhere as indicated. E. Install ball valves in each hot water circulating loop and discharge side of each pump.

3.2 PIPING INSTALLATIONS A. Install hangers and supports at intervals indicated in the applicable plumbing code and as recommended by pipe manufacturer.

B. Support vertical piping at each floor.

3.3 INSPECTING AND CLEANING

A. Inspect and test piping systems following procedures of authorities having jurisdiction.

B. Clean and disinfect water distribution piping following procedures of authorities having jurisdiction. END OF SECTION 15140

SECTION 15150 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL 1.1 SECTION REQUIREMENTS A. Minimum Pressure Requirement for Soil, Waste and Vent: 10 feet head.

B. Comply with NSF 14 "Plastic Piping Components and Related Materials". PART 2 - PRODUCTS

2.1 PIPES AND TUBES A. PVC Plastic, DWV Pipe: ASTM D 2665, Schedule 40, plain ends. 2.2 FITTINGS

A. PVC Plastic, DWV Pipe Fittings: ASTM D 2665, made to ASTM D 3311; socket type; drain, waste, and vent pipe patterns.

PART 3 - EXECUTION 3.1 PIPING INSTALLATION

A. Install cleanout and extension to grade at connection of building sanitary drain and building sanitary sewer. B. Locate drainage piping runouts as close as possible to bottom of floor slab supporting fixtures or drains.

A. Inspect and test piping systems following procedures of authorities having jurisdiction. END OF SECTION 15150

SECTION 15198 - NATURAL GAS PIPING

PART 1 - GENERAL 1.1 SECTION REQUIREMENTS

A. Quality Assurance: Comply with NFPA 54 and the Plumbing Code.

PART 2 - PRODUCTS 2.1 PIPE, TUBE, AND SPECIALTIES

A. Steel Pipe: ASTM A 53, Type S (Seamless), Grade B, Schedule 40, plain ends. B. Malleable Iron Threaded Fittings: ASME B16.3, Class 150.

C. Manual Valves: Comply with standards listed or, if appropriate, to ANSI Z21.15.

D. Gas Stops: AGA certified, bronze-body, plug type with bronze plug, for 2-psig E. or less natural gas. Include AGA stamp, flat or square head or lever handle, and threaded ends complying with ASME B1.20.1. F. Gas Valves: 150-psig WOG, cast-iron or bronze body, bronze plug, straightaway pattern, square head,

tapered-plug type. G. Gas Pressure Regulators: ANSI Z21.18, single stage, steel jacketed, corrosion resistant pressure regulators. Include atmospheric vent, elevation compensator. Regulator pressure ratings, inlet and outlet pressures, and flow volume in cubic feet per hour of natural gas at specific gravity are as indicated.

1. Line Gas Pressure Regulators: Inlet pressure rating not less than system pressure. H. Flexible Connectors: ANSI Z21.24, copper alloy. I. Strainers: Bronze body, Y-pattern, full size of connecting piping. Include stainless-steel screens with 3/64

inch perforations and a pressure rating of 125-psig- minimum, WOG working pressure. PART 3 - EXECUTION

3.1 INSTALLATION A. Close equipment shutoff valves before turning off gas to premises or section of piping. Perform leakage test as specified to determine that all equipment is turned off in affected piping section.

B. Install shutoff valve, downstream from gas meter, outside building at gas service entrance. C. Install gas stops for shutoff to appliances with NPS 2" or smaller low pressure gas supply.

D. Drips and Sediment Traps: Install drips at points where condensate may collect. Include outlets of gas meters. Locate where readily accessible to permit cleaning and emptying. Do not install where condensate would be subject to freezing.

E. Install gas piping at uniform slope of 0.1 percent upward toward risers. F. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.

G. Connect branch piping from top or side of horizontal piping.

H. Install strainers on supply side of each control valve, gas pressure regulator, solenoid valve, and elsewhere as indicated.

I. Install valves in accessible locations, protected from damage. Tag valves with metal tag indicating piping supplied. Attach tag to valve with metal chain.

J. Install gas valve upstream from each gas pressure regulator. Where two gas-pressure regulators are installed in series, valve is not required at second regulator. K. Connect gas piping to equipment and appliances with shutoff valves and unions. nstall gas valve

upstream from and within 72 inches of each appliance using gas. Install union or flanged connection downstream from valve. L. Inspect, test, and purge piping according to NFPA 54, Part 4, "Gas Piping Inspection, Testing, and

Purging", and requirements of authorities having jurisdiction. END OF SECTION 15198

SECTION 15410 - PLUMBING FIXTURES

PART 1 - GENERAL 1.1 SECTION REQUIREMENTS

A. Submittals: None. B. Comply with requirements of Public Law 102-486, "Energy Policy Act", regarding water flow rate and

water consumption of plumbing fixtures. C. Comply with applicable standards below:

Enameled, Cast Iron Fixtures: ASME A112.19.1M.

National Sanitation Foundation Construction: NFS2. 3. Porcelain Enameled Fixtures: ASME A112.19.4M.

4. Slip Resistant Bathing Surfaces: ASTM F 462. 5. Stainless Steel Fixtures: ASME A112.19.3M.

6. Vitreous China Fixtures: ASME A112.19.2M. PART 2 - PRODUCTS

2.1 Refer to the fixture schedule on drawing P200

PART 3 - EXECUTION 3.1 INSTALLATION

A. Install fitting insulation kits on fixtures for the disabled.

B. Install fixtures with flanges and gasket seals. C. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of

compartment. Install other actuators in locations that are easy for the disabled to reach. D. Fasten wall hanging plumbing fixtures securely to supports attached to building substrate when supports

are specified, and to building wall construction where no support is indicated. E. Fasten floor mounted fixtures to substrate. With fixtures having holes for securing fixture to wall

construction, fasten to reinforcement built into walls. F. Fasten wall mounted fittings to reinforcement built into walls.

G. Fasten counter mounted plumbing fixtures to casework. H. Secure supplies to supports or substrate within pipe space behind fixture.

I. Set shower receptors and mop basins in leveling bed of cement grout. J. Install individual supply inlets, supply stops, supply risers, and tubular brass traps with cleanouts at fixture.

K. Install water supply stop valves in accessible locations. L. Install traps on fixture outlets. Omit traps on fixtures having integral traps. Omit traps on indirect wastes,

unless otherwise indicated. M. Install escutcheons at wall, floor, and ceiling penetrations in exposed, finished locations and within

cabinets and millwork. Use deep pattern escutcheons where required to conceal protruding pipe fittings. N. Seal joints between fixtures and walls, floors, and counters using sanitary type, one part, mildew resistant, silicone sealant. Match sealant color to fixture color.

O. Install piping connections between plumbing fixtures and piping systems and plumbing equipment. Install insulation on supplies and drains of fixtures for the disabled.

P. Ground equipment. Tighten electrical connectors and terminals according to UL 486A and UL 486B. END OF SECTION 15410

SECTION 15425 - PLUMBING SPECIALTIES

Water Distribution Piping: 80 psig.

1.1 SECTION REQUIREMENTS A. Minimum Working Pressure Rating for Products:

PART 1 - GENERAL

3.1 INSTALLATION

finished floor.

END OF SECTION 15425

B. Submittals: Product Data. PART 2 - PRODUCTS

2.1 Refer to fixture schedule on drawing P200. PART 3 - EXECUTION

A. Install backflow preventers at each water-supply connection to mechanical equipment and where required by authorities having jurisdiction.

B. Install hose bibbs with integral or field-installed vacuum breaker. C. Install floor drains at low points of surface areas and where indicated. Set tops of drains flush with

1. Trap drains connected to sanitary building drain. 2. Install drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain

Columbus, Ohio 43230 Phone: (614) 751-9610 Fax: (614) 552-5240 Contact: Andrew Janosik



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CHIPOTLE MEXICAN GRILL, INC. 1401 WYNKOOP STREET, SUITE 500 DENVER, COLORADO 80202 TELEPHONE: (303) 595-4000 FAX: (303) 595-4014 INTERNET: WWW.CHIPOTLE.COM

Issue Record: PERMIT/LANDLORD REVIEW 09/15/15 1401163

Plumbing Specifications

Date of Last Print:

09/15/15