Y. Hangers and Supports

1. All ducts shall run as close as possible to the ceiling, or to the bottom of beams and steel structures when present.
    i. Where pipes and conduits pass above or at a level to interfere with the ducts, the Design-Builder shall alter the affected portion of the ducts to permit passage of pipes and conduits, as specified in Paragraph 1.1(o) Obstructions.
2. Horizontal ducts the larger dimension of which is less than 18 inches, unless otherwise supported, shall be hung by means of 1-inch x 1/8-inch galvanized steel bars at each joint.
    i. Horizontal ducts, the larger dimension, which is 18 inches or more, shall have additional hangers at the center braces.
3. All hangers shall be secured to steel or concrete of the structure in an approved manner.
4. Where ducts require support between beams, provide supplementary steel angles or channels.
5. One duct shall not act as support for another, but common hangers may be employed for two horizontal ducts in the same vertical plane.

Z. Horizontal Ductwork

1. Strap hangers shall be as per SMACNA Standards.
2. All hangers and supports shall be sized as per SMACNA duct construction standards.
3. Hanger spacing shall be in accordance with SMACNA duct standards and shall not exceed 8-foot intervals.

AA. Closure of Openings

1. When ducts pass through openings in walls, floors and partitions, openings shall be neatly closed up tightly with material to match.
    i. A 1-1/4" steel angle shall be riveted to the duct on the bottom and at the sides on each side of wall to close space between duct and wall practically airtight.
    ii. Any open space between the top of the duct and top of opening in wall, through which the duct passes, shall be closed practically airtight on each side of the wall with heavy gauge galvanized sheet steel secured to steel angles riveted to the duct and properly fastened to and fitted to the sides and top of the opening.
    iii. Penetrations through fire rated walls shall be provided with fire damper, or fire smoke damper suitable for the fire rating of the wall and installed in accordance with the damper manufacturer’s UL listing requirements.

5.4.14. HVAC Criteria Summaries

Summary of Ventilation Criteria				
Area	**Facility**	**Ventilation System**	**Ventilation Design Criteria**	**Applicable Codes or Standard**
Storage Room	Stations	None	None	NYCT
Communication Rooms	Stations (Below Ground station)	Fan (if room load is less than 24,000 btu/hr) Fan (if room load is greater than 24,000 btu/hr)	Fan sized by load and to maintain operating temperature range of batteries. Fan minimum size is 2000 CFM Fan sized for 4 air changes per hour with air conditioning unit for room cooling	NYCT

Summary of Heating Criteria				
Room or Space	**Facility**	**Heating System**	**Design Criteria**	**Applicable Codes or Standard**
Communication Room	Stations	Unit Heater	65ºF	NYCT
Storage Room (PSD)	Stations	Unit Heater	65ºF	NYCT

Summary of Cooling Criteria				
Room or Space	**Facility**	**Cooling System**	**Design Criteria**	**Applicable Codes or Standard**
Communication Rooms	Stations	Split DX System.	75ºF, 30-55%RH	NYCT Industry Standard

5.5. HEAT GENERATION EQUIPMENT (NOT USED)

5.5.1. Fire Tube Boilers (Not Used)

5.5.2. Indirect Fired Make-Up Air Units (Not Used)

5.5.3. Fuel Fired Heaters (Not Used)

5.5.4. Cast Iron Boilers (Not Used)

5.5.5. Breeching, Chimneys and Stacks (Not Used)

5.5.6. Hydronic Boilers (Not Used)

5.5.7. Steam Deaerator Pump (Not Used)

5.6. PLUMBING SYSTEMS

5.6.1. Plumbing Work

A. General

1. Provide components and installation capable of producing domestic hot- and cold-water piping systems with the minimum working pressure ratings of 125 psig.

B. Pipe Sizes Smaller than 2 Inches (not buried in ground or concrete):

1. Copper Tubing: Type L, hard drawn ASTM B88.

i. Fittings: Wrought copper and bronze, ASME B16.22

ii. Joints: Silver braze, AWS A5.8 BcuP

C. Pipe Sizes 2 Inches and Larger (not buried in ground or concrete):

1. Copper Tubing, Type L, hard drawn ASTM B88.

i. Fittings: Wrought copper, grooved

ii. Joints: Roll-grooved mechanical couplings, cast ductile iron, coated, ASTM A-536.

D. Water Piping, Below Grade, Within Buildings/Structures (Not Used)

E. Domestic Hot And Cold Water Service Pipe (Above Ground Use within Stations) (Not Used)

F. Flanges, Unions and Couplings

1. Cast Iron Threaded Flanges: Comply with ANSI/ASME B16.1, "Cast Iron Pipe Flanges and Flanged Fittings, Classes 25, 125, 250, and 800", Class 125; raised ground face, bolt holes spot faced. Threads shall conform to ANSI/ASME B1.20.1.

2. Cast Bronze Flanges: Comply with ANSI/ASME B16.24, "Cast Copper Alloy Pipe Flanges and Flanged Fittings", Class 150; raised ground face, bolt holes spot faced.

3. Copper Unions: Comply with ASME B16.18, cast copper alloy body, hexagonal stock, with ball and socket joint, metal-to-metal seating surfaces, brazed joint and threaded ends. Threads shall comply with ASME B1.20.1.

4. Dielectric Unions: Threaded or brazed end connections for the pipe materials in which installed; constructed to isolate dissimilar metals, prevent galvanic action, and prevent corrosion.

G. Valves

1. General

i. Valve Applications:

a. Shut off duty: Use gate or ball valves.

b. Throttling duty: Use globe or ball valves.

ii. Valve Design: Rising stem or rising outside screw and yoke stems.

iii. Sizes: Same size as upstream pipe.

iv. Operators: Provide the following special operator features:

a. Handwheels, fastened to valve stem, for valves other than quarter turn.

b. Lever handles, on quarter turn valves 6 inch and smaller.

c. Chain wheel operators, for valves 2 1/2 inch and larger, install 7 feet or higher above finished floor elevation. Extend chains to an elevation of 5 feet above finished floor elevation.

v. Extended Stems: Where insulation is indicated or specified, provide extended stems arranged to receive insulation.

vi. The stem shall be vertical, where possible, and in no case be below a horizontal position.

vii. Bypass and Drain Connections: Comply with MSS SP 45, "Bypass and Drain Connections Standard".

viii. Valves, two-inch or smaller, shall be provided with means for removal on both sides of the valve.

ix. All valves larger than two inches shall have flanged ends and shall be provided with flange-to-groove adapters.

2. Gate Valves

i. Gate Valves, 2 Inch and Smaller: Comply with MSS SP 80, "Bronze Gate, Globe, Angle and Check Valves", Class 125. Body and bonnet of ASTM B 62, , cast bronze; Provide Class 150 valves meeting the above where system pressure requires.

ii. Gate Valves, 2 1/2 Inch and Larger: Comply with MSS SP 70, "Cast Iron Gate Valves, Flanged and Threaded Ends", Class 125. Iron body, bronze mounted, with body and bonnet conforming to ASTM A 126, Class B;

3. Ball Valves

i. Ball Valves, 1 Inch and Smaller: The valves shall be rated for 150 psig saturated steam pressure, 400 psig WOG pressure. Two-piece construction, with bronze body conforming to ASTM B 62.

ii. Ball Valves, 1 1/4 Inch to 2 Inch: The valves shall be rated for 150 psig saturated steam pressure, 400 psig WOG pressure. 3 piece construction, with bronze body conforming to ASTM B 62.

4. Globe Valves

i. Globe Valves, 2 Inch and Smaller: Comply with MSS SP 80, Class 125. Body and screwed bonnet of ASTM B 62 cast bronze; with threaded ends, brass or replaceable composition disc, copper silicon alloy stem, brass packing gland, "TFE" impregnated packing, and malleable iron handwheel. Provide Class 150 valves meeting the above where system pressure requires.

ii. Globe Valves, 2 1/2 Inch and Larger: Comply with MSS SP 85, "Cast Iron Globe and Angle Valves, Flanged and Threaded Ends", Class B. With outside screw and yoke, bronze mounted, flanged ends, and "TFE" impregnated packing, and two piece backing gland assembly.

5. Check Valves

i. Swing Check Valves, 2 Inch and Smaller:

a. Comply with MSS SP 80, Class 125.

b. Cast bronze body and cap conforming to ASTM B 62; with horizontal swing, Y pattern, and bronze disc; and having threaded ends.

c. Provide valves capable of being reground while the valve remains in the line.

d. Provide Class 150 valves with threaded end connections, where system pressure requires or where Class 125 valves are not available.

ii. Swing Check Valves, 2 1/2 Inch and Larger: Comply with MSS SP 71, "Cast Iron Swing Check Valves, Flanged and Threaded Ends", Class 125. Cast iron body and bolted cap conforming to ASTM A 126, Class B; horizontal swing, and bronze disc or cast-iron disc with bronze disc ring; and flanged ends. Provide valves capable of being refitted while the valve remains in the line.

H. Plumbing Fixtures (Not Used)

I. Lavatory Faucets (Not Used)

J. Sink Faucets (Not Used)

K. Service Sink Faucets (Not Used)

L. Mop Basin Faucets (Not Used)

M. Lavatory Supplies and Stops: (Not Used)

N. Lavatory Traps (Not Used)

O. Sink Supplies and Stops (Not Used)

P. Sink Traps (Not Used)

Q. Sink tailpiece Wastes (Not Used)

R. Water Closets (Not Used)

S. Mop Sink Receptors (Not Used)

T. Wash Fountains (Not Used)

U. Kitchen Sinks (Not Used)

V. First Aid Hand Wash Sinks (Not Used)

W. Electric Water Coolers (Not Used)

X. Emergency Shower And Eyewash Stations (Not Used)

Y. Plumbing Fixture Supports (Not Used)

Z. Pipe Hangers, Anchors And Supports

1. All pipe hangers shall be as specified below.
    i. For bare pipe, the Design-Builder shall furnish and install Galvanized Clevis Hanger.
    ii. For insulated hot water piping the Design-Builder shall furnish Black Steel Elongated Clevis Hanger.
    iii. The Design-Builder shall also furnish Black Steel Pipe Covering Protection Saddle, which the Design-Builder shall weld to the inside of the pipe-supporting section of the Elongated Clevis Hanger, after which the Clevis and Saddle combination shall be galvanized and thereafter installed in the work.
    iv. For insulated cold water and City water piping the Design-Builder shall furnish and install Galvanized Refrigeration Hanger and Shield.
2. All hangers shall be supported from the structure by means of Galvanized Extended Beam Clamp; Galvanized Welded Eye Rod shall be used with the beam clamp.

AA. Water Meters (Not Used)

BB. Backflow Preventors (Not Used)

CC. Water Pressure Regulators (Not Used)

DD. Water Filters (Not Used)

EE. Thermostatic Water Mixing Valves (Not Used)

FF. Water Tempering Valves (Not Used)

GG. Hydrants (Not Used)

HH. Miscellaneous Specialties:

1. Hose End, Drain Valves: 3/4-inch ball valve, rated for 400 psig WOG. Include 2-piece bronze body conforming to ASTM B 62, standard port, chrome plated brass ball, replaceable "TFE" seats and seals, blowout proof stem, and vinyl covered steel handle.
    i. Inlet: Solder joint or threaded.
    ii. Outlet: Short threaded nipple with ASME B1.20.7 garden hose thread and cap.