

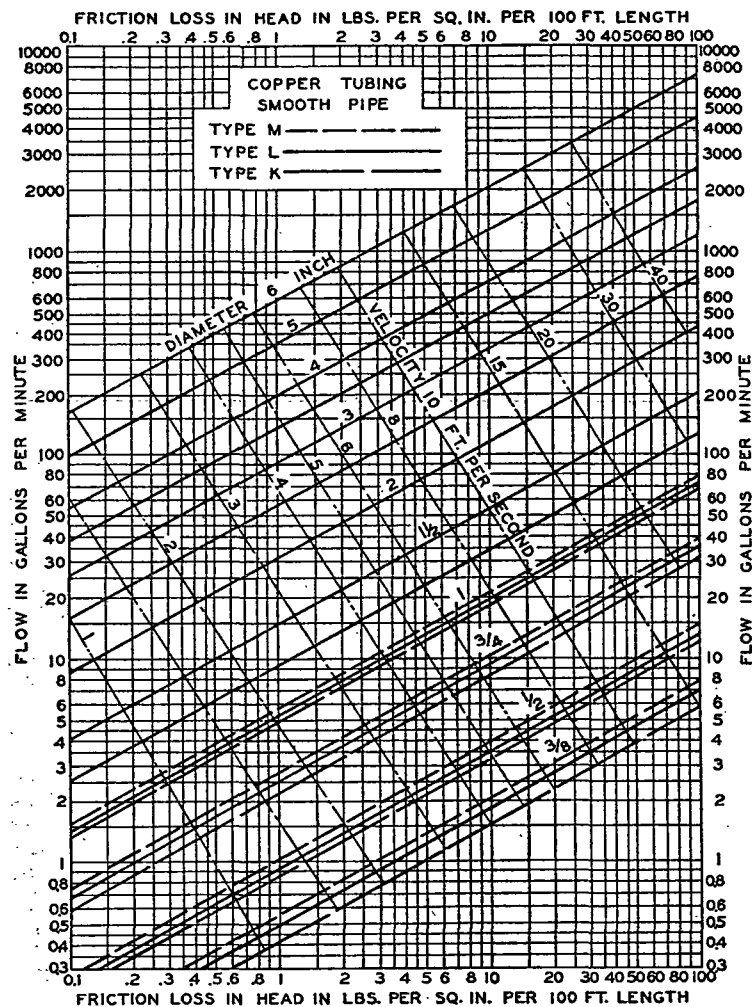


FIG. 3. FLOW CHART FOR COPPER TUBING

is proportional to the length of straight uniform pipes, and varies greatly with flow velocity, pipe diameter, and roughness of pipe.

On the basis of inside surface conditions, pipes may be classified as smooth, fairly rough and rough, as follows:

Smooth. The pipe surface shows no perceptible roughness. Pipes made of copper, brass or lead may usually be classified as smooth.

Fairly Rough. All ordinary pipes, such as wrought iron, galvanized iron, steel and cast iron, after a few years of usage, may be called fairly rough.

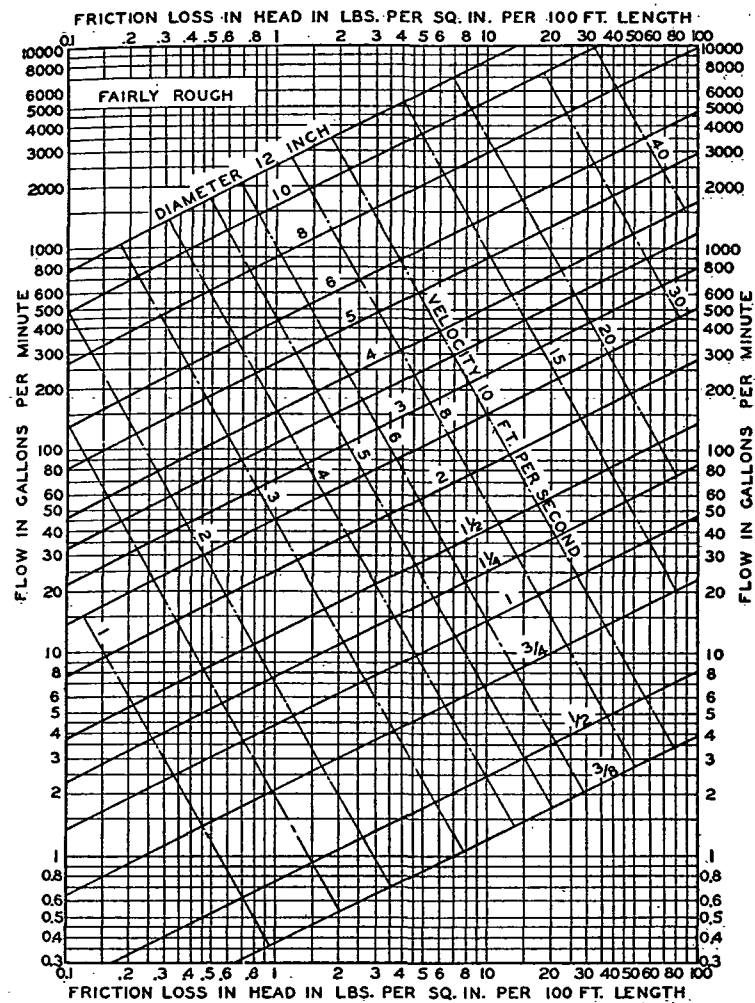


FIG. 4. FLOW CHART FOR FAIRLY ROUGH PIPE

Rough. Pipes that have deteriorated fairly rapidly for some 10 or 15 years after being laid, are classified as rough.

Figs. 3, 4 and 5 give the pipe friction losses corresponding to these three types of pipes for various nominal diameters.³

Example 1. A 2 1/4 in. fairly rough pipe supplies 100 gpm of water. Find the friction loss in head if the pipe length is 200 ft.

Solution. Enter Fig. 4 at 100 gpm, and move along this line until it intersects the 2 1/4 in. diameter line. From this intersection point, move vertically down and