

three or four calculations performed as a series of approximations in which assumptions of thickness and mean temperature are adjusted as indicated in the discussion which follows.

In the case of a single thickness of pipe covering, the quantity of heat

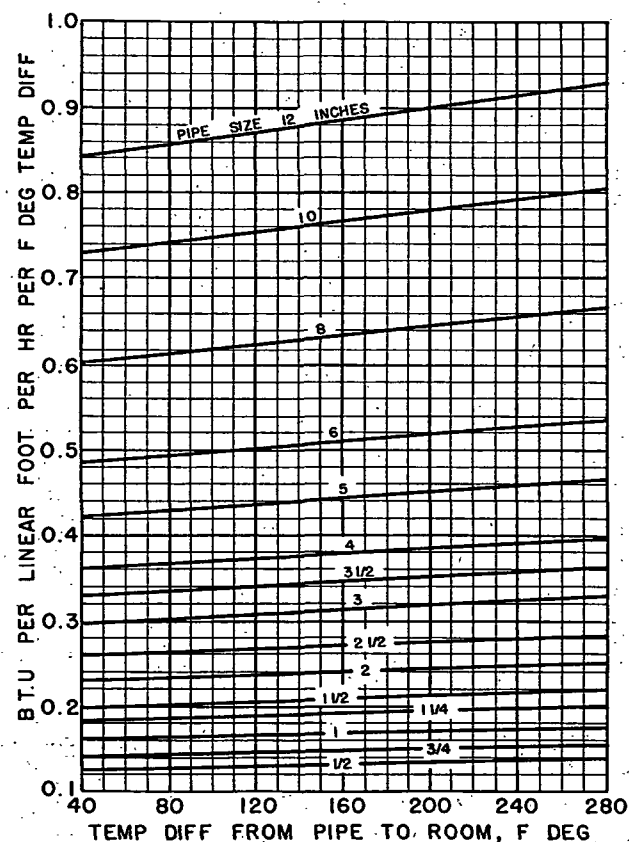


FIG. 2. HEAT LOSS THROUGH 1 1/2 IN. THICK 85 PER CENT MAGNESIA TYPE COVERING

transferred per square foot of outer surface of the insulation is given by the equation:

$$q_0 = \frac{k (t_1 - t_2)}{r_2 \log_e \frac{r_2}{r_1}} \quad (1)$$

where

- q_0 = Btu per (hour) (square foot of outer surface of insulation).
- r_1 = outer radius of pipe or inner radius of insulation, inches.
- r_2 = outer radius of insulation, inches.

k = thermal conductivity of insulation, Btu per (hour) (square foot) (Fahrenheit degree per inch).

t_1 = temperature of inner surface of insulation, Fahrenheit degrees.

t_2 = temperature of outer surface of insulation, Fahrenheit degrees.

It is convenient to work from the outer surface of the insulation, since the loss through the covering must be determined from the outer surface loss by means of surface loss curves such as given in Fig. 4.

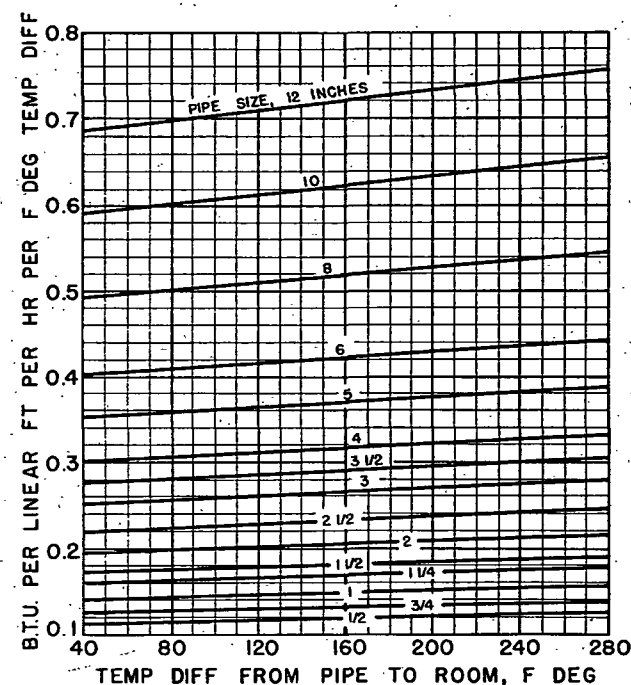


FIG. 3. HEAT LOSS THROUGH 2 IN. THICK 85 PER CENT MAGNESIA TYPE COVERING

After the true heat loss is obtained, the loss per square foot of pipe surface can be calculated from the relationship:

$$q_i = q_0 (r_2/r_1).$$

where

q_i = Btu per (hour) (square foot outer surface of pipe).

The heat loss through two or more thicknesses of insulation applied to a pipe can be calculated by means of the equation:

$$q_0 = \frac{t_1 - t_2}{\frac{r_2 \log_e \frac{r_2}{r_1}}{k_1} + \frac{r_3 \log_e \frac{r_3}{r_2}}{k_2} + \dots} \quad (2)$$