

TOPIC: MAINTAINING PLANT INSULATION

As we have already learned, most thermal insulation depends upon finely divided air spaces to retard the flow of heat. All the data on insulating materials, furthermore, are based on new materials, unaffected by service conditions. However, from the day of installation, insulation is subject to the deteriorating effect of moisture, and wear and tear, which not only affects the heat transfer qualities of insulation, but its useful life as well.

An attempt will be made here to outline some of the things that may be done on the plant to overcome the natural enemies of insulation.

1. The Moisture Problem

a. General

The unseen moisture in the air plays havoc with insulated construction. To illustrate the magnitude of this single item, consider the following:

- (1) On the average day, if all the moisture in the air above Manhattan Island were to fall to the earth as water, it would amount to 223 million gallons. Being in the air, this moisture can go wherever air can go, and no common building material can withstand the flow of air 100%.

Two forces join each other in the moisture attack:

- (1) When the temperature within an insulated area is lowered, the chilled air gives up its moisture. The difference in moisture content between the inside and the outside air sets up a vapor pressure, which may be powerful enough to force over a quart of water a week through a 200 sq. ft. area of a 13" thick brick wall.
- (2) In the previous example, we mentioned that when air in an insulated area is chilled it gives up moisture. Dew point temperature is the temperature at which the moisture in the air will condense to form "dew."

Frequently, the temperature where this takes place will be within the insulating material. Thus the insulation may absorb water and lose its "heat blocking" values.

This water will rapidly deteriorate the insulation, particularly if it should turn to ice.