

SECTION 23 0700**HVAC INSULATION****GENERAL****1.1 GENERAL REQUIREMENTS**

- A. All work specified herein shall be accomplished in accordance with the applicable requirements of Section 23 0000 - HVAC General.

1.2 WORK INCLUDED

- A. The work done under this section shall include all labor, materials, accessories, services and equipment necessary to furnish and install all insulation, complete, as indicated on the Drawings and as specified herein.

PRODUCTS**2.1 MATERIALS**

- A. Materials as specified in this section shall be manufactured by Armstrong, Johns-Manville, Knauf, Pittsburgh-Corning, Certainteed, Pabco, Dow Chemical, Owens Corning or approved equal.
- B. Insulation thicknesses shall be as shown in the following table:

Minimum Pipe Insulation			Insulation Thickness for Pipe Sizes					
Piping System Types	Fluid Temperature Range		Runouts 2 in. +	1 in. and Less	1-1/4 to 2 in.	2-1/2 to 4 in.	5 and 6 in.	8 in. and Larger
	°C	°F	In.	In.	In.	In.	In.	In.
(Heating Systems Steam & Hot Water)								
High Pressure/Temp	152-238	306-450	2.0	3.0	4.0	4.0	4.0	4.5
Medium Pressure/Temp	122-151	251-305	2.0	2.5	3.0	4.0	4.0	4.0
Low Pressure/Temp	94-121	201-250	1.5	2.0	3.0	3.0	3.5	3.5
Low Temperature	49-93	120-200	1.0	1.0	2.0	2.0	2.0	2.5
Steam Condensate (for Feed Water)	Any	Any	1.0	1.0	1.5	2.0	2.0	2.5
(Cooling Systems)								
Chilled Water*, Geothermal Heat Pump Loop, Condensate	4.5-13	40-55	1.0	1.0	1.5	1.5	1.5	1.5
Refrigerant or Brine	Below 4.5	Below 40	1.0	1.0	1.5	1.5	1.5	1.5
+ Runouts to Individual Terminal Units (not exceeding 12 ft. in length)								
* For chilled water piping located in attics and other unconditioned spaces (excluding return air plenums), increase the pipe insulation thickness by 1/2" for pipe sizes up through 8". Insulation for piping 10" and larger shall be 2-1/2" thick.								

- C. Unless noted otherwise, the abovementioned piping systems inside the building shall be insulated with a 5 lb/cu. ft. (nominal) density sectional fiberglass insulation with a thermal conductivity (k factor) not to exceed 0.24. The jacket shall be fire retardant with a suitable vapor barrier. All joints and seams shall be sealed vapor tight. All joints and seams shall be lapped in place to form a continuous vapor barrier covering. All seams shall then be covered with "All

Service Jacket" (ASJ) 3" wide tape. The tape shall match the jacket. The tape shall be squeegeed in place to provide complete adhesion of the tape to the jacket and to provide a continuous vapor barrier covering. Exterior water piping shall be heat traced.

- D. Piping installed outdoors shall be insulated with cellular glass insulation, Pittsburgh-Corning "Foamglas" or approved equal. Insulation thickness required to prevent condensation shall be determined by the manufacturer for worst case ambient conditions.
 - 1. Install with all service jacket and in accordance with manufacturer's recommendations.
 - 2. Where heat tracing is specified, oversize insulation to allow space for heat tape.
- E. Equipment shall be insulated in the same manner as specified for the associated piping. Suitable provisions shall be made for breaking flanges as may be required for maintenance. Hot water pumps do not get insulated unless specifically called for. The following equipment, but not limited to, requires insulation: expansion tanks, air separators, chemical treatment "shot type" feeders, storage tanks, etc.
- F. Provide high density preformed pipe insulation inserts at all pipe hangers. Inserts shall be equal to Foamglas by Pittsburgh Corning or calcium silicate. Provide ribbed hanger saddles by Centerline, Buckaroos, Inc. or approved equal.
- G. Ductwork
 - 1. All supply air and return ducts shall be insulated **as noted on Drawings**.
 - 2. Toilet and general exhaust ductwork exhausting air conditioned air and routed in attic spaces shall be insulated.
 - 3. ~~Ductwork described in 1. and 2. above shall be insulated with 3" thick blanket, 3/4 lb/cu. ft. with reinforced foil faced vapor barrier (R-10.2 min.). Insulation shall be securely adhered to ductwork. All joints shall be sealed with 3" wide strips of the foil faced vapor barrier tape and applied to form a continuous vapor seal.~~
- H. All outside air ducts shall be insulated with blanket type ~~insulated as described above~~ **insulation**.
- I. Provide insulating tape over all piping specialties to prevent condensation such as drain valves, drain plugs, combination temperature/pressure test plugs, etc.
- J. All insulation must meet applicable codes for Flame Spread and Smoke developed ratings.

EXECUTION

3.1 INSTALLATION

- A. Shop drawing submittals shall include a complete package of materials and methods intended for use as described in this section.
- B. All work shall be in strict accordance with applicable codes, ordinances and the manufacturer's recommendations.
- C. All work shall be performed in a professional workmanlike manner and standard trade practice. It shall be smooth in appearance and suitable for finish painting.
- D. All exterior piping shall be installed with a corrugated aluminum jacket with bands 3'-0" on center.
- E. Fiberglass pipe insulation shall be applied to clean (free of rust) dry pipe prior to leak testing. Chilled and condenser water systems shall not be operated until the insulation is completely installed with a vapor barrier in place.

END OF HVAC INSULATION