

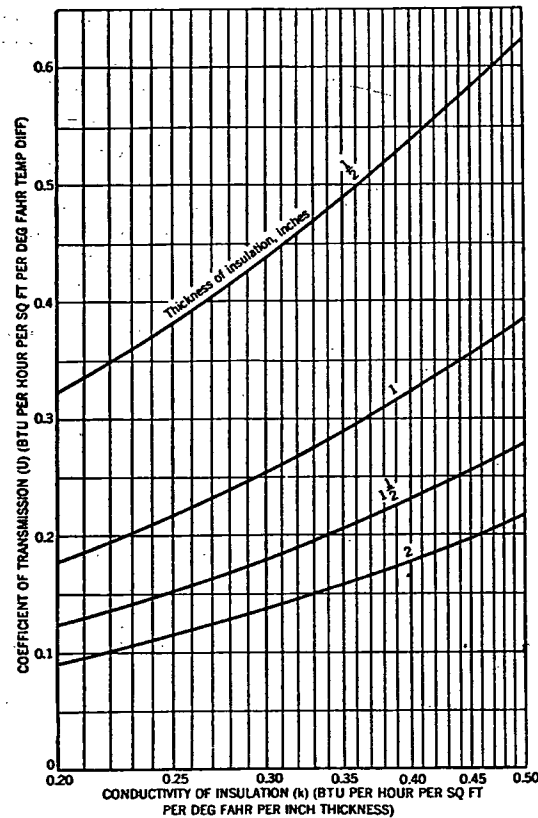


FIG. 16. HEAT LOSS COEFFICIENTS FOR INSULATED DUCTS*

* For round ducts less than 30 in. diameter, increase heat transmission values by the percentages shown below.

THICKNESS OF INSULATION (Inches)	$\frac{1}{4}$	1	$1\frac{1}{2}$	2
12 to 21 in. Duct Diameter.....	3%	5%	7%	9%
21 to 30 in. Duct Diameter.....	1%	2%	3%	4%

36 in. cross section and 70 ft in length, insulated with $\frac{1}{4}$ in. of a material having a conductivity of 0.35 Btu at 86 F mean temperature, carrying air at a velocity of 1200 fpm, measured at 70 F, to deliver air at 120 F with air surrounding the duct at 40 F.

Solution: Referring to Fig. 16, the overall heat transmission coefficient is found to be 0.49 Btu. From Table 1, Chapter 3 the density of air at 70 F and 29.921 in Hg. is found to be $1/13.348 = 0.0749$ lb per cu ft. Substituting these and the other given values in Equation 16, y and t_1 will be as follows:

$$y = \frac{28.8 \times 6 \times 1200 \times 0.0749}{0.49 \times 10 \times 70} = 45.3$$

$$t_1 = \frac{120(45.3 + 1) - 80}{45.3 - 1} = 123.7 \text{ F}$$

Substituting in Equation 14:

$$Q_w = 0.49 \times 10 \times 70 \left[\left(\frac{123.7 + 120}{2} \right) - 40 \right] = 28,100 \text{ Btu per hr.}$$

For special considerations which apply to insulation of ducts in marine installations see Chapter 48.

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