governed by the amount of pressure which can be spared in overcoming resistance to flow of a given volume of water per unit of time. After the approximate amount of water required has been computed, a minimum delivery pressure at the highest fixture may be determined, which should be approximately 15 lb per square inch. It should be remembered that for every foot in height there will be a hydrostatic loss of head of 0.433 lb.

The pressure loss through a water meter may be significant as may be seen from Table 2. The pressure losses through filters or other water-conditioning apparatus also must be considered. After evaluating the previously mentioned factors, the total allowable friction loss for the

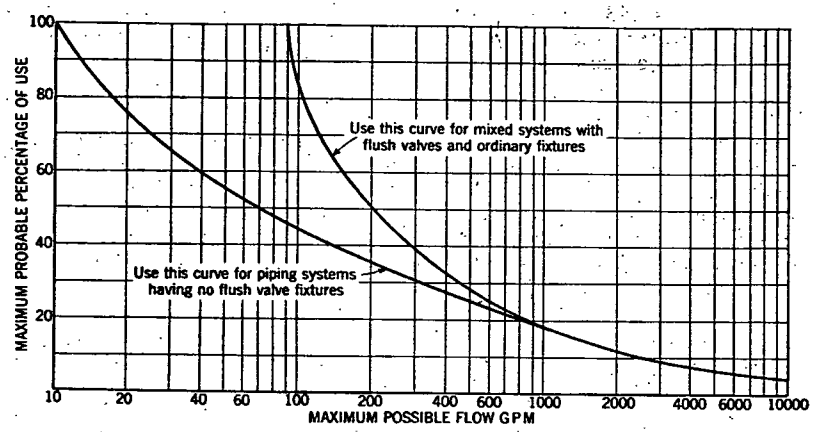

FIG. 1. CHART SHOWING RELATION BETWEEN MAXIMUM FLOW AND PROBABLE USAGE

system may be determined by subtracting from the street main pressure, the sum of the following four items:

1. Minimum allowable pressure at top fixture.
2. Meter loss.
3. 0.433 × height in feet from main to top fixture.
4. Loss for filters, softener, etc.

PIPE MATERIAL

The material used in the water piping affects its carrying capacity. For example, copper or brass pipe is not as likely to retain interior incrustation as is ferrous pipe, and galvanized pipe will not rust as quickly as uncoated pipe. Some waters tend to deposit salts, rust, and the like on the interior surfaces of pipes, greatly reducing their capacity. In some cities it has been found necessary to allow for as much as 50 per cent reduction in carrying capacity after 15 years of service.

The data given in this chapter are based on use of galvanized steel piping and on water which is not notoriously inclined to leave deposit. If the building is in a zone having untreated water known to carry precipitable solids, the pipe sizes should be increased at least one size and no water pipe should be smaller than ¾ in.

TABLE 2. PRESSURE LOSS THROUGH WATER DISC METERS[a]
A. W. W. A. Standards

RATE OF FLOW GPM	APPROX. PRESSURE LOSS THROUGH METERS, LB PER SQ IN. PIPE SIZE (IN.)							
	⅝	¾	1	1½	2	3	4	6
5	1.5	0.5	0.2					
10	6.0	2.0	1.0	0.2				
15	14.0	5.0	2.0	0.6	0.2			
20	25.0	9.0	3.5	1.0	0.4			
25		13.5	5.5	1.5	0.6			
30		19.5	8.0	2.0	0.9			
35			11.0	3.0	1.0			
40			14.0	4.0	1.5			
45			18.0	5.0	2.0			
50			22.0	6.0	2.5	0.7		
75				14.0	5.5	1.5		
100				25.0	10.0	2.8	1.0	
125					15.0	4.0	1.5	
150					22.0	6.0	2.2	
175						8.0	3.0	
200						10.4	4.0	1.0
250						16.0	6.0	1.5
300						23.0	9.0	2.2
350							12.0	3.0
400							16.0	4.0
500							25.0	6.5
600								9.0
800								16.0
1000								25.0

RATE OF FLOW GPM	MINIMUM SIZE OF SERVICE RECOMMENDED: APPROX. MINIMUM PIPE SIZE OF SERVICE, MAIN TO METER (IN.) MAXIMUM LENGTH (FT)					SAFE MAXIMUM DELIVERY OF METERS: METER SIZE IN.	SAFE MAXIMUM DELIVERY OF METERS: CAPACITY, GPM BASED ON 25 LB LOSS THROUGH METER
	30	75	100	150	200		
1–20	¾	¾	1	1	1	⅝	20
						¾	34
20–30	¾	1	1	1	1½	1	53
						1½	100
30–50	1	1½	1½	1½	1½	2	160
50–100	1½	1½	2	2	2	3	315
						4	500
100–150	1½	2	2	2½	2½	6	1000

[a]Pressure loss through compound and current meters is less than shown in table. For exact information consult manufacturers.

ALLOWANCE FOR FITTINGS

Before applying charts for pipe friction, the resistance due to fittings and valves should be evaluated. Table 3 gives this resistance expressed in equivalent feet of straight pipe. To use Table 3, the size of the valve or fitting must be known. Table 3 is therefore of little use in the original design of a system, since the valve and fitting allowances must be made before the pipe size is known. Experience indicates, however, that an average increase of 50 per cent in the length of the longest measured pipe will account for the fittings, and thus a tentative length can be assumed for computing the pressure drop per 100 ft of run. The values of Table 3