

## SECTION 15250 - MECHANICAL SYSTEMS INSULATION

## PART 1 – GENERAL

## 1.01 SUMMARY

## A. Work Includes:

1. Furnish and install all insulation for HVAC piping, duct and equipment and for plumbing piping. Insulation shall comply with the energy code as a minimum unless specified below.

## 1.02 QUALITY ASSURANCE

- A. Insulation specified is intended to set a standard. Insulation by other manufacturers will be considered provided that characteristics meet or exceed specified material. Each substitute item shall be submitted for approval.
- B. Specifications apply to all ductwork except exhaust unless specifically specified or indicated otherwise. See the drawings for additional specific requirements. Insulation may also be required for certain exhaust ducts when indicated on the drawings or in these specifications.
- C. Insulating materials shall comply with flame spread, smoke developed, and other applicable requirements of local and state Fire Codes and NFPA 90A, UL 723 or ASTM E-84. Before applying any insulation, submit satisfactory evidence of this compliance.
- D. It is the intent of this Section of the Specifications that all cold surfaces subject to "sweating" shall be insulated and have a vapor barrier applied
- E. Installer Qualifications: Insulation contractor installing this insulation system must be experienced with similar type systems and products.
- F. Furnish insulation thickness in excess of that specified herein if so indicated on the drawings.

## PART 2 – PRODUCTS

## 2.01 PLUMBING

- A. DOMESTIC COLD WATER (ABOVE-GRADE): Owens-Corning or Knauf 1/2" thick fiber glass, one piece, pipe insulation with factory-applied White All Service (ASJ) Vapor Barrier Jacket. Fittings shall be molded or mitered fiber glass for sizes under 3" and molded fiber glass for sizes 3" and larger.
- B. DOMESTIC HOT WATER (ABOVE-GRADE): Owens-Corning or Knauf 1" thick fiber glass, one-piece, pipe insulation with factory-applied White All-Service (ASJ) Vapor Barrier Jacket. Fittings shall be OC-110 Cement for sizes under 3" and molded fiber glass for sizes 3" and larger.
- C. DOMESTIC HOT WATER (BELOW-GRADE): Pittsburgh Corning "FOAMGLAS" 1" thick or Dow Chemical Trymer 2000 @ 1" thickness. Fittings shall be molded or mitered of "FOAMGLAS" or Trymer 2000. Trench to be constructed with stone bedding. Trench to be sand backfilled.

TRYMER brand rigid foam insulation to be wrapped with a tough puncture resistant vapor retarder jacketing. No additional outer mechanical jacketing is required.

Acceptable Vapor Retarder Manufacturers for underground installation:

Saran 560 Vapor Retarder Film and Saran Tape manufactured by The Dow Chemical Company; or Rubberized bituminous membrane material with a minimum 50 mils thickness.

- D. AIR CONDITIONING UNIT CONDENSATE DRAINS: Armstrong's AP Armaflex Pipe Insulation ½" thick.

## 2.02 HVAC PIPING AND VESSELS

- A. REFRIGERANT SUCTION: Armstrong's "AP ARMAFLEX" pipe insulation ¾" thick. Also insulate liquid lines located in spaces warmer than ambient temperature (Attics, Boiler Rooms, etc.).
- B. HOT WATER PIPING: Owens-Corning or Knauf one-piece fiber glass pipe insulation with factory-applied All-Service (ASJ) Vapor Barrier Jacket. Thickness shall be 1" through 2" pipe size and 1-1/2" for 2-1/2" size pipe and larger. Fittings shall be molded or mitered fiberglass for sizes through 2" and molded fiber glass 2-1/2" and larger.

## 2.03 HVAC DUCTWORK

- A. RECTANGULAR DUCTWORK (MAX. DIMENSION 30"): Owens-Corning or Knauf 2" thick fiberglass duct wrap with factory-applied flame-retardant foil-reinforced Facing (FRK/FSK), ¾ lb. Density. Use semi-rigid insulation for ductwork in finished spaces and for exposed ducts within eight (8) feet of the floor. Ductwork shall be both internally and externally insulated when indicated on the drawings. See paragraph "D" below for ducts exposed in equipment rooms and ducts with maximum dimension greater than 30".
- B. ROUND AND OVAL DUCT WORK: Owens-Corning or Knauf 2" thick (3" thick in attics) fiberglass faced duct wrap with factory-applied flame-retardant foil-reinforced Facing (FRK/FSK) 0.75 PCF density. For exposed ductwork within eight (8) feet of the floor, cover with aluminum jacket same as specified for ductwork exposed to weather; delete weather-proofing.
- C. RECTANGULAR DUCTWORK (INTERNALLY LINED): Refer to Section 15800 and the drawings for requirements.
- D. RECTANGULAR DUCT WORK (MAX. DIMENSION GREATER THAN 30", AND DUCTWORK EXPOSED IN EQUIPMENT ROOMS UP TO 8'-0" ABOVE THE FLOOR): Owens-Corning or Knauf 2" with foil scrim kraft (FSK) semi-rigid duct insulation having a minimum density of 3.0 PCF. Ductwork shall be both internally and externally insulated when indicated on the drawings.

## PART 3 – EXECUTION

### 3.01 GENERAL

- A. The application of all insulation shall be performed by experienced mechanics, regularly employed in the trade, in a neat and workmanlike manner. Unless otherwise specified to a greater quality, the application of all insulation shall be in accordance with the manufacturer's recommendations.
- B. Omit insulation from the following items:

1. Exposed plated plumbing pipe.
  2. Pipe vents to atmosphere, discharge from safety and relief valves, overflow pipes, and hot only drain pipes.
  3. Valves, Unions, Flanges, Traps, Strainers, and devices in HOT ONLY piping.
  4. Supply duct liner in ducts serving kitchen and range hood make-up air.
  5. Return air ductwork fully exposed in a fully conditioned space, return air plenums not included.
- C. Provide semi-circular protection saddles of #16-gage galvanized steel, 12" long, for insulated piping where hangers occur. On pipe sizes 2" and over, provide 12" length of foam-glass insulation at hangers.
- D. Insulation facings shall be acceptable to NFPA Standards 90A and 90B and ASTM C1136.
- E. All exposed ends of pipe insulation shall be pointed up neatly with appropriate insulating cement, or use premolded PVC end caps on cold only piping and preformed aluminum end caps on dual-temp, hot or steam piping.
- F. Piping systems shall be tested and cleaned before insulation is applied.
- 3.02 FIBER GLASS FOR HOT PIPING
- A. Apply insulation to pipe with side and end joints butted tightly. Seal self-sealing jacket laps and butt joint strips with nylon sealing tool. Fittings shall be finished as specified under "COLD PIPING." Cover fitting with preformed PVC covering.
- 3.03 FIBER GLASS DUCT WRAP TYPE INSULATION
- A. To be used on round or oval duct or only on rectangular duct with a maximum dimension less than 30."  
Adhere insulation to duct surface with approved adhesive applied in strips approximately 4" wide on approximate 8" centers. In addition, secure insulation to the bottom and/or sides of rectangular duct work with a dimension of 24" and above with mechanical fasteners at not more than 18" on center. Butt circumferential edges of insulation and seal joints with staples at 6" o.c., adhering the flange over each joint, and seam for lap of longitudinal joints. Tape all joints and punctures with 3" wide foil reinforced Kraft tape.
- 3.04 FIBER GLASS DUCT BOARD TYPE INSULATION
- A. Impale with speed washers the insulation over welded pins, spaced a minimum of two rows per side at a maximum of 16" o.c. Seal all breaks, punctures, and joints by adhering a 3" wide strip of foil reinforced Kraft tape.
- 3.05 ARMAFLEX PIPE INSULATION
- A. Apply in accordance with latest edition of Armstrong's "INSTALLATION INSTRUCTIONS TO THE CONTRACTOR." Apply two coats of Armstrong's WB Vinyl Finish with color selected by engineer.
- 3.06 SHEET ARMAFLEX
- A. Apply in accordance with latest edition of Armstrong's "INSTALLATION INSTRUCTIONS TO THE CONTRACTOR." Apply two coats of Armstrong's WB Vinyl Finish with color selected by engineer.

3.08 PIPE INSULATION EXPOSED TO WEATHER

- A. Provide aluminum jacket 0.016" thick and smooth. Provide side and end laps of 2" minimum with cut edge of side lap turned under 1" for smooth edge. Seal laps with weatherproof sealant. Position laps to shed water. Secure jacket in place with bands 1/2" x 0.015" thick placed on 9" centers. Extend exterior insulation and jacketing 2" beyond sleeve inside building.

END OF SECTION 15250