

SECTION 20 07 00 – MECHANICAL INSULATION

PART I - GENERAL

1.01 DESCRIPTION

- A. Section 01 11 00 Summary of Work and Section 20 05 00 Common Work Results for Mechanical shall be considered a part of these specifications.
- B. The insulation work includes:
 - 1. Piping insulation, jackets, and accessories.
 - 2. Ductwork insulation, jackets, and accessories.

PART II - PRODUCTS

2.01 FLEXIBLE ELASTOMERIC CELLULAR

- A. Material: Flexible expanded closed-cell structure with smooth skin on both sides. Comply with ASTM C 354, Type I for tubular materials and ASTM C 354, Type II for sheet materials.
- B. Thermal Conductivity: 0.30 average maximum at 75 deg. F.
- C. Coating: Water based latex enamel coating recommended by insulation manufacturer.
- D. Products: AP/Armaflex by Armacell or Rubatex Insultube-180 by RBX Corporation.

2.02 GLASS FIBER

- A. Material: Inorganic glass fibers, bonded with a thermosetting resin.
- B. Jacket: All-purpose, factory-applied, laminated glass-fiber reinforced, flame-retardant Kraft paper and aluminum foil having self-sealing lap.
- C. Board: ASTM C 612, Class 2, semi-rigid jacketed board. Thermal Conductivity: 0.26 average maximum, at 75 deg. F mean temperature. Density: 6 pcf average.
- D. Blanket: ASTM C 553, Type II, Class F-1, jacketed flexible blankets. Thermal Conductivity: 0.32 average maximum, at 75 deg. F. mean temperature.
- E. Preformed Pipe Insulation: ASTM C 547, Class 1, rigid pipe insulation, jacketed. Thermal Conductivity: 0.32 average maximum, at 75 deg. F mean temperature.
- F. Adhesive: Produced under the UL Classification and follow-up service.
- G. Type: Non-flammable, solvent-based.
- H. Service Temperature Range: Minus 20 to 180 deg. F.
- I. Vapor Barrier Coating: Waterproof coating recommended by insulation manufacturer for outside service.

- J. Manufacturers: CertainTeed Corporation, John Manville, Knauf Insulation, or Owens-Corning.
- 2.03 POLYOLEFIN
- A. Material: Unicellular, polyethylene thermal plastic insulation. Comply with ASTM C 534 or ASTM C 1427, Type I, Grade 1 for tubular materials and Type II, Grade 1 for sheet materials.
 - B. Products: Aerocel by Aeroflex USA.
- 2.04 PHENOLIC
- A. Preformed pipe insulation of rigid, expanded, closed-cell structure. Comply with ASTM C 1126, Type III, Grade 1.
 - B. Products: Koolphen K by Kingspan Tarec Industrial Insulation NV.
- 2.05 PVC JACKET
- A. High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; 20 mils thick ready for shop or field cutting and forming.
 - B. Products: Subject to compliance with requirements, provide the following:
 - Johns Manville; Zeston.
 - P.I.C. Plastics, Inc.; FG Series.
 - Proto PVC Corporation; LoSmoke.
 - Speedline Corporation; SmokeSafe.
 - C. Adhesive: As recommended by jacket material manufacturer.
 - D. Color: As selected by Architect.
 - E. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
 - F. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
- 2.06 PLUMBING AND HVAC PIPING INSULATION
- A. Insulate all interior domestic cold water piping, condensate drain piping from HVAC roof-top units, and waste water pump discharge with ½" thick flexible elastomeric, polyolefin, phenolic or preformed rigid glass fiber insulation.
 - B. Insulate roof drain bodies and horizontal rainwater leaders of storm water piping with ½" thick flexible elastomeric, polyolefin, phenolic or preformed rigid glass fiber insulation.
 - C. Insulate water lines, sanitary drains and traps exposed at fixtures for disabled as indicated on Plumbing Fixture Schedule for LAV-1 on drawing P-610.

- D. Insulate interior domestic hot water and recirculated hot water piping 1 ¼” and smaller with ½” thick flexible elastomeric, polyolefin, phenolic or preformed rigid glass fiber insulation.
- E. Insulate interior domestic hot water 1 ½” and larger with 1” thick flexible elastomeric, polyolefin, phenolic or preformed rigid glass fiber insulation.
- F. All joints shall be sealed with approved manufacturers’ adhesive.
- G. Exposed insulated piping in General Sales shall be covered with 20 mils PVC jacket. PVC jacket color shall be selected by the Architect.

2.07 FREEZER/COOLER PIPING INSULATION

- A. Insulate refrigerant suction piping for cooler/freezer and refrigerant liquid piping for freezer with a reverse defrost with 1” thick close-cell flexible elastomeric insulation inside the building and 2” thick outside the building. Thickness of 2” shall be achieved by two (2) layers of 1” insulation with adhesive applied per manufacturers’ recommendations.
- B. Outdoor insulation shall be protected from weather and UV by two (2) coats of manufacturer’s approved finish or a PVC jacket.
- C. Insulate the walk-in cooler/freezer condensate drain line.
 - 1. Inside the walk-in freezer, insulate the entire condensate drain line with 1” thick close-cell flexible elastomeric insulation. Apply insulation after the drain line heater installation.
 - 2. Inside the walk-in cooler it is not necessary to insulate the condensate line and trap.
 - 3. Outside the walk-in cooler/freezer, insulate all condensate drain lines with a minimum of ½” thick close-cell flexible elastomeric insulation.
 - 4. All joints shall be sealed with approved manufacturers’ adhesive.
- D. Exposed insulated piping in General Sales shall be covered with 20 mils PVC jacket. PVC jacket color shall be selected by the Architect.

2.08 DUCTWORK INSULATION

- A. All concealed ductwork inside the building, and all ductwork outside the building shall be insulated, including but not limited to supply, return, and transfer. Exhaust ductwork located within 10 feet of the building exterior penetration shall be insulated as well.
- B. Internally lined ductwork is not acceptable in any supply ductwork including main drops from HVAC roof-top units.
- C. Internally lined ductwork is acceptable in the exposed return ductwork in General Sales for sound attenuation. Refer to section 23 30 00 “HVAC Air Distribution”.

- D Concealed ductwork inside the building: The insulation shall consist of all service fiber glass duct wrap 1 1/2" thick with 0.75 lbs /cu. ft. density, with an installed R-value of 4.2, FSK jacket and a vapor barrier.
- E Products: Subject to compliance with requirements, provide one of the following:
 - 1. Owens Corning; SOFTR Type 75 All-Service Duct Wrap.
 - 2. CertainTeed Corp.; SoftTouch Duct Wrap.
 - 3. Johns Manville; Microlite.
 - 4. Knauf Insulation; Friendly Feel Duct Wrap.
- F Exposed ductwork in General Sales shall be fiberglass duct wrap 1 1/2" thick with 0.75 lbs /cu. ft. density, with an installed R-value of 4.2 and a vapor barrier white, gray or black metalized polypropylene-scrim kraft (PSK) or vinyl facing instead of foil-scrim kraft (FSK) facing. Facing color (white, gray or black) shall be selected by the Architect to match other finishes. No painting is necessary.
- G Products for the exposed ductwork in General Sales: Subject to compliance with requirements, provide one of the following:
 - 1. Knauf Insulation; Friendly Feel Duct Wrap, white or black PSK facing.
 - 2. CertainTeed Corp.; white or gray vinyl facing.
 - 3. Johns Manville; white vinyl facing.
- H Supply ductwork outside the building: For Climate Zones 1 through 5 the insulation shall be 6 psf duct board with 2" thick insulation with an installed R-value of 6.0 and a waterproof jacket. For Northern Climates (climate zones 6, 7 & 8) the insulation shall be 3" thick with an installed R-value of 8.3. These climates are defined by ASHRAE Standard 90.1-2007, Figure B-1 "Climate zones for United States locations" & Table B-1 "U.S. Climate Zones".
- I Return ductwork above roof: The insulation shall be 6 psf duct board with 1 1/2" thick insulation with an installed R-value of 4.2 and a waterproof jacket.

2.09 INSULATION RATINGS

- A. Flame spread shall be 25 or less.
- B. Smoke developed shall be 50 or less.

PART III - EXECUTION

3.01 INSTALLATION

- A. Install materials in accordance with the manufacturer's instructions.

END OF SECTION