PART 1 - GENERAL

1.01 Protect insulation against damage during and after construction.

1.02 Provide vapor retarder jacket for all fiberglass mechanical insulation regardless of service. Water vapor permeability: 0.020 Perm or less. Coordinate more restrictive Perm requirements with project needs and as available from basis of design manufacturers.

1.03 Provide metal jacket for all calcium silicate insulation and on all insulation subject to foot traffic. (i.e. low mounted horizontal piping in mechanical rooms.)

1.04 Provide canvas lagging on all piping and ductwork in mechanical rooms and mechanical spaces requiring access for service which is in reach of normal activities and wear and tear. In general, lag all piping an duct work below 10 feet. Where metal jacket is provided, canvas lagging is not required.

1.05 In public spaces provide metal or canvas lagging as directed by FS/DDC. Coordinate finish with FS/DDC depending on project requirements.

1.06 Provide drawing detail of building vapor retarder connection to all penetrations including but not limited to: duct and plenum insulation vapor retarder jacket, piping insulation vapor retarder jacket, conduits, heating oil piping, etc.

1.07 Consider fan location to minimize length of outside air intake duct or size of outside air intake plenum.

PART 2 - PRODUCTS

2.01 Utilize snap buckle fabric covered insulation blanket type covers for all valves and fittings not covered with standard pipe insulation. Provide vapor retarder on both sides of blanket for chilled water and domestic cold water. Coordinate with FS/DDC Project Manager as to whether the owner will furnish the jackets from UAF FS/Maintenance.

2.02 Piping insulation (except refrigerant piping – see below): semi-rigid molded fiberglass insulation with vapor retarder jacket. R-value of all insulation shall meet or exceed current ASHRAE 90.1 and USGBC LEED standards, whichever is more stringent. Staple and seal seams to provide tight vapor barrier.

2.03 Refrigerant suction and got gas piping insulation: ½ inch thick closed cell insulation preformed by the manufacturer specifically for the size of pipe or tubing on which it is to be installed. Vapor retarder properties inherent in insulation.

2.04 Duct insulation: semi rigid fiberglass insulation with vapor retarder jacket on the outside of the ductwork. R-value of all insulation shall meet or exceed current ASHRAE 90.1 and USGBC LEED standards, whichever is more stringent.
2.05 Lagging:

A. Metal Jacket: 22 (approx.03 mil thickness) gauge embossed aluminum with metal bands


2.06 Corner inserts and covers: PVC cover with fiberglass insert. Both pre-formed by manufacturer. Do not use PVC Corners on steam piping.

2.07 Sound Lining: Where sound lining of ductwork is required, provide flexible liner made from glass fibers bonded with thermosetting resin.

A. Airside surface and factory edges protected with manufacturer’s protective coating.

B. Rated for use in airstreams with velocities up to 5000 fpm and temperatures up to 250 degrees F.

PART 3 - EXECUTION

3.01 Design insulation system for easy access at expansion joints, flexible piping, pump connectors, test plugs, sensors, and meters. Consider removable/replaceable insulation blocks or blankets.

3.02 Insulate valve bodies, unions, strainer bodies (leave blow-down valves exposed), control valves, check valves, in-line pump bodies with oversized insulation the same thickness as adjacent piping. Where insulation blankets are applied to larger valves and piping accessories, additional insulation is not required.

3.03 Insulate all domestic and lab water piping (hot, hot water recirculation and cold).

3.04 Piping systems conveying fluids below ambient temperature including rain leaders, chilled water, and cold water.

A. Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints. Thickness as determined by ASHRAE 90.1 but not less than 1 inch.

B. Furnish factory-applied or field-applied vapor retarder jackets. Secure factory-applied jackets with pressure sensitive adhesive self-sealing longitudinal laps and butt strips. Secure field-applied jackets with outward clinch expanding staples and seal staple penetrations with vapor retarder mastic.

C. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor retarder adhesive or PVC fitting covers.
3.05 Insulate drain bowls, discharges, and rain leaders. For leader piping, insulate the entire length of the run inside building to prevent condensation. Interior insulation to be one inch thick fiberglass with vapor retarder jacket. Ensure adjacent building vapor retarder is adequately coordinated; provide detail(s) for tie-in. Exterior insulation: Refer to Division 33.

3.06 No plumbing vents where subject to freezing temperatures, except vent through roof (VTR). Insulate VTR from top to a point 6 feet inside building vapor barrier. Flash and weather seal as appropriate for specified roof construction. Insulation to be one inch thick fiberglass with vapor retarder jacket. Ensure adjacent building vapor retarder is adequately coordinated; provide detail(s) for tie-in.

3.07 Outside air intake ducts: minimum of 3 inch rigid fiberglass insulation with vapor retarder jacket and canvas lagging. Ensure adjacent building vapor retarder is adequately coordinated, provide detail(s) for tie-in.

3.08 Relief and exhaust ducts at wall penetrations and louvers: minimum of 1.5 inch rigid fiberglass insulation with vapor retarder jacket and canvas lagging. Ensure adjacent building vapor retarder is adequately coordinated; provide detail(s) for tie-in.

3.09 Supply Air: minimum of 1 inch of flexible fiberglass or as thick as required by ASHRAE 90.1 with vapor retarder jacket.

3.10 Pipe hangers: Outside insulation on chilled water, recirculated cold water, high pressure steam (upstream of control valve tree), and generator exhaust piping. All other locations install hangers directly in contact with piping and with insulation over hangers.

3.11 Insulate all hydronic heating piping except that individual branch piping which serves single terminal unit equipped with 2 way control valves or slab heat piping with glycol temperatures 105 degrees and lower. Thickness as determined by ASHRAE 90.1 but not less than 1 inch.

3.12 Extend test plugs, sensors, valve stems, and other devices mounted on insulated pipes above insulation on stand-offs and stems. "Dishing" the insulation is not permitted.

3.13 Use double-wall construction within air handler housings for insulation (sound and thermal). Air handler inner wall may be perforated steel if required for acoustical dampening.

3.14 Sound Lining: Prior to installation in ductwork, apply manufacturer’s provided sealant to all cut edges where glass fibers are exposed regardless of orientation to airstream in final installation.

END OF SECTION