

represents the difference between the dry-bulb temperature and the dew-point temperature for the conditions involved. (See discussion of condensation in Chapter 3).

Insulation to Prevent Freezing of Water in Pipes

Insulation will retard the freezing of water in pipes. With a certain amount of circulation, or even without circulation, if the air remains at a

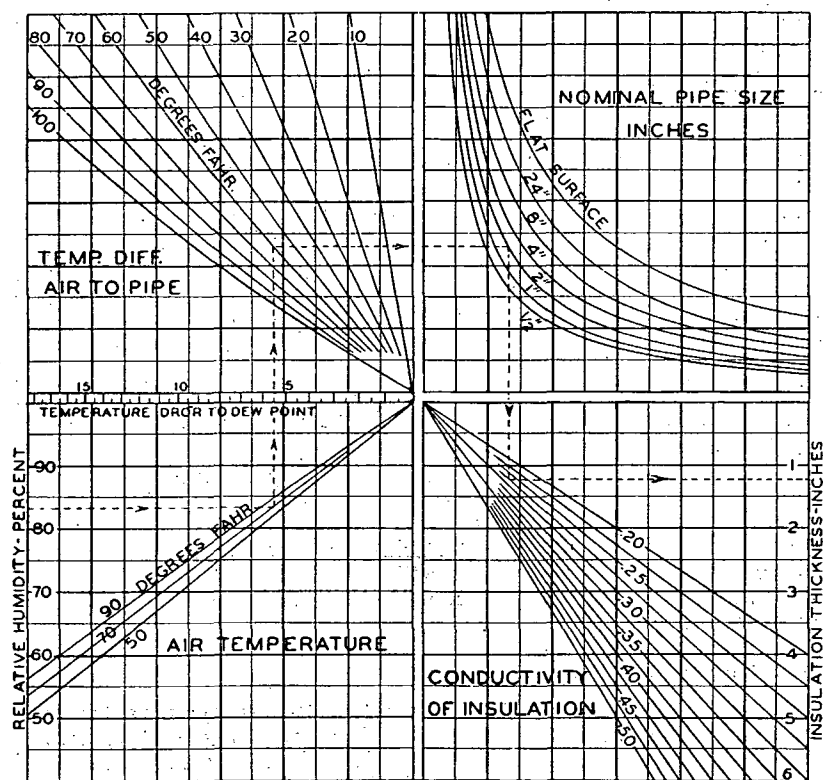
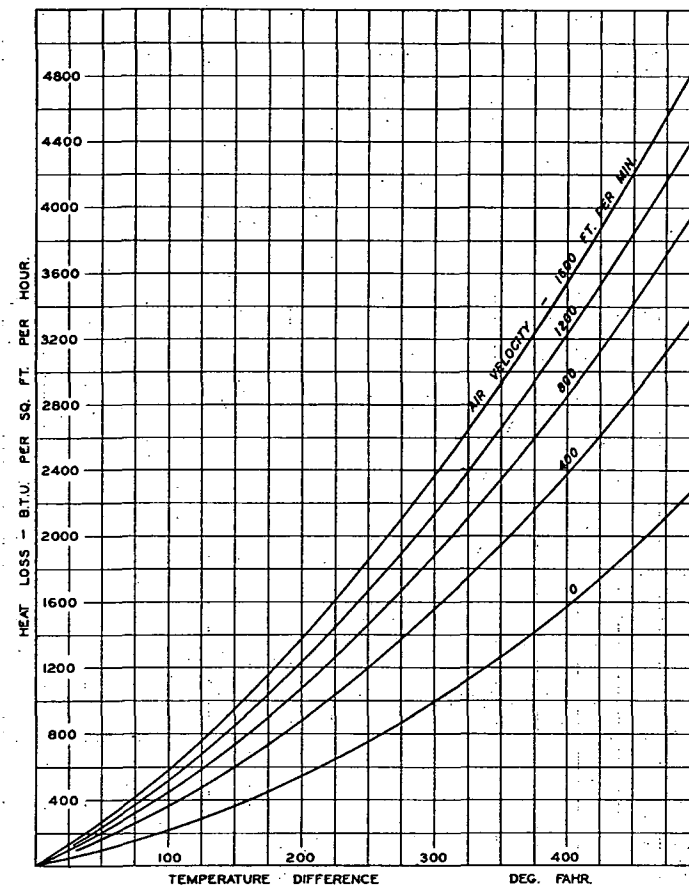


FIG. 2. THICKNESS OF PIPE INSULATION TO PREVENT SWEATING^a

^aSolve problems by drawing lines as indicated by dotted line, entering chart at lower left hand scale.

low temperature for only a short period, freezing may be prevented. Still water in pipes may be prevented from freezing by inserting a heating medium inside the insulation surrounding the pipe. No amount of insulation, however, will prevent water in pipes from freezing where there is no circulation or where there is only a small amount of circulation in the pipe, if the outside temperature remains below the freezing point for a sufficient length of time. Pipes carrying water and which may be sub-

jected to severe conditions of temperature are insulated with insulations such as hair felt or cork. The insulation is applied in layers of approximately 1-in. thickness, securely bound in place on the pipe and finished on the outside with a waterproof jacket.



(L. B. McMillan, *Iron and Steel Engineer*, July 1926.)

FIG. 3. HEAT LOSSES FROM SURFACES EXPOSED TO VARIOUS AIR VELOCITIES

EFFECT OF AIR VELOCITY ON SURFACE LOSSES

The rate of heat loss from a surface maintained at constant temperature is greatly increased by air circulation over the surface. Fig. 3 is based on Langmuir's equations (*Trans. Am. Electro-Chem. Soc.*, Vol. 23). Other investigators have shown even greater increases in rates of heat loss from bare surfaces due to air velocity.