apply to work under Division 15.

The Contractor shall provide and install all labor, equipment and materials shown on the Mechanical Drawings and specified under the Division 15, or as required for complete and successfully operating mechanical and plumbing systems.

1.03 EXAMINATION OF PREMISES:

The Contractor shall examine the premises and fully acquaint himself with all existing conditions so that all problems pertaining to work under this division are fully understood. No subsequent allowance will be made in this connection for any error of judgment or negligence on the Contractor's part.

.04 CODES:

All plumbing work shall be done in strict accordance with all requirements of the International Plumbing and Building Codes (National Standard Plumbing Code), Local and State Department of Health and Mental Hygiene and the NFPA including specifically NFPA 54. Connections to public utilities shall be accordance with applicable plumbing and building

in addition, all work shall be installed in accordance with requirements of any other applicable building, plumbing, mechanical, fire and safety codes. and Health Act will be strictly adhered to

Work shall conform to the requirements of the latest editions of the following codes, regulations,

specifications and standards: American Society for Testing and Materials (ASTM)
Sheet Metal and Air Conditioning Contractors

National Association (SMACNA) * Air Conditioning and Refrigeration Institute (ARI) American Society of Mechanical Engineers (ASME) * Council of American Building Officials (CABO) National Electrical Code (NEC) National Board of Fire Underwriters

National Electrical Manufacturers Association (NEMA Underwriters Laboratories, Inc. (UL) National Institute of Standards & Technology (NIST Occupational Safety and Health Act (OSHA) American National Standards Institute (ANSI) * National Fire Protection Association (NFPA)

* American with Disabilities Act (ADA) .05 LAWS, ORDINANCES, PERMITS AND FEES

The Contractor shall give necessary notices, obtain and pay for permits, prepare all documents and obtain all necessary approvals of all Regulating Certificates of Inspection for his work and delive same to the Architect before request for acceptance and final payment for the work.

B. The Contractor shall include in the work, withou extra cost to the Owner, all labor, materials. services, apparatus, drawings (in addition to Contrac Drawings and Documents) required to comply with all applicable laws, ordinances, rules and regulations.

1.06 GENERAL REQUIREMENTS:

Everything necessary for the completion of the work and successful operation thereof, whether they may be definitely specified or indicated or not, shall be furnished and completed in a manner corresponding with the rest of the work as though they were

B. The Contractor shall have competent foremen on the premises at all times to check layout and superintend the installation of all work included in this division of the specifications and to provide nformation regarding locations and sizes of chases openings, etc., and be responsible for the accuracy of such information. The foremen shall layout and superintend the installation of all hangers, inserts sleeves and other work in masonry and concrete in advance of the work during construction of building giving consideration to the work of other trades to ent interference in the location of pipes, onduits, ducts and other equipment

C. The Contractor shall provide complete connections for equipment furnished under sections of this division, or under other divisions, or by the Owner,

 All individual pieces of equipment shall be separately valved and fitted with unions so that the individua piece of equipment may be removed for servicing without disturbing other portions of the system.

E. No beams, columns, structural members, etc., shall be sleeved for the passage of piping or ducts, except where noted on the drawings and approved

The general arrangements and details of the equipment, piping, ducts, etc., are shown on the drawings. Dimension or scales shown are approximate and must be checked at the building by the Contractor prior to the installation of any equipment or the fabrication of any equipment. Dimensions for the fabrication of piping, equipment etc.. shall not be scaled from the drawings, but shall be acquired by accurate measurements at the building. Any equipment or materials fabricated of the site, or any work which is installed on the job caused by the Contractor's neglect to coordinate his work with the work of other trades, shall be modified or reinstalled without change in the

All systems and equipment shall be arranged operate without objectionable noise or vibration. Where objectionable noise or vibration occurs, modifications or changes shall be made until satisfactory results are obtained, at no additional

Unless otherwise indicated or required all piping shall be installed parallel to the lines of the building. Piping shall be installed straight and free of traps, sags, and bends. Pipe shall be free of kinks, wrinkles and flattened sections. Piping shall properly fit into place and not be forced or stretched.

1.07 SCHEDULE:

Within 30 days of contract date, the Contractor shall submit to the Architect for approval, a schedule showing make, type, manufacture's specifications for each article of equipment or specialty and shall give guarantee, etc., and such other detailed information as may be required. When approved, such schedule shall be an addition to the specifications here in with, and shall be of equal force, in that no rariation will be permitted except with the approva of the Architect.

.08 QUALITY STANDARDS:

Manufacturers specified herein, under Division 15, represent products that meet the project's

Where three or more manufacturers of one product are listed, the Contractor shall bid the job using desire to substitute another material or product for the material or product specified (if specifically permitted elsewhere within these contract

documents), he shall apply in writing for such permission. Requests for substitutions must b submitted within fourteen (14) days after award of contract or notice to proceed, whichever shall occur first; shall state the credit (or extra cost) involved the use of such substitution, the advantage to the Owner in accepting such substitution, and acknowledgement that ramifications or impact on other trades and the construction schedule has bee considered and costs associated with the substitution are reflected in the request. The Contractor shall pay all costs to determine acceptability of the proposed substitution including, but not necessarily nited to, the following:

For tests required by the Engineer for evaluation of both the specified product and the proposed

2. For additional evaluation time of the Engineer. 3. For shipping costs to and from the Engineer, to the Owner, etc. as may be required for evaluation 4. For any mockup, installation, or other

demonstration required by the Engineer for

evaluation of the product(s). In the event that a substituted item is submitted twice and approval is not obtained by the second submission, the Contractor shall furnish the specifie item of material or equipment at no additional cost

The Contractor is responsible for assuring products supplied by listed or alternate manufacturers are of equivalent or better quality as the primary specified manufacturer. This quality standard will apply to all 09 SUBMITTALS:

Submittals shall consist of manufacturer's certified scale drawings, cuts, catalogs or descriptive literature with complete certified characteristics o equipment, dimensions, capacity, code requirements, motor drive and testing. in addition, Contractor sho provide working shop drawings of ductwork, piping, sprinklers, tank vault and any other details which may be required to clarify installation of piping or

Certified performance curves for all fans and pumps shall be submitted for approval.

Prior to submittal, the Contractor shall check the submittals thoroughly to ascertain that they comply in detail with the Plans and Specifications, the electrical characteristics are correct for the available service, and that dimensions are shown and check to fit available space with recommended access. Any deviations from Plans and Specifications shall be clearly noted on the certified submittals. Submittals shall include a reference to the appropriate sectionage, paragraph number of the specification. The nstaller shall stamp the submittal with his firm's name, date, and approval noted, indicating that the above has been complied with. Submittals received without his stamp will be returned disapproved

Submittals shall be tendered for items of equipmen specified under each section of the specifications o specified on the drawing.

Any changes in any trade brought about by substitutions of specified equipment shall be done a no change in the contract price. Failure to submit Shop Drawings or Material Lists ample time for proper checking and necessary re-submission, shall not be allowed as reason for

any claim for extension of time or delay The review of a Shop Drawing or Material List shall not be considered as a guarantee of the measurements of the building conditions, or that the Shop Drawings or Material Lists has been checked to relieve the Contractor of his responsibility or necessity for furnishing material or performing work as required by the specifications and contract drawings, or relieve the Contractor of his responsibilities for correctness of dimensions and quantities, or for proper coordination of details and

interface with other trades 10 RECORDED CHANGES INFORMATION: As the work progresses, the Contractor shall record on a set of white prints, the installed locations, sizes and depths of all piping, services, trenches, etc. in the project wherever they differ from those indicated on the Contract Drawings. All dimensions shall be established from the datum points approve

by the Architect. Upon completion of work, the Contractor shall turn over to the Architect one (1) neat copy of white prints showing required Recorded Changes Information.

TEMPORARY SERVICE:

The permanent building facilities, transformers, etc. may be used for temporary power. Written approval must be obtained from the Owner before facilities

12 ELECTRICAL REQUIREMENTS: Items of electrical work including power wiring,

disconnects and motor starters will generally b pecifications, unless otherwise noted. Where electrical work is required for equipment furnished and installed under sections of this division including control wiring, interlocking, starters, disconnects, power wiring, heat tracing of mechanical or plumbi piping, etc. and is not included under the Electrical on, it shall be furnished and installed under this Division, in conformance with the requirements of the "Electrical Work" Division.

13 COORDINATION OF TRADES: A. The Subcontractor shall give full cooperation to other trades and shall furnish in writing, with copie to Architect, and information necessary to permit the work of all trades to be installed in proper sequence and with the least possible interference of delay. B. If the Subcontractor installs his work without

coordinating with other trades, and the installation interferes with their installation, he shall make any changes necessary in this work to correct the The Contractor shall provide dimensioned fabrication drawings of critical areas as described hereinbefore

DRAWINGS: A. The drawings are generally diagrammatic and are intended to convey the scope of work and indicate the general arrangement of equipment, ducts, conduits, piping and fixtures. The location of all items not definitely fixed by dimensions are approximate only. The exact locations necessary scure the best conditions and results must be determined at the project by the Contractor and

installed. Do not scale drawings.

PART 2: PRODUCTS 2.01 ACCESS DOORS:

All concealed valves, dampers, traps, cleanouts, controls, fire dampers and other devices requiring manual operation or maintenance, shall be provide with metal access doors and frames. Doors shall be Zurn, Inland Steel Project Company "Milcor", quality standard of the following Milcor style: Style AT in acoustic tile surfaces

shall have the approval of the Architect before being

Style K in plastered surfaces Style M in masonry or ceramic tile surfaces Style DW in dry wall walls and ceilings Access panels and doors shall meet the fire protection rated walls and floor/ceiling assemblies which they are installed.

Access doors shall be properly sized for the

particular application and shall be furnished under

the sections requiring same, unless a means of

access is otherwise afforded. Access doors in rated

surfaces shall carry UL rating equal to the surface

Access doors shall be installed as required by Local 2.02 FOLIPMENT FOLINDATIONS AND SUPPORTS:

All Contractors responsible for work under the Mechanical and Electrical Divisions are to provide concrete housekeeping pads under their respective Pads shall be 4" thick and shall extend 1" beyond each edge of the equipment supported and all

Equipment suspended or supported from above shall be secured by means of approved hanger rods and other supports properly attached to the structural system. Sub-framing of structural steel beams, of mechanical equipment, where said framing is required, but not furnished under another section

For pipe hangers and supports and spacing of each, see Pipe Hangers and Support section.

In no case shall runs of piping be supported from other pipes. Trapeze hangers may be used for parallel runs of pipe with the same pitch or grade. t will be permissible by proper arrangement between the plumbing and heating trades to use common

trapeze hangers for such pipes. Vibration isolators shall be provided for all items of equipment producing vibration likely to be transmitted to the structure, or portions of building which will disturb occupants.

All pipes shall be braced to prevent shock and 2.03 CONCRETE WORK

All concrete work required under any section shall be provided and installed under that section, and shall be performed in accordance with the requirements of the general specifications for concrete work as hereinbefore written, except where included under another section. Coordinate to avoid

.04 SLEEVES AND ESCUTCHEONS: Provide standard iron pipe size steel sleeves for a lines passing through concrete slabs and masonry walls. All sleeves shall be set before concrete is poured. Holes required in masonry shall be made with core drills in a manner approved by the

Sleeves for pipes through walls and floors shall t of sufficient size to permit the insulation, where specified, to continue through the sleeves. Sleeves through floors shall be flush with the underside o the slab and extend * above finish floor in wet areas only. Projecting sleeves shall be provided with anchors to prevent them from being loosened and knocked down in the floor construction. The annular space between pipe and all sleeves shall be caulked with polyaulfide caulking compound. The annular space shall not be larger than 3 for all pipes.

Escutcheon plates shall be used to conceal sleeve openings and openings in masonry walls. Ceiling and wall plates shall be chrome plated, properly secured in place. Floor plates shall be cup type, similar t Grinnell No. 400. At the Contractor's option, split type escutcheons equal in quality to one-piece type

PART 3: EXECUTION:

3.01 TESTS: A. Prior to connection of plumbing fixtures and before sewer connections are made, the entire sanitary and storm drainage piping systems shall be capped and tested as required by the Plumbing Code. The under a hydrostatic pressure of at least 15 to 20

All domestic water piping shall be tested and proven tight under a 150 psig hydrostatic test of four (4) After plumbing fixtures have been set and connected, all piping and fixtures shall be tested

operation and a smoke or peppermint test shall be made on all soil, waste and vent piping. After each piping system has been completed and tested, a preliminary operation shall be made of the system for the purpose of cleaning out all sediment, systems as required to thoroughly clean same.

After the building has been occupied and the various equipment is in actual use, the Contractor shall make an operating test of all equipment at a time directed by the Architect to determine that all performance requirements of the Contract are met

All equipment, specialties, etc., required for all tests shall be furnished by the Contractor under this

3.02 IDENTIFICATION OF PIPING AND EQUIPMENT: A. All service piping which is accessible for maintenance operations (except piping in finished spaces) will be identified with pressure—sensitive vinyl identification markers. Direction of flow arrows are to be included

on each end of the marker. Where required by local codes, all piping shall be appropriately marked with color-coded bands at the locations and spacing required by the code.

 All materials and equipment shall be properly and effectively covered and protected by the Contractor during the execution of the work. During the execution of the work, the open ends of all piping, ducts and conduits and all openings in equipment shall be closed so as to prevent the

entrance of all foreign matter. Plumbing fixtures shall be boarded over. Any damaged equipment, piping, etc., shall be replaced by the Contractor at his expense. 3.04 WATERPROOFING:

All waterproofing and damp-proofing of the building shall be cleaned and left unharmed by the installation of the work under this division. Wherever any of the work or piping under this division has to pierce waterproofing or damp-proofing, including outside walls, they shall be caulked to wall in a manner satisfactory to the Architect and made watertight. Any waterproofing damaged or destroye shall be re-water-proofed and made tight by the Contractor. Insulation shall also be waterproofed a

3.05 VALVE CHARTS AND TAGS: All valves shall be provided with tags as specified in this section. Tags shall be secured to valve wheels with metal chain. Stop valves on individual fixtures or equipment where their function is obvious, or where the fixture or equipment is immediately adjacent, need not be so equipped. Care shall b exercised in selecting valve numbers to prevent conflict between various trades. The Contractor shall furnish schematic drawings prepared on tracing mylar showing locations, details of arrangement, etc. of all manual and automatic control valves indicating Identity and function. A print of this drawing shall

be framed and mounted where directly by the 3.06 CLEANING: A. At the conclusion of the work, the premises shall left broom clean. All factory—applied ename! paint shall be cleaned and waxed with industrial quality

GUARANTEE: In addition to the guarantee obligations contained in the GENERAL CONDITIONS, the Contractor shall guarantee the complete mechanical systems nstallation, as embraced by this specification, free from all mechanical and electrical defects for the period of one (1) year-beginning from the day of final acceptance of the work by the Architect.

The guarantee period will only be implemented after the following conditions have been met:

PLUMBING SPECIFICATIONS - COMMERCIAL

Hangers and clamps for copper piping shall be

paint before installation, or painted with rust

vent stacks shall be supported at floor with

For horizontal piping running along walls and partitions, the hangers shall be suspended from

shall be supported using pipe stands similar to B-Line B3088T threaded base stand with B308

pipe support complete with saddle and U-bolt.

Furnish and install heavy structural angle irons, channels and wide flange beams as required for

suitable anchor supports and bracing for the piping

in mechanical equipment rooms and ceiling spaces. Black steel pipes shall be welded to these supports

for anchoring. Galvanized and copper pipes shall be attached to the supports by pipe clamps. Those for

copper pipes shall be copper plated or pipe shall be wrapped with lead sleeves. All anchor supports shall

be arranged to suit field conditions and must be

adequate for the required duty and meet approval

the building structural systems or floor slabs.

manufacturers are acceptable provided they meet the quality of the specified equipment. This includes

Provide all valves shown, called for, or required for

proper operation and servicing of all systems and equipment included in this Division.

2.01 DOMESTIC WATER SYSTEM AND DRAINAGE VALVES:

manufacturers as specified hereinafter.

A. Furnish and install all valves as indicated on the

drawings, as specified below or as required. Valve

"Victaulic" for grooved piping systems and "Nibco Company" for flanged or soldered systems, whose

Valves installed in domestic water systems in which

figure numbers are used below, or other acceptable

there is the potential for human consumption shall contain only valves that meet the Safe Drinking Water

Act. These valves shall be "Lead Free" in which they

shall not contain more than 0.25% lead when used with respect to the wetted surfaces of the valve.

All valves 2" and smaller which will be operate

frequently, or will be used for throttling services, shall be globe valves. Stop valves shall be gate

valves. Ball valves may be used as stop valves i

water return and cold water systems shall be:

Steel Pipe

Valves 2" and less in the domestic hot water, hot

Valves larger than 2" in the domestic hot water, hot

Globe Valves: Figure F-718-B Figure T-235/S-235

Check Valves: Figure F-918-B Figure T-413/S-413 Bail Valves: Figure F-510 Figure S-580-70-66

Balancing valves 1/2"-2" shall be equal to TA Hydronics

ottom of all risers, and elsewhere where necessary

series 786/787/787-U STAD/STAS style balancing

valves with portable differential (ft of head) pressure meter or Nibco T1710 or S1710.

Hose end drain valves shall be provided at the

A. Where piping is insulated, ball valves shall be equipped with 2" extended handles of non-thermal

conductive material equal to "NIB-seal". Also, provide

a protective sleeve that allows operation of the valve

without breaking the vapor seal or disturbing the

insulation. Memory stops, which are fully adjustable after insulation is applied, shall be included.

Provide balancing valves on all domestic hot water

All valve sizes shall be the same as the line size in

recirculating branch lines and as indicated on the

drawings to properly balance the entire system.

which they are being installed unless otherwise

D. All water heaters and hot water supply tanks shall be equipped with an ASME rated temperature and

pressure relief valve that complies with all applicable

codes including ASME-CSD-1 for pressure vessels.

The discharge of the valves shall be piped to within

6" of the floor and shall not have more than one

90 degree elbow. The drainpipe shall terminate with a 45 degree mitered edge. The pipe shall terminate

Other acceptable manufacturers are Crane, Fairbanks

Jenkins, Lunkenheimer, Reading Pratt and Cady or DeZurick for valves. Other acceptable manufacturers

manufacturers are acceptable provided they meet the quality of the specified equipment. This includes

Provide and install insulation as hereinafter specified

All insulating materials used shall have Flame Spread

Rating not exceeding 25, and a Smoke Developed Rating not to exceed 50. These ratings shall be determined and verified by ASTM E-84, NFPA 255,

Insulation using "Salts" to impart fire safety will not

"Owens-Corning" or other manufacturers as specified

Insulation shall be by one manufacturer, either

Armstrong, Thrush, Dwyer, Ames or Febco. These

for specialties are Victaulic, Bell & Gossett,

items which are standard for the specified

for all piping systems where indicated.

FIRE SAFETY CONSIDERATIONS:

be accepted.

PART 2: PRODUCTS

MANUFACTURERS

above or near a floor drain if one is installed in

close proximity to the equipment.

to permit draining the systems or portions of the

Figure TI-8/SI-8

water return and cold water systems shall be:

Gate Valves: Figure F-619

PART 3: EXECUTION

pipes 3" or less and shall be full port.

for all services shall be of one manufacturer.

A. Other acceptable manufacturers are PHD, Anvil,

Items which are standard for the specified

Gateway, Modern, C&P or Grabler. These

of the Architect, and shall transmit the thrust loads

PART 3: EXECUTION

2.01 OTHER MANUFACTURERS

VALVES AND ACCESSORIES:

PART 2: PRODUCTS

installed outside shall be protected from rust and

copper plated. Hangers for steel piping shall be black steel. All black steel hangers, pipe supports

washers and rods shall be dipped in rust inhibiting

Vertical piping, including downspouts, soil, waste and

extension pipe clamps, similar to B-Line B3373 for iron and steel pipe, Fig. B3373 CT for copper pipe.

attached to wall with rawl anchors or toggle bolts.

Horizontal piping supported from the floor or roof

XISTING CONDITIONS PART: 1 GENERAL

.01 SCOPE:

The Contractor shall make all necessary changes to the existing mechanical systems to accommodate Material and equipment made superfluous by reason

of the new work shall become the property of the Contractor and shall be removed from the site unless the equipment is specifically indicated to be retained by the Owner, in which case the Contract will disconnect and remove the equipment and deliver it to a location selected by the Owner.

Prior to preparing the bid, the Mechanical contractors shall visit the site and familiarize themselves with all existing conditions and make all necessary investigations as to locations of utilities and all other matters which can affect the work. additional compensation will be made to the Contractor as a result of his failure to familiarize himself with the existing conditions under which the

PART: 2 PRODUCTS

3.01 UTILITY COORDINATION:

The Contractor shall furnish all labor, material and equipment necessary to complete the demolition work and maintain existing/systems required to remain in service during the construction phas and/or after the completion of the work. Where new work causes interference with existing

work, the new work or the existing work shall b altered or modified as required. No alteration or modification shall be performed without written approval by the Architect. PART: 3 EXECUTION

The Contractor shall coordinate the removal or relocation of existing utility systems with the utility companies prior to commencement of the work. No work shall be performed on or near existing service entrance and distribution equipment without the approval of the authorized utility representative 3.02 OUTAGES:

A. All mechanical outages which will interfere with the normal use of the building in any manner, shall be Unless otherwise specified, outages of any services required for the performance of this contract and affecting areas other than the immediate work area, shall be scheduled at least ten (10) days in

advance with the Owner. All such outages shall be performed on other than normal duty hours. The Contractor shall include in his price the cost all premium time required for outages and other work which interferes with the normal use of the building, which will be performed, in most cases during other than normal work time and at the convenience of the Owner.

.03 CONNECTIONS AND ALTERATION TO EXISTING WORK: When existing work is removed, all piping, ductwork etc. shall be removed back to the point of tie-in or below/behind finished greas and capped. Removal and/or relocation of existing services shall

be closely coordinated with the Owner as they Impact adjacent areas which shall remain While performing connections and alterations to existing mechanical work, the contractor shall take extreme care to protect all existing materials, equipment, casework, etc. from dirt, debris, and domage. All damage to existing material, equipment casework, etc. shall be repaired at the Contractor's

A. Cutting and patching associated with the work in the workmanlike manner. Existing surfaces which are damaged by the Contractor, shall be repaired or patched with new materials Structural members shall not be cut or penetrated. Holes cut through concrete and/or masonry to

accommodate new work shall be cut by recirculating or rotary, non-percussive methods. Patching of areas disturbed by installation of new work and/or required demolition, shall match existing adjacent surfaces as to material texture and color. PIPE HANGERS AND SUPPORTS

1.01 SCOPE

3.04 CUTTING AND PATCHING:

A. Furnish and install pipe hangers and supports for all piping systems and herein specified. B. All piping shall be firmly supported to prevent shock and swaying, bowing, and vibration. Where shown on drawings, pipes shall be anchored

firmly to the structure and pipe guides shall be installed to control expansion. PART 2: PRODUCTS 2.01 HANGERS

 A. Horizontal piping shall be supported from above to heavy adjustable hangers. Where below bar joist construction, hangers shall be supported from structural channels welded to the top chords of a least two joists. Structural channels shall be Kindorf, Unistruct, or PHD. Where large numbers of pipes are grouped together, their individual hangers shall be staggered so as not to concentrate the load on c few joists. Where hanger rods are attached to structural beams, use PHD Fig. 350 side beam clamps of proper size to suit flange width and hanger rods. Where hangers are required in existing structure, appropriate expansion shields and inserts will be allowed in concrete only. Do Not hang from

cinder or concrete blocks. B. Hangers shall be spaced as follows: Copper Pipe: 11/4" and smaller - at least every 6 feet. 1½" and larger - at least every 10 feet

Steel Pipe: 1" and smaller - at least every 6 feet. 11/4" and larger - at least every 12 feet. 3. Cast Iron Pipe:

Where joints occur 5 feet or less apart— at leas every 5 feet. Where joints occur over 5 feet apart— at least every 10 feet. Chlorinated Polyvinyl Chloride (CPVC) Pipe: 1" and smaller - at least every 6 feet. 11/4" and larger - at least every 12 feet

Polyvinyl Chloride (PVC) Pipe: 1" or larger - at least every 5 feet. Hangers for insulated piping shall be of sufficient size to include the pipe insulation within the hanger Furnish and install Insul-Shield, multi-purpose pipe saddles as manufactured by Insul-Coustic Corp. of each hanger as pipe is installed. The thickness of press-glass support segment shall be equal to the thickness of the adjoining insulation when load is applied. Other saddle type supports may be submitted for approval. See Section 15180.

B—Line catalog numbers. Other Manufacturers are acceptable as specified hereinafter. Fig. B3170 - Adjustable steel band hanger; use for piping up to 2" size. Fig. B3108 - Clevis hanger; use for piping 2-1/2" thru 6" size. Note: Hangers for insulated piping shall be oversized for installation on outside of insulation. Fig. B3114 - Twin suspension hanger for plping 8"

size and larger.

Pipe Size

Hangers shall be B-Line quality standard to following

Rod Size 2-1/2" to 3-1/2"

B. Insulation thicknesses shall be:

PART 3: EXECUTION

1. Domestic Water (Cold, Hot, and Recirculating): a. 1" thickness for lines up to 3". b. 1-1/2" thickness for lines 4" and over.

c. Armaflex, as manufactured by Armstrong, o

equal thickness and 'K' value may be used lieu of fiberglass. "Zeston" or approved equal jacket system shall be used for all valves, fittings, and joints in the piping system, with insulation.

All insulation shall be applied on clean, dry surfaces Spacing shall be the same as for hangers. Supports All insulation shall be continuous thru wall and ceiling openings, and sleeves. Insulation on all cold surfaces where vapor barrier jackets are used, will be applied with continuous unbroken vapor seal. Hangers, supports, anchors,

> Inserts shall be installed at outside hangers. Inserts between the pipe and pipe hangers shall consist of rigid pipe insulation of equal thickness to the adjoining insulation, and shall be provided with vapor arrier where required, insulation inserts shall be 3-Line or equal and shall not be less than the

> > ½" to 2-1/2" pipe size: 6" long

etc. that are secured directly to cold surfaces mus

e adequately insulated and vapor—sealed to preven

3" to 6" pipe size: Metal shields shall be applied between hangers or supports and the pipe insulation. Shields shall be rmed to fit the insulation and shall extend up t the centerline of the pipe and length specified f the insulation hanger inserts. Metal shields shall t B-Line or equal. Specified adhesives, mastics and coatings shall be

applied at the manufacturer's recommended

imum coverage per gallon. 3.02 OTHER MANUFACTURERS: Other acceptable manufacturers are Johns Mannville, Gustin Bacon, PPG and Knauf. These manufacturers are acceptable provided they meet the quality of the specified material. This includes the items which are

standard for the specified material. LUMBING FIXTURES: PART 1: GENERAL

1.01 SCOPE: A. Furnish and install the plumbing fixtures shown and specified on the drawings, in accordance with the requirements set forth herein.

ART 2: PRODUCTS

2.01 PLUMBING FIXTURES: All fixtures shall be complete with all required trim, supports supplied, stop valves, cast brass traps, etc Vi porcelain enamel shall be acid resisting. Fixtures shall be as specified on drawings or by approved anufacturers as specified hereinafter. All exposes metal shall be chrome plated.

Faucets dispensing water in which there is the potential for human consumption shall comply with Maryland's Lead Free Law, House Bill H.B. 372-2010. The faucets shall be "Lead Free" containing not mor than 0.2% lead for solder and flux, containing not more than 8% lead by dry weight for pipes and pipe fittings, containing a percentage of lead for plumbing fittings and fixtures that is in compliance with standards established under 42U.S.C.A. 300g-6(e) of The Federal Safe Drinking Water Act and containing no more than a weighted average lead content of 0.25% for wetted surfaces of pipe, pipe fittings, plumbing

PART 3: EXECUTION 3.01 INSTALLATION:

Where fixtures are set against glazed tile surfaces, Gate Valves: Figure T-111/113 Figure S-113-LF
Globe Valves: Figure T-211-Y NA
Check Valves: Figure T-413-W Figure S-685-80-LF
Ball Valves: Figure T-580-70 Figure S-685-80-LF the back edges shall be ground to make as tight fit as possible. The seam between fixture and wall shall be caulked with clear silicone sanitary sealant floors and shall be set on floor flanges with ring

> Where fixtures are mounted on uneven masonry walls, the wall behind the fixture shall be ground smooth and the fixture installed flush and caulked Traps and supplies of ADA compliant fixtures shall be covered with soft factory manufactured protective

.02 CLEANING: During construction, plumbing fixtures shall not be put in use, and shall be boarded over to prevent their use by construction personnel. Prior to the completion of the work, all plumbing

fixtures, fittings, and exposed piping shall be thoroughly cleaned and polished. 03 EQUIPMENT MANUFACTURERS: Where a fixture is specified as American Standard, Kohler, Eljer or Crane, the offered fixture shall be this specified fixture or one of those named herein

Where a fixture is specified as Elkay, Just or Advance, the offered fixture shall be the specified fixture or one of those named herein. The manufacturers named herein are acceptable provided they meet the quality of the specified equipment. This includes items which are standard for the specified equipment. 4 PLUMBING FIXTURE TRIM:

Plumbing fixture trim refers to faucets, traps, supplies, strainers, etc.

Plumbing fixture trim which is offered for approval shall be the specified trim or an equal in performance and construction. Equal construction requires that the materials used in construction are similar, (i.e. where heavy brass or stainless steel, etc. is part of the construction of the specified item, the offered item shall be the same).

DOMESTIC WATER PIPING PART: 1 GENERAL 1.01 SCOPE:

Furnish and install all labor, materials and equipmen required to provide a complete cold, hot and recirculating domestic water piping system as shown on the drawings and specified herein. Pipes, valves, fittings installed in domestic water systems shall comply with Maryland's Lead Free Law, House Bill H.B. 372-2010. The faucets shall be "Lead Free" containing not more than 0.2% lead for solder and flux, containing not more than 8% lead by dry weight for pipes and pipe fittings, containing a percentage of lead for plumbing fittings and fixtures that is in compliance with standards established under 42U.S.C.A. 300g-6(e) of The Federal Safe Drinking

Water Act and containing not more than a weighted average lead content of 0.25% for wetted surfaces of pipe, pipe fittings, plumbing fittings or fixture. PART 2: PRODUCTS

2.01 PIPING AND FITTINGS: A. All hot water and cold water piping above grade shall be of Type L hard drawn copper water tube, ASTM B-88-49, with solder type wrought copper fittings ASA A40.3, or standard weight galvanized steel pipe with galvanized malleable iron fittings. Brass solder-joint valves shall be used with coppe tubing, Isolating fittings shall be used to prevent metal-to-metal contact between steel and copper pipe. Type L copper must be used for pipe 3" and smaller, above 3" gaivanized steel may be used. Solder for copper pipe shall be 95-5 tin-antimony, non-lead bearing. Fittings used in the Victaulic Pressfit system shall be Vic-Press 304, precision cold drawn austenitic 304 steel. Pipe 2" and smaller shall be ASTM A312.049 wall, 304SS, Pressfit

For domestic water piping larger than 3": The Victaulic or equal grooved systems may be used lieu of threaded or soldered system for above-ground water piping not exceeding 230°F. In galvanized systems, all fittings must be galvanized. In copper systems, all fittings must be wrought copper or bronze sand casting per ASTM 8584-87 copper alloy CDA 836. Gaskets supplied with grooved couplings shall be pre-lubricated by the manufacturer with Vic-Plus dry lubricant or equal.

Furnish and install shock absorbers in the water piping, in horizontal runs as indicated on drawings s required to prevent noise or injury to the piping system resulting from water hammer. The shock absorbers shall be Zurn Z-1700, SHOKTROL quality standard. The unit shall consist of stainless steel casing and air-changed bellows. As a

> Flush valve water closets Each battery of lavatories Showers in batteries or 2 or more The top of all water risers

6: Quick closing valves All domestic water piping above grade as permitted by local code, jurisdiction having authority and building owner/landlord may be chlorinated polyvinyl chloride (CPVC) plastic pipe, tubing and fittings conforming to ASTM 2846

.02 SYSTEM ACCESSORIES: Each of the various mains, branches and connections of the hot and cold water distributing piping systems shall be provided with a shut-off valve. These valves shall be placed at points necessary for the proper control and isolation of the system. Each piece of equipment or appliance shall be separately valved and provided with sufficient unions that service can be shut off and the piece of equipment or appliance removed, if desired, without disturbing the piping system. Valves shall be

B. Provide for expansion of all piping subject to temperature changes. In general, this shall be accomplished by swings, bends or loops.

PART: 3 EXECUTION .01 MISCELLANEOUS ITEMS:

Thermometers shall be installed where shown or specified and shall be 4-1/2" dial type, range 30" to 240°F., "H.O Trerice" V80445 quality standard. 3. Pressure gauges shall be heavy-duty type with cast aluminum case and chrome ring, 4-1/2" size, range 0 to 160lbs., "H.O Trerice" 600. Provide one on

water line where it enters building and elsewhere as Unless otherwise directed, piping subject to damage from freezing shall be heat traced using "Raychem XL" self regulating heat tracing system. The heat tracing shall be applied directly to the pipe, valve and fittings underneath any insulation or pipe Jocketing. The heat tracing shall be sized and installed in accordance with the manufacturers instructions. Coordinate all electrical work wit

3.02 STERILIZATION: After final testing for leaks, all new potable water lines shall be thoroughly flushed to remove foreign material. Before placing the systems in service, Contractor shall engage a qualified service organization, ARC Water Treatment Company or approved equal, to sterilize the new water lines in

the building, pump in sufficient sodium hypochlorite less than 200 PPM. Contractor shall provide plumbing connections and power for pumping chlorine into the system. Proceed upstream from the point of chlorine application opening all faucets and taps until chlorine is detected. Close faucets and taps when

Through a 3/4" hose connection in the main entering

chlorine is evident. When chlorinated water has been brought to every faucet and tap with a minimum concentration o 200 PPM chlorine, retain this water in the system for three (3) hours as required by the local Health

At the end of the retention period, no less than 100 PPM of chlorine shall be present at the extreme end of the system.

Proceed to open all faucets and taps and thoroughly flush all new lines until the chlorine Obtain representative water samples from the system for analysis by a certified bacteriological laboratory. If all samples tested for coliform organisms are negative, a letter and laboratory reports shall be submitted by the service organization to the

If any samples tested indicate the presence of coliform organisms, the entire sterilization procedure shall be repeated.

DRAINAGE PIPING PART: 1 GENERAL

1.01 SCOPE: A. Furnish and install all labor and materials required to provide a complete plumbing system, including sanitary, drain, vent, and storm water piping, as

shown on the drawings and specified herein. Rules, regulations and standard of the respective regulating authorities shall be followed whenever applicable. This Contractor shall include in his bid price, the cost of all materials or labor required, and all charges or fees assessed by the above authorities order that the work shall comply with

PART 2: PRODUCTS

2.01 DRAINAGE PIPING MATERIALS A. All sanitary drain piping and storm water piping above ground shall be service weight cast iron hub and spigot pipe and fittings, cast iron no HUB or standard weight galvanized steel pipe, with galvanized recessed drainage fittings. Joints shall be made up with appropriate materials in an approved manner. OWV copper or schedule 40 plastic is allowed where Code permits. Plastic piping shall not be permitted in any plenum ceiling areas or ceiling areas open to

plenum ceilings. All sanitary drain and vent piping and storm water piping in the ground inside and outside the building shall be service weight cast iron hub and spigot type, pipe and fittings standard ASTM A 74. Schedule 40 plastic is allowed where code and local

jurisdiction permits. All cast iron pipe and fittings shall conform to the requirements of CISPI 301, ASTM A 888 or ASTM A Cast iron pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe

Institute (CISPI) or receive prior approval from the

PART 3: EXECUTION

3.01 MANNER OF INSTALLATION All materials and equipment shall be new and of the quality specified, and shall be installed in a neat and workmanlike manner by competent specialists equipment not meeting these standards may be condemned by the Architect and shall be removed and reinstalled at no cost to the Owner. Materials, equipment fixtures, and fittings shall be

properly protected during installation and all outlets,

tappings and openings in the work shall be kept

temporarily closed, with proper capping methods All piping shall be sloped, free of traps and unnecessary bends and arranged to conform to the and to suit the necessities of clearance for other mechanical work. This Contractor shall fully inform nimself regarding all furred ceilings, pipe spaces, walls, etc., in which his pipes are to run and see t that his pipes do not require more than available furred space. If, for any reason, changes in location of piping are made, Contractor shall make sure his

pipes are not run in areas which are to be clear All horizontal drainage piping 3" and larger shall i at a uniform grade of not less than 1/8" per foot; piping less than 3" at no less than 14" per foot. All vent piping shall be graded to drain back to drain pipe by gravity.



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ISSUE DATE

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PLUMBING SPECIFICATIONS



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