

CHAPTER 12 INSULATION

Insulation prevents loss of heat, freezing of hot- and cold-water pipes, condensation on cold-water pipes, and it protects against fire. Insulation can reduce noise and vibration from heating or air-conditioning equipment and reduce noise made by water flowing inside pipes. It also reduces expansion and contraction of pipes.

12-1. Types. Insulation may be either unformed blanket-type that allows shaping and wrapping or rigid, preformed sections that fit around pipe runs and other objects (Figure 12-1).

a. Rigid Preformed Insulation.

(1) *Frost Proof.* Frost-proof insulation is used on cold-water service lines that pass through unheated areas and those that are located outside. Common supply is 3 feet long and 1-1/2 inches thick, with a canvas cover.

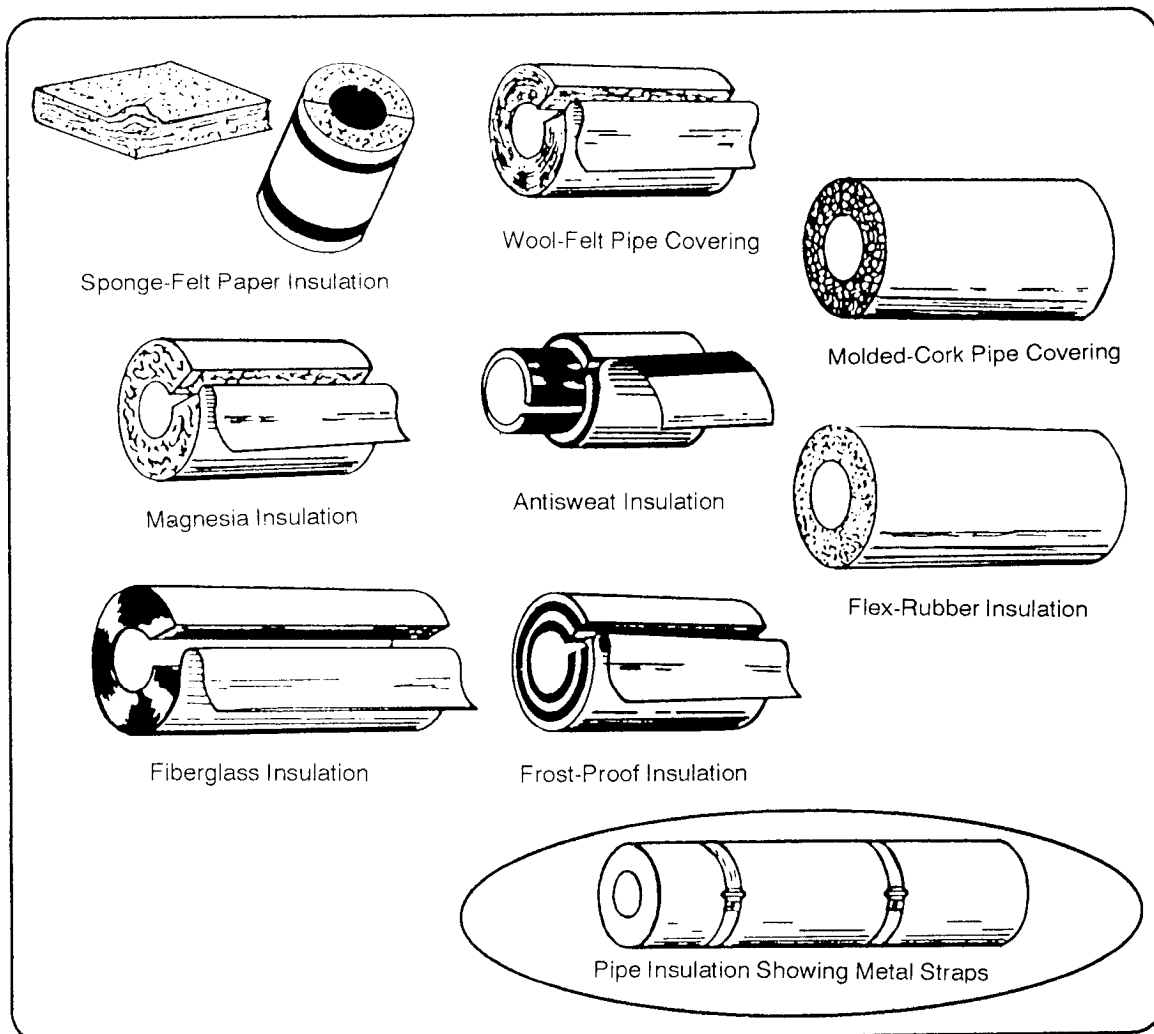


Figure 12-1. Insulation

(2) *Fiberglass*. Fiberglass insulation is shaped to fit pipes, tubing, small boilers, and water heaters. It has a long life; will not shrink, swell, rot, or burn; is easily applied; is lightweight; and saves space. It is made of very fine glass fibers bound together by an inactive resinous mixture.

(3) *Antisweat*. Antisweat insulation is used on cold-water lines. It keeps water in the pipes colder and, if properly installed, prevents the pipes from sweating. The outer layer has a nap about 3 inches long, which extends beyond the joint to help make a perfect seal. A canvas jacket is placed around each 3-foot length to protect the outer felt covering.

(4) *Cork-Pipe Covering*. This covering is a grainy material made by grinding the bark of cork trees. No other product can match its advantages. This pure, clean cork is pressed and molded to the exact size and shape and finished with a coating of plastic asphalt. It is ideal for covering brine, ammonia, ice water, and all kinds of cold-water lines. It has excellent insulating qualities over a wide low-temperature range. Cork-pipe covering will not rot or burn and is clean, sanitary, and odor-free. It comes in a variety of sizes and shapes that can be used on various sizes of pipes and fittings. A waterproof material should be used to coat it to keep moisture out of the insulation.

(5) *Wool-Felt*. Wool-felt is made of matted wool fibers or wool and fur or hair, pressure-rolled into a compact material. It is used on cold-water service and hot-water return lines. It is often used with alternate layers of tar paper to provide waterproof insulation.

(6) *Flex Rubber*. This insulation is a tough, flexible rubber material. It has good insulating qualities, good cementing qualities, excellent weather-aging qualities, and it prevents sweating of cold-water lines.

(7) *Magnesia*. This insulation has maximum strength and is very suitable for steam and hot-water lines or other pipes whose temperature does not exceed 600°F. It has a canvas jacket and may be used on pipes up to 30 inches in diameter.

b. *Blanket Insulation*. Blanket insulation insulates against heat loss and protects against fire. This insulation is used on boilers, furnaces, tanks, drums, driers, ovens, flanges, and valves. The fiberglass type is used on small boilers and water heaters. It is used to wrap around objects that are irregular in shape and for large, flat areas. It is made in strips, sheets, rolls, and blocks. It comes in different widths and thicknesses, depending on the equipment to be insulated. It resists vermin (insects, rats, mice) and acid and is fireproof.

12-2. Installation.

a. Pipe Covering

(1) *Above-Ground Piping*. Each section is split in half and has a canvas cover with a flap for quick sealing. Cheesecloth can be used in place of canvas, but it must be glued in place. Use joint collars to cover joint seams on piping exposed to outside conditions. Use metal straps at least 3/4-inch wide, placed 18 inches apart, to hold the insulation firmly (See insert in Figure 12-1).

(2) *Underground Piping.* Some underground piping must be insulated. The insulation is similar to above-ground insulation except that it needs more protection from the weather. In most cases, a concrete trench is made for installation of the piping. Molded pipe covering or loose mineral-wool or glass-wool is used. To protect the pipes from ground moisture, use coal tar as a sealer or wrap the pipes with tar paper or aluminum foil.

b. *Boiler and Tank Coverings.* An unjacketed boiler or storage tank should be insulated with an approved insulation. Some approved types are magnesia, mineral wool, calcium silicate, and cellular glass at least 2 inches thick. The insulation is kept away from the metal surface by applying it over 1 1/2-inch wire mesh, lifted by metal spacers that provide an air space of at least 1 inch. The joints should be filled with magnesia, mineral-wool, or other suitable cement. The surface of the insulation should be covered with a thin layer of hard-finished cement, reinforced with 1 1/2-inch wire mesh. The insulation must be firmly wired in place.

c. *Valve and Fitting Coverings.* Valves and fittings are covered with wool, felt, magnesia cement, or mineral-wool cement the same thickness as the pipe covering. These types of insulation are molded into shape. For magnesia- or mineral-wool-cement insulation, use cheesecloth to bind and hold it in place.

12-3. Maintenance. Properly installed insulation requires little maintenance. Insulation exposed to weather or possible damage from sharp objects must be frequently inspected. Proper installation and frequent inspections will minimize maintenance problems.

a. *Pipe Covering.* If the canvas cover gets torn or punctured, it should be patched with a piece of canvas. Only waterproof paste should be used when installing or repairing outside insulation.

b. *Leaky Pipes.* When repairing a leak in an *insulated* pipe, the insulation must be removed back far enough to uncover the damaged pipe. When reinstalling the pipe, use the same kind of insulation used for the rest of the system.

c. *Valves and Fittings.* An inspection may reveal loose straps or loose insulation around valves and fittings. The straps should be retightened and the loose insulation replaced or glued down.