SECTION 23 07 00 - HVAC INSULATION AND COVERING

PART 1 - GENERAL

1.01 REFERENCE

A. Refer to Section 23 05 00 for requirements which are applicable to this section.
B. Insulation to be in accordance with ASHRAE 90.1-2010.

1.02 SCOPE

A. The work included in this specification consists of furnishing all labor, materials, accessories, and equipment necessary for the insulation of all heating and air conditioning systems. Said work shall be completed in strict accordance with the insulation section of the specifications and applicable drawings.
B. All work is subject to the terms and conditions of the contract.

1.03 SUBMITTALS

A. Submit shop drawings which indicate complete material data, a list of materials proposed, and indicate thickness and density of material for individual services.
B. Submit fabrication instructions for pipe fitting and valve insulation.
C. Submit manufacturers joining recommendations for butt joints and longitudinal seams.

1.04 QUALITY ASSURANCE

A. Install insulation in accordance with the manufacturer's instructions.
B. Insulation shall be installed by skilled workmen regularly engaged in insulation work.
C. Protect insulation and covering until accepted in place by the owner.

PART 2 - PRODUCTS

2.01 HOT WATER PIPING

A. Includes;
   1. Domestic Hot Water Supply
   2. Domestic Hot Water Return
   3. Heating Hot Water Supply
   4. Heating Hot Water Return
B. Material; Fiberglass bonded with resins to form circular pipe sleeves and pipe covering segments with factory applied all service jacket.
C. Fire Safety; U.L. listing flame spread rating of 25 and smoke developed rating of 50.
D. Thermal conductivity of 0.276 at 90 degrees F.
E. Thickness per ASHRAE STD. 90.1-2010:
   Piping System Types: PIPE SIZES / INSULATION THICKNESS

	Temp	Up to 1"	Up to 1.5"	Up to 4"	Up to 8"	8" & Up
2. Hot Water						
a) Heating HW	140-200	1.5"	1.5"	2"	2"	2"
b) Domestic HW/HWR	100-130	1"	1"	1.5"	1.5"	1.5"

F. Joints; Pressure sealing lap strips for longitudinal joints and minimum 3" pressure sealing butt strips for circumferential joints.
G. Valves and Fittings; Fiberglass insulation of same thickness as pipe with pre-molded fitting covers.
H. Contractor shall insulate all exposed domestic water and drainage piping under all handicapped lavatories and sinks with pre-formed insulation kit with PVC jacket similar to Lav,Guard as manufactured by Truebro. There shall be no sharp or abrasive surfaces under the handicapped lavatories.
I. Manufacturer: Johns-Manville Micro-Lok, Knauf Lo Smoke PVC.

2.02 COLD WATER PIPING

A. Includes;
1. Domestic Cold Water: 1/2" insulation
2. Horizontal Storm Water, both normal and overflow, and underside of Roof Drains: 1" insulation.
3. Fan/coil condensate drains: 1/2" insulation
4. Dual Temperature water supply and return: 1½ " insulation
5. Chilled water supply and return: 1½" insulation
6. Geothermal HPS & R piping: 1 ½" insulation

B. Material; Fiberglass bonded with resins to form circular pipe sleeves with factory applied jacket of Kraft paper bonded to aluminum foil, reinforced with fiberglass yarn. Vapor barrier.
C. Fire safety; Flame spread rating of 25 or less and a smoke density rating of 50 or less and a fuel contributed rating of 50 as tested by ASTM E 84-75.
D. Thermal Conductivity; 0.25 at 100 degrees.
E. Joints; Pressure sealing lap strips for longitudinal joints and 3 inch wide wrapping strips for butt joints. Strips shall be sealed with an adhesive meeting NFPA 90 25-50 code such as:
1. CMC17-465
2. H. B. Fuller Co., Foster Products Division 85-20
As an option the contractor may utilize pressure sensitive butt strips.
F. Valves and Fittings; Fiberglass insulation of same thickness as pipe with pre-molded fitting covers. Seal edges of fitting cover with vapor barrier mastic adhesive or vapor barrier strip tape which shall overlap the insulation and fitting cover by 2 inches.
G. Manufacturer: Johns-Manville Micro-Lok HP, Knauf Proto Lo Smoke PVC.

2.03 DUCT INSULATION - INTERIOR – CONCEALED

A. Includes: All supply, return, and outside air ductwork.
1. All supply air ductwork.
2. All outside air ductwork.
3. All return air ductwork.
4. All dryer exhaust ductwork extending thru unconditioned spaces and/or attics.
5. All exhaust ductwork extending thru unconditioned spaces.
6. Kitchen supply and return ductwork.

7. Supply ductwork in unconditioned spaces.
8. Return ductwork in unconditioned spaces.
9. Soundtraps if adjacent ductwork is lined or insulated.
10. Duct heating coils if adjacent ductwork is lined or insulated.

* NOTE: Refer to Section 23 31 13 which defines Lining Requirements. Insulation indicated is in addition to internal lining.

B. Material; Flexible vapor seal duct insulation with foil scrim kraft facing consisting of aluminum foil reinforced with fiberglass scrim to a U.L. rated kraft, 0.75 lb. density, .02 perms.
C. Fire safety; Flame spread rating of 25 or less and a smoke density rating of 50 or less as tested by ASTM E 84-75.
D. In conditioned space thickness is 2" inches, equaling an installed “R” value of 4.2. In unconditioned space/outdoors, thickness is 3", equaling an installed “R” value of 8.3.
E. Application; All joints shall be sealed with a 3 inch wide strip of same material applied with H. B. Fuller Co., Foster Products Division 85-75. For ducts over 18" wide insulation shall be secured on bottom at 18" centers to reduce sagging.
F. Manufacturer: Johns-Manville 800 Series Flexible Spin-Glass.

2.04 DUCT INSULATION - INTERIOR – EXPOSED

A. Same as above except 6 PCF density with FSK facing, 0.02 perms.
B. Secured with fasteners, 2 rows per side at 12" centers.

2.05 EQUIPMENT INSULATION

A. Includes;
1. Pumps
B. Material; Spun glass inorganic glass fiber insulation bonded by a thermosetting resin with aluminum foil reinforced with fiber glass yarn and laminated to a fire-resistant kraft. 6 lb. density. Provide vapor barrier on all equipment that will have cold surfaces.
C. Fire safety; Flame spread rating of 25 or less and a smoke density rating of 50 or less as tested by ASTM E 84-75.
D. Thermal conductivity; 0.24 at 100 degrees F.
E. Application; All joints shall be sealed with a 3 inch wide strip of same material applied with H. B. Fuller Co., Foster Products Division 85-75.
F. Manufacturer: Johns-Manville 800 Series Non-Flexible Spin-Glass or approved equal.
G. Thickness: 1 1/2" on equipment in mechanical rooms and in ceiling spaces, 3" on equipment in unconditioned attic spaces.

2.06 REFRIGERANT PIPING

A. Includes;
1. Refrigerant lines - interior
2. Refrigerant lines - exterior
B. Material; Elastomeric thermal insulation with exposed closed cell structure, pipe size 1 ½" or less = 1", pipe size larger than 1 ½" = 1 ½" (interior and exterior).
C. Residential Only - ½" interior, 1" exterior - minimum of R-2).
D. Fire safety; Flame spread rating of 25 or less and a smoke density rating of 50 or less as tested by ASTM E 84-75.
E. Thermal conductivity not to exceed .25 BTU per inch/h-Ft2 -°F.
F. Joints; Butt joints and seams are to be sealed with contact adhesive as per manufacturer’s specifications. Seams are to be sealed with an adhesive meeting NFPA 90 25-50 such as CMC 17-465, H. B. Fuller Co., Foster Products Division 85-20 or approved equal. As an option the contractor

may utilize pressure sensitive butt strips. Seal all edges.

G. Manufacturer: Armacell AP Armaflex or approved equal.

H. PHFA Requirement: All exposed refrigerant piping, power, and control wiring extending from the building to the remote condensing unit shall be protected and insulated with split type insulation with PVC jacket and cemented joints.

2.07 MANUFACTURERS

A. Johns-Manville, Certain Teed, Owens/Corning, Knauf, Armstrong.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Do not install until all piping systems and ductwork are tested.

B. Do not install until the building is closed in.

C. Perform work at ambient and equipment temperatures as recommended by the adhesive manufacturer.

D. Work in the area which may damage the insulation shall have been completed prior to the start of insulating. The owner shall not be responsible for subsequent charges arising out of damage to insulation caused by work progressing in the area after insulation has been installed.

E. All insulation shall be continuous through wall, ceilings, and floor openings except where fire safe materials are required.

F. Insulation on all cold surfaces must be applied with a continuous unbroken vapor seal. Hangers, supports, anchors, etc., that are secured directly to cold surfaces shall be adequately insulated and vapor sealed to prevent condensation.

G. Finish insulation neatly at hangers, supports, and other protrusions.

H. Secure with tacks or tape as required.

I. Install inserts on all hangers. Inserts between the pipe and pipe hanger shall consist of rigid pipe insulation of thickness equal to the adjoining insulation and shall be provided with vapor barrier where required. Insert length shall be 10" long for pipes up to and including 2-1/2" and 12" for pipes over 2-1/2".

J. Pipe insulation shall have metal shields. The shields shall be installed between hanger support and the pipe insulation. Shield shall be formed to fit the insulation and shall extend up to the center line of the pipe. Shield shall be 10" long for pipes up to and including 2-1/2" and 12" for pipes over 2-1/2"

K. Repair separation of joints or cracking of insulation due to thermal movement or poor workmanship.

L. All insulation shall be secured at sufficient intervals to prevent sagging, gaps, or spaces from occurring. Any repairs necessary for 1 year due to improper installation shall be provided by Contractor at no cost to Owner.

3.02 SURFACE PREPARATION

A. Pipe, duct, and equipment shall be clean, oil free, and dry prior to the application of insulation.

END OF SECTION