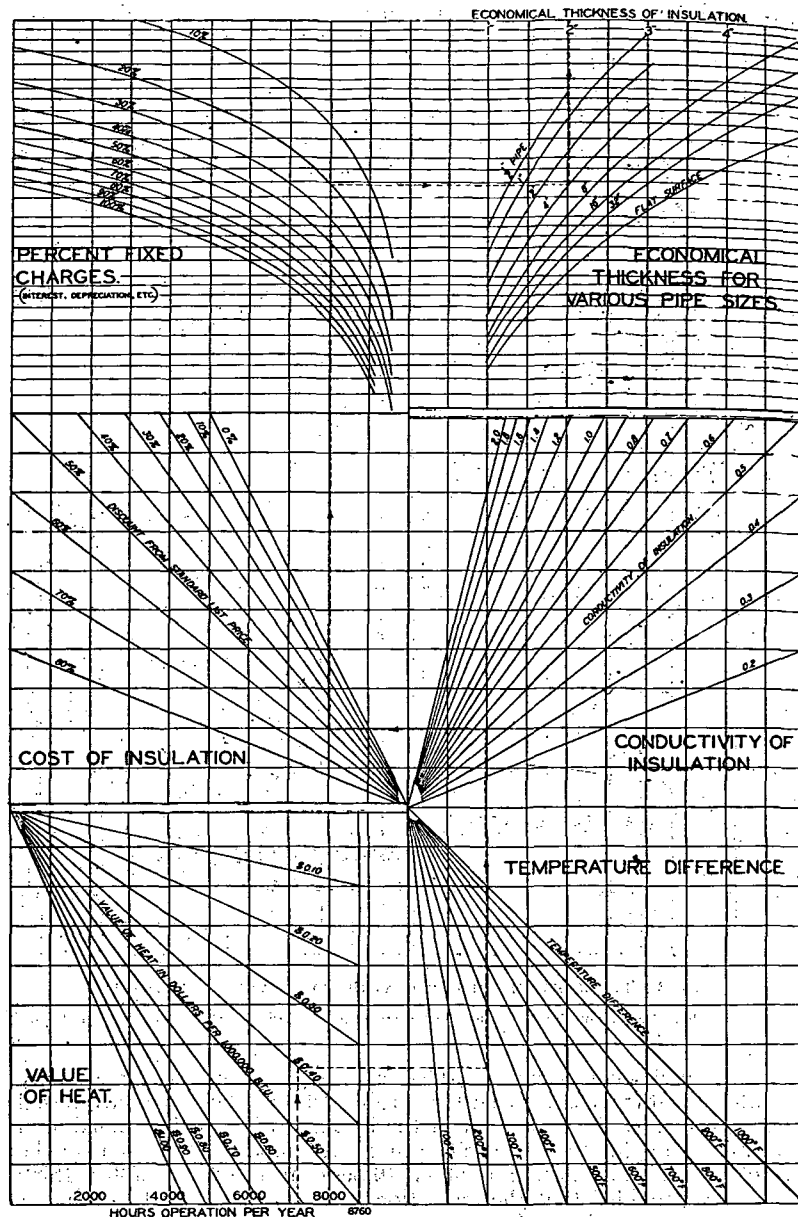




(L. B. McMillan, Proc. National Dist. Heating Ass'n., Vol. 18, p. 131.)

FIG. 3. CHART FOR DETERMINING ECONOMICAL THICKNESS OF INSULATION

If the conditions are such that the air may circulate through cracks and crevices in the insulation, the increases may be far greater than those given. Therefore, it is essential that insulation be sealed as tightly as possible. Pipe insulation out-of-doors should be provided with a waterproof jacket, and other outdoor insulation should be thoroughly weatherproofed.

ECONOMICAL THICKNESS OF PIPE INSULATION

Table 12 shows the thicknesses of insulation which ordinarily are used for various temperature conditions. Where a thorough analysis of economic thickness is desired, this may be accomplished through the use of the chart, Fig. 3.

The dotted line on the chart illustrates its use in solving a typical example. In using the chart, start with the scale at the left bottom margin representing the given number of hours of operation per year; then proceed vertically to the line representing the given value of heat; thence horizontally, to the right, to the line representing the given temperature difference; thence vertically to the line representing the conductivity of

TABLE 12. THICKNESSES OF INSULATION ORDINARILY USED INDOORS*

STEAM PRESSURES (LB GAGE) OR CONDITIONS	STEAM TEMPERATURES DEGREES FAHRENHEIT	THICKNESS OF INSULATION		
		Pipes Larger Than 4 in.	Pipes 2 in. to 4 in.	Pipes 1½ in. to 1¼ in.
0 to 25	212 to 267	1 in.	1 in.	1 in.
25 to 100	267 to 338	1½ in.	1 in.	1 in.
100 to 200	338 to 388	2 in.	1½ in.	1 in.
Low Superheat	388 to 500	2½ in.	2 in.	1½ in.
Medium Superheat	500 to 600	3 in.	2½ in.	2 in.
High Superheat	600 to 700	3½ in.	3 in.	2 in.

*All piping located outdoors or exposed to weather is ordinarily insulated to a thickness ¼ in. greater than shown in this table, and covered with a waterproof jacket.

the given material; thence horizontally, to the left, to the line representing the given discount on that material; thence vertically to the curve representing the required per cent return on the investment; thence horizontally, to the right, to the curve representing the given pipe size; thence vertically to the scale at the top right margin where the economical thickness may be read off directly. The dotted line on the chart illustrates its use in solving a typical example.

Underground Insulation

Underground steam distribution lines are carried in protective structures of various types, sizes and shapes. (See Chapter 37.) Detailed data on commonly used forms of tunnels and conduit systems have been published by the *National District Heating Association*².

Pipes in tunnels are covered with sectional insulation to provide maximum thermal efficiency and are also finished with good mechanical

²Handbook of the National District Heating Association, Second Edition, 1932.