TABLE 1. EQUIVALENT LENGTH OF PIPE *vs.* PRESSURE HEAD AT VARIOUS FRICTION LOSSES STEEL PIPE

HEAD LOSS, FT	MILINCH FRICTION LOSS PER FOOT OF PIPE													
	720	480	360	300	240	180	160	144	120	96	90	80	70	60
	EQUIVALENT LENGTH OF PIPE IN FEET													
2	33	50	66	80	100	133	150	167	200	250	270	300	340	400
2½	42	62	84	100	125	167	188	208	250	312	333	375	428	500
3	50	75	100	120	150	200	225	250	300	375	400	450	510	600
3½	59	87	117	140	175	233	263	291	350	437	463	525	593	700
4	67	100	133	160	200	266	300	333	400	500	533	600	685	800
4½	75	112	149	180	225	300	338	374	450	562	593	675	758	900
5	83	125	167	200	250	333	375	416	500	625	666	750	860	1000
5½	92	137	183	220	275	366	413	457	550	687	713	825	923	1100
6	100	150	200	240	300	400	450	500	600	750	800	900	1030	1200
6½	108	162	217	260	325	433	488	540	650	812	843	975	1088	1300
7	116	175	233	280	350	465	525	580	700	875	933	1050	1200	1400
7½	124	187	249	300	375	500	563	623	750	937	973	1125	1252	1500
8	133	200	266	320	400	533	600	666	800	1000	1070	1200	1370	1600
8½	142	212	283	340	425	566	638	706	850	1062	1103	1275	1417	1700
9	150	225	300	360	450	600	675	750	900	1125	1200	1350	1540	1800
9½	159	237	317	380	475	633	713	789	950	1187	1233	1425	1577	1900
10	167	250	333	400	500	666	750	833	1000	1250	1333	1500	1715	2000
10½	175	262	349	420	525	700	788	872	1050	1312	1363	1575	1737	2100
11	183	275	366	440	550	733	825	916	1100	1375	1466	1650	1885	2200
11½	192	287	383	460	575	766	863	955	1150	1437	1533	1725	1897	2300
12	200	300	400	480	600	800	900	1000	1200	1500	1600	1800	2030	2400

NOMINAL PIPE SIZE, IN.		CAPACITY OF PIPES *Mbh* WITH A 20 F[a] DROP *A = Carrying Capacity, B = Velocity, inches per second* Friction Head of Pipe Milinches per foot													
		720	480	360	300	240	180	160	144	120	96	90	80	70	60
½	A	20	16	14	13	11	10	9	9	8	7	7	6	6	5
	B	*27*	*22*	*19*	*17*	*15*	*13*	*12*	*11*	*10*	*9*	*9*	*8*	*8*	*7*
¾	A	43	35	30	27	24	21	19	18	17	15	14	13	12	11
	B	*33*	*25*	*23*	*21*	*18*	*16*	*15*	*14*	*13*	*11*	*11*	*10*	*9*	*9*
1	A	85	70	60	54	48	41	39	36	33	30	28	27	25	23
	B	*39*	*32*	*27*	*25*	*22*	*19*	*18*	*17*	*15*	*13*	*13*	*12*	*11*	*10*
1¼	A	180	145	125	115	98	85	80	75	68	60	58	55	51	47
	B	*48*	*39*	*33*	*30*	*27*	*23*	*21*	*20*	*19*	*16*	*16*	*15*	*14*	*12*
1½	A	285	230	195	180	160	135	125	120	110	96	92	88	82	75
	B	*54*	*44*	*38*	*34*	*30*	*26*	*24*	*23*	*21*	*19*	*18*	*17*	*15*	*14*
2	A	540	435	370	340	300	255	240	230	205	180	175	165	150	140
	B	*64*	*52*	*45*	*40*	*36*	*30*	*29*	*27*	*24*	*22*	*21*	*20*	*19*	*17*
2½	A	890	720	610	550	480	420	390	370	330	300	280	270	250	230
	B	*74*	*60*	*50*	*46*	*41*	*35*	*33*	*31*	*28*	*24*	*24*	*22*	*21*	*19*
3	A	1650	1340	1130	1000	900	760	720	670	600	540	520	480	450	410
	B	*88*	*70*	*60*	*54*	*48*	*41*	*38*	*36*	*33*	*29*	*28*	*26*	*24*	*22*
3½	A	2500	2000	1700	1500	1350	1150	1080	1000	900	800	760	720	670	620
	B	*99*	*78*	*66*	*60*	*54*	*46*	*43*	*40*	*36*	*32*	*31*	*29*	*27*	*25*
4	A	3500	2800	2400	2200	1900	1600	1520	1440	1300	1150	1100	1050	960	880
	B	*110*	*87*	*74*	*66*	*58*	*50*	*47*	*45*	*40*	*35*	*34*	*32*	*30*	*27*
5	A	7000	5600	4700	4300	3700	3200	3000	2750	2500	2200	2100	2000	1800	1700
	B	*152*	*106*	*90*	*80*	*70*	*60*	*56*	*53*	*48*	*42*	*41*	*38*	*35*	*32*
6	A	12,000	9200	7800	7000	6200	5200	4800	4600	4100	3600	3500	3300	3000	2800
	B	*156*	*124*	*104*	*94*	*82*	*69*	*64*	*61*	*55*	*48*	*46*	*44*	*41*	*37*

[a]For other temperature drops the pipe capacities may be changed correspondingly. For example, with a temperature drop of 30 F, the capacities shown in this table are to be multiplied by 1.5.

TABLE 2. EQUIVALENT LENGTH OF TUBE *vs.* PRESSURE HEAD AT VARIOUS FRICTION LOSSES TYPE L COPPER TUBE

HEAD LOSS, FT	MILINCH FRICTION LOSS PER FOOT OF TUBE											
	720	600	480	360	300	240	180	150	120	90	75	60
	EQUIVALENT LENGTH OF TUBE IN FEET (LONGEST CIRCUIT)											
2	33	40	50	67	80	100	133	160	200	267	320	400
2½	42	50	63	83	100	125	167	200	250	333	400	500
3	50	60	75	100	120	150	200	240	300	400	480	600
3½	58	70	88	117	140	175	233	280	350	467	560	700
4	67	80	100	133	160	200	267	320	400	533	640	800
4½	75	90	113	150	180	225	300	360	450	600	720	900
5	83	100	125	167	200	250	333	400	500	667	800	1000
5½	92	110	138	183	220	275	367	440	550	733	880	1100
6	100	120	150	200	240	300	400	480	600	800	960	1200
6½	108	130	163	217	260	325	433	520	650	867	1040	1300
7	117	140	175	233	280	350	467	560	700	933	1120	1400
7½	125	150	188	250	300	375	500	600	750	1000	1200	1500
8	133	160	200	267	320	400	533	640	800	1067	1280	1600
8½	142	170	213	283	340	425	567	680	850	1133	1360	1700
9	150	180	225	300	360	450	600	720	900	1200	1440	1800
9½	159	190	238	317	380	475	633	760	950	1267	1520	1900
10	167	200	250	333	400	500	667	800	1000	1333	1600	2000
10½	175	210	263	350	420	525	700	840	1050	1400	1680	2100
11	183	220	275	367	440	550	733	880	1100	1467	1760	2200
11½	192	230	288	383	460	575	767	920	1150	1533	1840	2300
12	200	240	300	400	480	600	800	960	1200	1600	1920	2400

NOMINAL TUBE SIZE, IN.		CAPACITY OF TUBES *Mbh* WITH A 20 F[a] DROP *A = Carrying Capacity, B = Velocity, inches per second* Friction Head of Pipe Milinches per Foot											
		720	600	480	360	300	240	180	150	120	90	75	60
⅜	A	10	9	8	6.8	6.2	5.4	4.6	4	3.6	3	2.8	2.4
	B	*27*	*24*	*21*	*18*	*16.5*	14	*13*	*11*	*10*	*8.5*	*8*	*7*
½	A	20	18	16	13.5	12	10.8	9	8	7	6	5.4	4.7
	B	*33*	*30*	*25*	*21*	*19*	*17*	*15*	*13*	*12*	*10*	*9*	*8*
⅝	A	36	30	26	22.1	20	17.8	15	13.1	11.8	9.9	9	7.9
	B	*37*	*34*	*30*	*24*	*21*	*19*	*17*	*15*	*13*	*11*	*10*	*9*
¾	A	51	46	40	34	31	28	23.2	20.5	18.1	15.3	13.9	12.1
	B	*42*	*38*	*33*	*27*	*24*	*21*	*19*	*17*	*14*	*12*	*11.5*	*10*
1	A	104	94	82	70	63	56	47	42	37	32	28	25
	B	*48*	*45*	*39*	*34*	*30*	*25*	*22*	*19*	*17*	*14.5*	*13*	*12*
1¼	A	185	169	149	125	112	100	84	75	66	56	50	44
	B	*55*	*51*	*46*	*39*	*35*	*30*	*25*	*22*	*19*	*17*	*15*	*13*
1½	A	300	270	235	200	180	160	134	120	105	90	81	71
	B	*62*	*57*	*51*	*43*	*39*	*35*	*30*	*25*	*22*	*19*	*17*	*15*
2	A	625	560	495	420	375	335	280	250	200	188	170	150
	B	*76*	*68*	*59*	*51*	*47*	*42*	*36*	*32*	*27*	*22*	*20*	*18*
2½	A	1130	1010	890	750	680	600	500	450	395	335	305	270
	B	*90*	*80*	*69*	*58*	*49*	*47*	*42*	*37*	*33*	*26*	*23*	*21*
3	A	1840	1650	1450	1210	1100	980	820	740	650	550	490	420
	B	*98*	*90*	*80*	*66*	*59*	*52*	*47*	*42*	*36*	*30*	*27*	*23*
3½	A	2750	2480	2170	1840	1650	1450	1210	1100	980	820	740	650
	B	*110*	*100*	*89*	*75*	*66*	*57*	*51*	*45*	*40*	*35*	*30*	*26*
4	A	3900	3505	3100	2600	2350	2090	1760	1580	1390	1180	1080	950
	B	*120*	*108*	*96*	*83*	*73*	*63*	*55*	*49*	*44*	*37*	*34*	*29*

[a]For other temperature drops the pipe capacities may be changed correspondingly. For example, with temperature drop of 30 F, the capacities shown in this table are to be multiplied by 1.5.