SECTION 23 07 19

HVAC PIPING INSULATION

1.0 GENERAL

1. DESCRIPTION
   1. All work specified in this Section is governed by the Common Work Results for HVAC Section 23 05 00.
   2. This Section 23 07 19 and the accompanying drawings cover the provisions of all labor, equipment, appliances, and materials and performing all operations in connection with the insulation of the HVAC piping systems as specified herein and as shown for the heating, ventilating and air conditioning (HVAC) systems. These insulated piping systems include, but are not limited to, the following:
      1. Condenser water supply and return (CWS&R)
      2. Heating hot water supply and return (HHWS&R)
      3. Refrigerant suction and liquid (RS&L)
      4. Condensate drains (indoors only)
   3. All insulation products installed indoors shall meet ASTM E 84, UL 723, NFPA 90A, and 90B requirements for Flame Spread Rating 25 and Smoke Developed Rating 50.
   4. Inserts for all piping which is specified to have hangers outside the insulation shall be provided at such hangers and supports for all piping 2" and larger. Inserts shall be Foamglas insulation, and shall be at least 2" longer than the length of the associated pipe shields.
   5. Insulation products in air plenum spaces shall be listed and labeled and have a fire hazard rating not more than 25 for flame developed and not more than 50 for smoke developed.
2. INTENT
   1. It is the intent of this Section of the specifications to provide a complete piping insulation system which is free of gaps and tears, properly fitted and finished, free of sweating, and fabricated so as to fit the space allotted and to exhibit a negligible heat transfer.
   2. The word "piping" is defined to mean all piping, fittings, joints, hangers, coatings, valves, cocks, test and sensor wells and accessories necessary for the HVAC piping systems described, shown and specified.
3. ACCEPTABLE MANUFACTURERS
   1. Insulation products shall be as manufactured by Owens Corning, Knauf, Manville, Certainteed, Dow, or Armacell.

2.0 PRODUCTS

1. PIPING INSULATION
   1. Piping insulation installed inside the building, except for the refrigerant suction and liquid service and cooling coil condensate drains, shall be fiberglass preformed pipe insulation with a white all-service jacket/vapor barrier. Insulation shall have a maximum K of 0.27 BTU/In/Hr/SF/°F, at a mean temperature of 75°F. For pipe sizes larger than 1.5”, 2" thick insulation shall be used; and for pipe sizes 1.5” and smaller, 1.5" thick insulation shall be used.
   2. Piping insulation installed outside the building, except for the refrigerant suction service, shall be prefabricated 2 lb/ft3 density polyisocyanurate insulation (Trymer 2000 XP or approved equal) with waterproof mastic and glass fiber jacket finished with an aluminum jacket, minimum 0.032”, with waterproof silicone caulk joints and seams. Outside the building, insulation with a maximum K of 0.19 BTU/In/Hr/SF/°F at a mean temperature of 75°F shall be used. Outdoor piping 1.5" and smaller shall be insulated with 1.5" thick insulation; outdoor piping larger than 1.5” shall be insulated with 2" thick insulation.
   3. Piping insulation installed underground, either inside or outside the building, shall be prefabricated 2 lb/ft3 density polyisocyanurate insulation (Tymer 2000 XP or approved equal) with HDPE jacket. Jacket shall conform to ASTM D1248 and D3350, be extruded, have a minimum thickness of 175 mils.
   4. Flexible elastomeric foam closed-cell insulation shall be provided over all refrigerant suction piping, cooling coil condensate, and other services as specified or noted. Refrigerant suction piping insulation shall be 1-1/2" thick 25/50 AP Armaflex, black. Insulation shall be wrapped by listed and labeled product in return air plenums. Cooling coil condensate insulation shall be 1” thick ArmaFlex Ultima. All glues and coatings shall be products of the same Manufacturer as the insulation. Insulation shall comply with ASTM C534, Type I for tubular materials. Insulation shall be listed and labeled per UL 723 at 25/50 when used in return air plenums.
   5. Insulation shall be continuous over all valve bodies, fittings, and wall and floor penetrations. Do not insulate unions on hot water piping; nor instruments, gauges, valve handwheels, etc. on any piping.
   6. All piping insulation covering water-carrying piping which is exposed to the weather and subject to bursting from freezing temperatures shall have oversized insulation to accommodate heating cable. See Section 23 05 33.
   7. Provide a continuous watertight aluminum jacket and fitting covers for all polyisocyanurate insulation piping exposed to the weather.

3.0 EXECUTION

1. INSTALLATION OF PREFORMED PIPE INSULATION
   1. Indoors
      1. Preformed pipe insulation with all-service jackets shall have all longitudinal joints lapped by a minimum of 2" and sealed with fire retardant adhesive. Butt joints shall be sealed with 3" wide tape similar to the insulation vapor barrier jacket and secured with adhesive.
      2. All elbows shall be insulated with preformed fitted insulation equal to the thickness specified for the adjacent piping insulation. As an alternative, provide fitting covers meeting NFPA/UL 25/50 ratings; stuff all covers with fiberglass insulation having characteristics equal to adjacent pipe insulation.
   2. Outdoors
      1. Preformed pipe insulation for exterior water-carrying pipe shall have insulation secured on with copper wire with ends twisted and turned into the insulation. Over the insulation, apply mastic to a minimum 1/4" thickness and draw in, while mastic is wet, glass fiber cloth. Finish with aluminum jacket with waterproof silicone caulk joints and seams. All seams shall be overlapped in the direction of rainfall, as practical.
      2. All elbows shall be insulated with preformed fitted insulation equal to the thickness specified for the adjacent piping insulation.
      3. All water-carrying piping subject to freezing weather shall have self-regulating electric heat tracing installed as specified in Section 23 05 33.
2. CLOSED-CELL PIPING INSULATION INSTALLATION
   1. Insulation shall be provided on all refrigerant suction and indoor cooling coil condensate drain lines. The insulation shall be installed by the slip-on method; slitting of the insulation is prohibited and shall be cause for rejection, except that AP ArmaFlex Lapseal with interior adhesive liner and wide adhesive lap seal is acceptable. All elbows shall be mitered and all such joints and butt joints shall be tightly made and glued.
   2. All insulation installed outdoors shall be coated with a glossy white, ultraviolet protective coating applied in two coats.
3. MISCELLANEOUS REQUIREMENTS
   1. Where insulation is installed over pipe hangers, supports, etc., seal vapor barrier at all penetrations. Also seal all end joints at unions and points of termination by bevel cutting the end and drawing jacket over until secured at the pipe. Apply white mastic to all end seals over jacket.

END OF SECTION