Mechanical Pipe Specification

- Exposed Chilled Water & Heating Water Mechanical Pipe in Building
    - Welded Pipe - Black steel pipe ASTM A53B ERW ANSI schedule 40 with steel butt-welded fittings ANSI B16.9 using long turn ells, ANSI B16.5 weld neck or slip-on flanges & Bonney Forge Weldolets and Threadolets. Joints shall be welded in accordance with the Engineering Standard of the Mechanical Contractors Association of America Inc., Part VII, Standard Procedure Specifications Nos.1 and 2. All fittings shall be "Made in America"

- Mechanical Chilled Water & Heating Water Pipe in Tunnel
    - Grooved Pipe - Provide pipe fittings for system as hereinafter specified.
    - Joint construction can be ductile iron grooved fittings ASTM-A-395 and ASTM-A-536; ASTM-A-234 forged steel; or factory-fabricated ASTM-A-53. Victaulic Style 107N (rigid) and 177 or 77 (flexible) couplings with heat treated carbon steel bolts and nuts ASTM A-449 and A-183 used on roll grooved carbon steel pipe. Gaskets shall be EPDM Grade "E" or Grade "EHP", suitable for water services -30°F to +230°F. Outlets shall be mechanical T, Victaulic Style 920/920N. Pipes 14" and larger shall be two-segment couplings, Victaulic Style W07 (rigid) and W77 (flexible). All references to codes shall apply to the latest year. Grooved products may be as manufactured by Victaulic or equal Grinnell. All piping and fittings shall be "Made in America".

- HEATING WATER PIPING (4" and smaller)
    - ASTM B88, Type L, hard tempered with wrought copper solder joint fittings 150 lbs., ANSI B16.22. Joints soldered with ASTM B32 tin-antimony 95.5 or Taramet Sterling "lead free" solder or equivalent
        - 1. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
        - 2. Copper Pressure-Seal-Joint Fittings: ASME B16.51, copper press-connect pressure fittings.
            - a. Basis-of-Design Product: Subject to compliance with requirements, provide Mueller Industries, Inc. Streamline PRS™ copper press fittings or a comparable product by one of the following:
                - 1) Elkhart Products Corporation.
                - 2) Viega LLC.
            - b. Fittings for NPS 2 (DN 50) and Smaller: Wrought-copper or bronze fitting with EPDM-rubber O-ring seal in each end.

- c. Fittings for NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Wrought-copper or bronze fitting with stainless-steel grip ring and EPDM-rubber O-ring seal in each end.

- Sprinkler Pipe
  - Grooved Pipe - Provide pipe fittings for system as hereinafter specified. All references to codes shall apply to the latest year. Grooved products may be as manufactured by Victaulic or Grinnell. All piping and fittings shall be "Made in America".

- Butterfly Valves
  - Butterfly valves shall be provided in chilled water and hot water HVAC lines size 4" and larger.
  - Butterfly valves shall be Bray, Crane, NIBCO or DeZurik equal to DeZurik Model BGS resilient seated butterfly valves installed with welded neck companion flanges.
  - Butterfly valves shall be of the lug body style suitable for use with ANSI 125 or 150 pound flanges. Bodies shall be ductile iron or cast iron. Valves shall be manufactured in accordance with MSS-SP67 rated at least 200psi non-shock cold water working pressure. Bodies of all flangeless wafer vales shall have 4 flange bolt guides to center the body in the pipeline. Body to have 2" extended neck for insulation.
  - All valves shall have retained seats and shall provide bubble tight shutoff up to the full valve rating without the use of downstream flanges.
  - All valves shall be furnished with bronze [TFE coated stainless steel for 20" and large] self-lubricated bearings. Shaft seals shall be provided to prevent leakage and to protect bearings from internal or external corrosion.

- Pipe insulation
  - Chilled Water Pipe Insulation 1-1/2" or larger insulation shall be 1-1/2" thickness
  - Chilled Water Pipe Insulation 1-1/4" or smaller insulation shall be 1" thickness
  - Heating water pipe insulation 1-1/2" or larger insulation shall be 2" thickness
  - Heating Water Pipe Insulation 1-1/4" or smaller insulation shall be 1=1/2"" thickness
  - In buildings Type I heavy duty molded fiberglass pipe insulation with factory applied all-service jacket. The K factor shall not be more than 0.23 at seventy-five degrees Fahrenheit mean temperature. Rated for a maximum service temperature of 650*. Insulation shall be equal to Manville Microlock AP-T Plus .
  - **PVC** jacket shall be provided on all interior exposed piping, equipment, and ductwork herein specified to be insulated. Where PVC jacket is to be installed on piping, installation materials and procedures shall be in accordance with the manufacturer's recommendations.
  - In tunnel Type XII Flexible, polymer based, low density, closed cell, chemically inert insulation with a pressure-sensitive adhesive system for closure and vapor seal. For chilled and heating water applications the field joint shall be sealed with Armaflex

adhesive. The K factor shall not be more than 0.27 at seventy-five degrees Fahrenheit mean temperature. Insulation shall be equal to Armacell AP Armaflex SA.