

Part 1 General

1.1 DEFINITIONS

- .1 Service temperature
- .1 Inside building heated at 20 °C (70 °F): temperature of handled fluid.
- .2 Outside building insulation envelope:
- For hot fluids 18.3 °C (65 °F) and over, use:
 - Service temperature (°C) = handled fluid temperature (°C) + 45 °C
(service temperature (°F) = (handled fluid temperature (°F) + 80°F)).
 - For cold fluids 17.8 °C (64 °F) and under, use:
 - 1.5 the insulation required for a fluid inside the building.

1.2 SUMMARY

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| .1 | Content of this Section |
| .1 | Materials, equipments, accessories and methods of installation related to plumbing system. |
| .2 | Materials, equipments, accessories and methods of installation related to domestic water network. |
| .3 | Materials, equipments, accessories and methods of installation related to drainage network. |
| .4 | Materials, equipments, accessories and methods of installation related to piping, fittings and equipment for compressed air system. |
| .5 | Materials, equipments, accessories and methods of installation related to special devices for plumbing systems. |

1.3 REFERENCE CODES

- .1 Unless otherwise specified, execute works according to:
.1 Plumbing Code.

1.4 PERMIT

- 1 Obtain all necessary permits and approvals by competent authorities.

1.5 ERE OPERATIONS

- .1 Articles 1.11 to 1.21 of Section 23 00 52 also apply to this section.

Part 2 PRODUCTS

2.1 PIPE AND FITTINGS FOR STORM AND SANITARY DRAINS, SEWERS AND VENTS

- .1 Above ground building drainage.
 - .1 DWV copper tubing to ASTM B.306, DWV fittings to CSA B158.1, soldered joints, tin/antimony 95/5 to ASTM B32.
 - .2 Cast iron and fittings with factory applied corrosion resistant coating inside and outside, to CSA B70.M. Jointing done with stainless steel clamp and neoprene gasket to CSA B70M or cement base cold caulking (PC4) to CGGB F77-GP up to NPS 250 (10"). For NPS 300 (12") and 380 (15"), use hub and spigot type joints with compression neoprene gaskets.
 - .3 PVC/DEV pipes and fittings conforming to CSA B182.2 and ULC S102.2.
 - Where required by applicable codes, use PVC/DWV pipes and fitting with maximum flame spread rating of 25 and maximum smoke density rating of 50;
 - Acceptable product:
 - IPEX;
 - Royal Building;
 - Or approved equivalent.
- .2 Underground
- .3 PVC/DWV DR35 pipes and fittings conforming to NQ 3624-130, NQ 3624-135 et CSA B182.2 standards.
- .4 Cast iron and fittings, hub and spigot, with factory applied corrosion resistant coating inside and outside, to CSA B70.M. Joints: compression type with neoprene gasket molten lead to CSA B70-M.

2.2 DOMESTIC WATER SUPPLY PIPING

- .1 Supply piping for domestic water, to be installed above ground, inside a building
 - .1 See material specification sheet P22-1 at the end of this section.
- .2 Supply piping for domestic water to be buried
 - .1 See material specification sheet P22-1 at the end of this section.

2.3 PIPE HANGERS AND SUPPORTS

- .1 Support from structural members. Where structural support does not exist suspend hangers from steel channels or angles. Provide and install supplementary structural members. Obtain approval before using vertical expansion shields. Use minimum two shields for each hanger. Do not suspend from metal deck. Conform to equipment manufacturer recommendations.

- .2 Use hangers adaptable for all pipe sizes.
 - .1 Use roller type hangers where specified.
 - Acceptable products:
 - Myatt;
 - Anvil;
 - Apex.
 - .2 Piping with service fluid temperature higher than 95 °C (200 °F).
 - Acceptable products:
 - Anvil 181 and 271.
 - .3 Copper pipes: domestic water, drains vents and others.
 - Acceptable products:
 - Anvil CT-65, CT-121.
 - .4 Fire protection:
 - Acceptable products:
 - Anvil 260 and 261, UL and FM.
 - .5 All other services.
 - Acceptable products:
 - Anvil 65 up to 50 mm (2");
 - Anvil 60 for 65 mm (2½") and over;
 - Anvil 261 for vertical runs.
 - .6 Use roller type hangers with bracing in the following cases: hangers cannot be supported from top of structural steel work.
 - .7 Minimum hanger rod length: 150 mm (6") for all piping.
 - .8 Hangers rods shall be made of mild steel, with mechanical threading, length of threads shall be sufficient to allow adjustment of pipe levels.
- .3 Pipe racks shall be fabricated from I, U, H structural steel or angle iron and prefabricated galvanized steel channels. Welds shall be continuous and free of cavities. Racks attached to structural elements with Philipps Red Head anchors or approved equal. For painting, refer to the Section 20 05 00.
- .4 Pipes racks spacing shall suit pipe of smaller diameter.
- .5 Use rod diameters and spacing for pipe supports as shown in table except for the following:
 - .1 Support sanitary plumbing piping in accordance with plumbing code municipal or provincial or as specified.
 - .2 Support NPS 12 mm (½") copper pipe every 1.5 m (5').

Pipe size (Nominal Diameter)		Rod diameter	Maximum spacing	
			Steel	Copper
NPS 20, 25	(¾", 1")	10 mm (⅜")	2.1 m (7')	1.8 m (6')
NPS 32	(1¼")	10 mm (⅜")	2.1 m (7')	1.8 m (6')
NPS 40	(1½")	10 mm (⅜")	2.7 m (9')	2.4 m (8')
NPS 50	(2")	10 mm (⅜")	3 m (10')	2.7 m (9')
NPS 65, 75	(2½", 3")	10 mm (⅜")	3.6 m (12')	3 m (10')
NPS 100	(4")	16 mm (⅝")	4.2 m (14')	3.6 m (12')
NPS 125	(5")	16 mm (⅝")	4.8 m (16')	
NPS 150	(6")	22 mm (⅞")	5.1 m (17')	
NPS 200	(8")	22 mm (⅞")	5.7 m (19')	
NPS 250	(10")	22 mm (⅞")	6.6 m (22')	
NPS 300	(12")	22 mm (⅞")	6.9 m (23')	

- .6 Place support within 300 mm (12") of each horizontal elbow.
- .7 Hangers shall be three (3) pieces minimum standard: i.e. anchor, rod, pipe collars and hangers.
- .8 For piping having an operating fluid temperature of 18 °C (64 °F) or less, except cold domestic water, install saddles or hangers on top of insulation over prefabricated insulation shields for each saddle and/or support.
- .9 Install saddles on insulated piping.
 - .1 Acceptable products:
 - Anvil 160 to 165 (saddles), 167 (insulation shields);
 - Myatt;
 - Apex.
- .10 Offset hanger pipe and structural attachments in such a manner that rod is vertical when piping is at its service temperature.
- .11 Set hanger levels to distribute the weight load evenly.
- .12 Before proceeding with fabrication or installation, submit, for verification, the shop drawings for all types of proposed supports.
- .13 On a roof, use prefabricated supports with aluminum disk, stainless steel clamps and polystyrene pad.
 - .1 Acceptable products:
 - Portable Pipe Hangers serie PP and SS;
 - Advanced Support Products inc. serie SS1000.

2.4 COCK AND OUTLETS

- .1 Frost proof outlets
 - .1 Wall type, recessed 177 x 177 (7" x 7") box, bronze or stainless steel; bronze finish, polished face brass valve with vacuum breaker, copper casing and key NPS 25 mm (1").
 - Acceptable products:
 - Jay-R. Smith, model 5509 QT;
 - Zurn, model Z-1300;
 - Watts ou equivalent approuvé.

2.5 WATER HAMMER ARRESTORS (SHOCK ABSORBERS)

- .1 Provide arrestors on branch supplies to each fixture or group of fixtures and where indicated.
- .2 Conform to ASSE-1010 « Plumbing and Drainage Institute », stainless steel or copper construction. Water-hammer arrestors dimension must be conform to ASSE-1010.
 - .1 Acceptable product:
 - Sioux Chiefs, serie 650-660;
 - Wilkins, model 1250.

2.6 ROOF DRAINS

- .1 Type I - Standard roof drain | Standard cast iron drain
 - .1 Cast iron drain with aluminium mushroom dome, underdeck clamp and extension, flashing clamp ring with integral gravel stop, 400 mm (16") diameter with a 250 mm (10") diameter bowl, weir, adjustable mounting clip with four (4) anchor bolts, extension of supporting bowl, solid riser and neoprene gasket. Diameter at the neck 75 mm.
 - .2 Acceptable product:
 - Zurn, Z154-85-DP

2.7 INSULATION TYPE P-1: SERVICE TEMPERATURE BETWEEN 5 °C AND 200 °C (40 °F AND 400 °F)

- .1 Insulation system for piping, valves and fittings at a service temperature between 5°C and 200°C (40 °F and 400 °F).
- .2 Material
 - .1 Rigid fiberglass sleeving for piping according to ASTM C547 with vapor barrier and all purpose jacket according to CGSB 51-GP-52Ma.
 - Maximum thermal conductivity (k) (ASTM C553): 0.042 W/m °C at 93 °C (0.31 BTU inch/hr-sq.ft. oF at 200 °F).
 - .2 Acceptable products:
 - Johns Manville, Micro-Lok HP;
 - Knauf, Earthwool 1000 Pipe Insulation ASJ;
 - Manson, Alley-K ASJ;
 - Owens Corning, Isolant Fiberglas for pipe ASJ.
- .3 Insulation thickness
 - .1 For service temperatures between 5 °C and 14 °C (40 °F and 57 °F), all fluids except domestic cold water:

Pipe nominal diameter	Insulation nominal thickness
All diameters	38 mm (1.5")

- .2 Domestic cold domestic:

Pipe nominal diameter	Insulation nominal thickness
All diameters	13 mm (½")

2.8 INSULATION TYPE P-3 FOR ROOF DRAINS

- .1 Description: used to insulate underside of roof drains.
- .2 Materials
 - .1 Fiberglass blanket according to ASTM C1290 and ASTM C553 with reinforced aluminum vapor barrier according to ASTM C1136. Minimum thermal resistance $RSI = 0.88$ (R5) to 24 °C (75 °F).
 - .2 Acceptable products:
 - Certainteed, Soft Touch FSK;
 - Johns Manville, Microlite Standard duct wrap FSK;
 - Knauf, Duct Wrap FSK;
 - Manson, Alley-Wrap FSK;
 - Owens Corning, SoftR Duct Wrap FSK.
- .3 Insulation thickness

Pipe nominal diameter	Insulation nominal thickness
All diameters	38 mm (1.5")

- .4 Insulation thickness

Nominal insulation thickness	Service temperature
100 mm (4")	450 °C to 650 °C (850 °F to 1,200 °F)

2.9 ADHESIVES, TAPES AND FASTENERS

- .1 For insulation types P-1 and P-3.
 - .1 Fire resistant insulation for jacket.
 - Acceptable products: Foster 30-36, POLR POLAG.
 - .2 Fire resistant insulation adhesive: to glue insulation to metal surfaces.
 - Acceptable products: Bakor 220-05, Duro Dyne "WSA"; Bakor 220-05, Foster 85-60.
 - .3 Fire resistant insulation adhesive for vapor barrier strips or all purpose jackets (ASJ or AP).
 - Acceptable products: Bakor 220-05; Foster 85-60.
 - .4 Fire resistant insulation and vapor barrier adhesive to bond fiberglass on fiberglass or elastomeric layers in multi layer installations.
 - Acceptable products: Foster 85-60.
 - .5 Locking clips on main ducts strips, hot service.
 - .6 Self-adhesive tape 75 mm (3") wide to cover joints for all purpose (ASJ or AP) jackets, hot or cold.

Part 3 EXECUTION

3.1 PIPING/ INSULATION INSTALLATION

.1 General

- .1 Install straight, parallel and close to walls and ceilings, with specified pitch. Use standard fittings for direction changes.
- .2 Install groups of piping parallel to each other on trapeze hangers; spaced to permit application of insulation, identification, and service access.
- .3 Install eccentric reducers in horizontal piping to permit drainage and eliminate air pockets.
- .4 Where pipe sizes differ from connections sizes of equipment, install reducing fittings close to equipment. Reducing bushings are not permitted.
- .5 Brass and copper pipe and tubing shall be free from surface damage. Replace damaged pipe or tubing.
- .6 Ream ends of pipes and tubes before installation.
- .7 Lay copper tubing so that it is not in contact with dissimilar metal and will not be kinked or collapsed.
- .8 Use suitable dielectric unions when connecting two (2) metallic materials having together a potential risk for galvanic corrosion (example: stainless steel, carbon steel or cast iron connected to copper or bronze).
- .9 Use non-corrosive lubricant or Teflon tape applied to male thread.
- .10 Grooved pipe ends: cut square, seating surface clean and free from indent and score marks.
- .11 Install swing or swivel joints to connect risers to mains. Use coupling in risers from one floor outlet to next.
- .12 Install flanges or unions to permit removal of equipment without disturbing piping systems.
- .13 Clean ends of pipes or tubing and recesses of fittings to be brazed or soldered. Assemble joints without binding.
- .14 Copper pipe can not be used for urinal drain pipe and portion of vent pipe below the urinal over flow.
- .15 Where PVC/DWV pipes are forbidden by applicable codes, use copper or cast iron pipes and fittings, conforming to requirements of this section.
- .16 Apply insulation after required tests have been completed and approved by Engineer. Insulation and surfaces shall be clean and dry when installed and during application of any finish. Clean the insulation surface before applying coating or covering.
- .17 Work shall be performed by insulation journeymen.
- .18 Apply insulation and coverings on hot piping duct or equipment while surface is between 50°C and 60°C (120°F and 140°F).

- .19 Vapor barriers and insulation to be complete over full length of pipe or surface, without penetration for hangers, and without interruption at sleeves, pipe and fittings.
- .20 Install insulation with smooth and even surfaces.
- .21 Apply insulation materials, accessories and finishes in accordance with manufacturer's recommendations.
- .22 Use multilayers, overlapping joints when insulation thickness exceeds 50 mm (2").
- .2 Expansion and contraction
 - .1 Install expansion joints and compensators, flexible connections, pipe loops and offsets as indicated.
 - .2 Support piping to prevent any stress or strain.
 - .3 Install guides for expansion joints to manufacturer instructions, otherwise, for minimum 3 m (10') on each side of expansion joint for sizes to 75 mm (3") nominal, minimum 4.8 m (16') on each side for larger pipe sizes.
 - .4 Provide steel anchors welded to steel piping, clamped to non-ferrous fastened to building structure or embedded in concrete pier. Coordinate with Engineer where fastenings are to be made.
 - .5 Anchor horizontal runs of brass and copper pipe to wall or floor construction. Coordinate locations with Engineer. Obtain approval for all anchor types.
- .3 Storm drainage
 - .1 Run piping to main sewers with uniform grade. Trap and vent fixtures as required.
 - .2 Where inverts are not given, pipes of 75 mm (3") or less in diameter and drain pipes shall have uniform grade of 1:50 in the direction of flow. Pipes with larger diameter shall have uniform grade of 1:100 in the direction of flow.
 - .3 Plug or cap pipes and fittings to keep out debris during construction.
 - .4 Jointing of pipe: compatible with type of pipe used.
 - Acceptable product:
 - Garlock;
 - John Crane Compound;
 - Master Metallic Compound;
 - Loctite.
 - .5 Retain all joints of dimension greater than 100 mm (4') located below the street level using lifting flanges held together with threaded rods (except for buried, underground joints).
 - .6 Retain all clean-outs located below the street level using lifting flanges held together with threaded rods.
- .4 Interior buried piping:
 - .1 Lay piping on compacted bedding of clean coarse sand compacted, and free from clay, snow or ice, organic matter or stones.
 - .2 Do not lay pipes in water when Engineer states that conditions are unsuitable.
 - .3 Run buried drains minimum 200 mm (8") clear below bottom of concrete slab.

.5 Water Piping

- .1 Run water piping from service connections to fixtures, equipment, outlets.
- .2 Connect pressure gauge graduated from 0 to a gauge pressure of 1100 kPa (0 to 150 psig) on water service main on building side of water meter. Install gauge cock between service main and gauge. Stem mount gauge shall have 115 mm (4.5") dial to CGSB91-GP-1, type A, grade A.
- .3 Provide hose bibs faucet for complete drainage, at low points of systems or part of systems.
- .4 Flushing and cleaning procedure for piping systems
 - Flush and clean out after pressure tests;
 - Fill with solution of water and non-foaming, phosphate-free detergent;
 - Flush and drain. Clean strainers;
 - Refill water system with clean water;
 - Remove moisture from interior surfaces of fuel oil systems using dry compressed air on nitrogen before filling with oil.
- .5 Clean potable water piping as requested by authority having jurisdiction.
 - Clean domestic water piping adequately before putting it into service;
 - Clean piping with normal potable water flowing until water is clean at every outlet.

.6 Testing

- .1 Test water piping hydrostatically at a pressure 1½ times system pressure or at 860 kPa (125 psig), whichever is greater.
- .2 Pressurize piping for 4 hours makes sure that the piping is free of leaks, unless otherwise stated.
- .3 Test drainage and vent piping as requested by codes. Test system with water only unless written Engineer permission is obtained.
- .4 For subsoil drainage piping, test flow after backfill and compaction and produce a written report.

.7 Clean-up

- .1 Leave systems operating with work areas clean to satisfaction of Engineer.

.8 Connections to municipal networks

- .1 Connections to municipal services including cutting, excavation, backfilling, pavement and sidewalk coating.

3.2 INSULATION INSTALLATION

- .1 Works for this section include but are not limited to the thermal insulation of the following elements:

Elements	Insulation type
Piping, valves and fittings for:	
• Domestic cold water	P-1
• Storm drainage piping	P-1
• Underside of roof drain body	P-3

- .2 Works for this section include but are not limited to the fireproofing protection of the following systems:
- .3 Cover flexible joints with a self-adhering insulation and jacket in order to avoid restricting movement of the joint.
- .4 When flexible insulation is used, insulation must not be compressed at supports. A rigid piece of insulation must be applied at the supports or supports must be insulated.

3.3 PIPING INSULATION

- .1 Preformed insulation: sectional insulation up to NPS 375 (15"), sectional or curved segmented above equal to or above NPS 450 (18").
- .2 Multi-layered insulation: use staggered butt joint construction.
- .3 Vertical pipes over NPS 75 (3"): use insulation supports welded or bolted to pipe directly above lowest pipe fitting. Thereafter locate on 4.5 m (15') centers and at each valve and flange.
- .4 Expansion joints: install every 6.5 m (20') or as indicated. Terminate single layer and each layer of multiple layers in straight cut. Leave space of 25 mm (1") between terminations. Pack void tightly with glass wool. Protect joints with stainless steel aluminum sleeves.
- .5 Use factory installed, easily disassembled insulation, for valves, fittings and process equipment requiring periodic maintenance of parts and subassemblies listed or indicated.
- .6 Terminate insulation at each end of unions and flanges on hot lines, and at other points where indicated, with insulation cement, to CGSB 51-GP-6M, trowel led on bevel.
- .7 Gouge out insulation for proper fit where there is interference between weld bead and insulation. Bevel away from studs and nuts to permit their removal without damage to insulation, and closely and neatly trim around extending parts of pipe saddles, supports, hangers, and clamp guides and seal with insulating cement.
- .8 For piping with mechanical fasteners, stop insulation at connection level. Cover flanges with one (1) or more additional layer(s) of insulation overlapping 150 mm (6") on both sides of joint. This or these additional layers shall be of the same thickness, as the piping insulation and shall not contain any deformation.
- .9 Fix insulation with straps every 900 mm (36") at least, with at least three (3) straps per straight run for piping NPS 250 mm (10") dia. and over.
- .10 All cold piping supports shall be installed on the outer side of insulation. At rack support, use a "Foam glass" piece between pipe and saddle.
- .11 Finish
 - .1 For exposed elements, finish with a canvas cover with the insulation cement and apply one additional coating of the insulation cement.

PIPING MATERIAL SPECIFICATION SHEET

PIPING MATERIAL SPECIFICATION SHEET				
SERVICE	P22-1 Supply piping for domestic water – Ground piping			
FLUIDS	To be used for above ground piping, inside the building for hot water, cold water and recirculated water			
Item	Dimensions	Description	Material specification	Acceptable product
Piping	Up to NPS 75 mm (3")	Hard copper tubing, type "L"	ASTM B42, B43, B88	
	NPS 100 mm and up (4" and up)	austenitic stainless steel pipe, type 304 Schedule 10S	ANSI A21.51	
Fittings	Up to NPS 75 mm (3")	Flanged fittings, brass or bronze	CSA B131.9 ASTM A21.11	
		Threaded connections, brass or bronze	ANSI 21.10 ANSI 21.11 ASTM A-307	
		Weld Fittings cast bronze or wrought copper and bronze	ANSI B16-18 ANSI B16-22	
	NPS 100 mm and up (4" and up)	Flanges and fittings of stainless steel, type 304, including flange of Schedule 10S	ASTM-A-403	
Joints	Up to NPS 75 mm (3")	Flange Seals in solid surface rubber, 1.6 mm thick, in accordance with the standard Bolts to six (6) sections, bolts and gaskets sealing robust, consistent with the standard.	ASTM A307	

PIPING MATERIAL SPECIFICATION SHEET				
SERVICE	P22-1 Supply piping for domestic water – Ground piping			
FLUIDS	To be used for above ground piping, inside the building for hot water, cold water and recirculated water			
Item	Dimensions	Description	Material specification	Acceptable product
		Welded Solder 'tin-antimony-silver-copper." Welds must be performed with TIG and with argon purge continuously inside the pipe. The welds must be full penetration; all piping, fittings, flanges must be from the same manufacturer.	ASTM B-32	Handy Sol from Handy & Harman or Aquasol approved equivalent
	NPS 100 mm and up (4" and up)	Welds must be performed with TIG and with argon purge continuously inside the pipe. The welds must be full penetration; All piping, fittings, flanges must be from the same manufacturer.		Douglas Barwick Pinnacle;
Valves	<p>Unless otherwise indicated, valves shall conform to ANSI Class 200 standards, 1400 kPa or 125/200 class 860/1 400 kPa without shocks with threaded ends or welded and fitted with a handle malleable. Provide for mechanical rooms and boiler rooms, valves with outside screw and yoke for DN 65 mm (2.5 ") and more.</p> <p>For potable water piping, valves up to 50 mm (2") must comply with NSF 61 / ANSI 372 Lead Free.</p>			
Ball valves	Up to NPS 50 mm (2")	Body brass or copper alloy, brass ball with chrome finish, brass rod, PTFE packing reinforced.	MSS SP-110	<u>Potable water</u> Crane LF-9201/2 ; Apollo, 77FLF; Milwaukee, UPBA475B; Nibco, S-FP-600A-F ; Watts, LFFBV-3C ; Kitz, 868 or 869 .

PIPING MATERIAL SPECIFICATION SHEET				
SERVICE	P22-1 Supply piping for domestic water – Ground piping			
FLUIDS	To be used for above ground piping, inside the building for hot water, cold water and recirculated water			
Item	Dimensions	Description	Material specification	Acceptable product
Gate valves	Up to NPS 50 mm (2")	Threaded bronze cap, bronze body, rising stem and disc made of bronze.	MSS SP-80	<u>Water potable</u> Milwaukee, UP148 or UP149; Nibco, T-111-LF or S-111-LF; Apollo 101 S/TLF
	NPS 65 (2½") and over	bolted iron cap, cast iron body, brass rising stem, carbon steel spring disc, bronze seat.	ASME/ANSI B16.1 MSS-SP-70	Crane, 465 1/2; Toyo, 421A; Milwaukee, F-2885-M; Nibco, F-617-0; Toyo, 421JA; Kitz, 72; Jenkins, 454J. Apollo, 611F.
Butterfly valves	NPS 65 (2½") and over	Cast iron body, stainless steel plug, stainless steel stem, EPDM seat.	MSS SP-67	Keystone, F-222-CBJ-2; Toyo, 918 BESL; Crane, 44-BXZ-L; Grinnell, L-1281-3; Jenkins, 200 ; Kitz DJ; Apollo, LD141XXBE11; Nibco, LD2022/2122.

PIPING MATERIAL SPECIFICATION SHEET				
SERVICE	P22-1 Supply piping for domestic water – Ground piping			
FLUIDS	To be used for above ground piping, inside the building for hot water, cold water and recirculated water			
Item	Dimensions	Description	Material specification	Acceptable product
Check valve	Up to NPS 50 mm (2")	Threaded bronze cap, bronze body, flapper valve, bronze removable disk.	MSS SP-80	<u>Potable water</u> Crane, LF37 or LF1342; Milwaukee, UP509 or UP1509; Nibco, T413-Y-LF or S-413-Y-LF; Apollo 163S/TLF.
	NPS 65 (2½") and over	Bolted iron cap, cast iron body, flapper valve, bronze removable disk.	MSS SP-71	<u>[Non potable water]</u> Crane, 37 or 1342; Milwaukee, 509 or 1509; Nibco, T413-Y or S-413-Y; Apollo 163S/T.
Balancing valves	Up to NPS 75 mm (3")	Brass body, stainless steel ball or brass, brass stem, reinforced PTFE seal.		Bell&Gossett, Circuit Setter; RWV, 9517AB or 9519
Drain valve (ball)		Brass body, brass ball with chrome finish, brass rod, PTFE packing reinforced with chain and lid.		Toyo, 5046 ; DAHL, 50.430

PIPING MATERIAL SPECIFICATION SHEET				
SERVICE	P22-1 Supply piping for domestic water – Ground piping			
FLUIDS	To be used for above ground piping, inside the building for hot water, cold water and recirculated water			
Item	Dimensions	Description	Material specification	Acceptable product
Dielectric union (Copper stainless steel)		Design to prevent galvanic corrosion between stainless steel and copper (or bronze). Suitable for fluid temperature up to 180 °F.	NSF 61 / ANSI 372 Lead free	Victaulic 647, Watts

SPECIFICATIONS SHEET FOR MATERIALS TO BE USED				
SERVICE	P22-2 Supply piping for domestic water to be buried			
FLUIDE	To use on buried water pipes (hot, cold and recirculated for domestic, non potable and laboratory water) inside the building and within 1 m of the building.			
Éléments	Dimensions nominales	Description	Norme	Produits acceptables
Pipes	To NPS 75 mm (3")	Hard copper tubing, type "K"	ASTM B-68-10	
	NPS 100 mm (4") and over	ductile iron pipe	ANSI A21.51	
Fittings		ductile iron fittings with compression rubber joint. The joints must allow the electrical conductivity between the pipes	CSA B131.9 ASTM A21.11	
		cast iron fittings flanged with rubber gaskets and bolts, nuts and gaskets.	ANSI 21.10 ANSI 21.11 ASTM A-307	

END OF SECTION