

BOCK ENGINEERING MANUAL TABLES

VENT TABLES • pages 44-56

National Fuel Gas Code, 2006 Edition, ANSI Z223.1 • NFPA 31, 2006 Edition

INDIRECT COIL TANK PERFORMANCE TABLES • page 57

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Using the Individual Vent Tables

To determine the proper vent size for an individual vent:

1. Determine Total Vent Height and Length of Lateral based on water heater and vent location, plus height to top, or to chimney-styled roof assembly.
2. Read down the Total Vent Height column (first column) to a height equal to or less than the total vent height.
3. Select the horizontal row of the table for the appropriate Length of Lateral (use zero for straight vertical vents).
4. Read across to the first column which shows a capacity equal to or greater than the water heater name plate heat input. Be certain to view the correct column for your burner/heater type.
5. If the vent size shown at the top of the column containing the correct capacity is equal to or larger than the water heater vent connector, use the vent determined.

STANDBY LOSS FORMULA

1. Gallons in tank X 8.25 X 90°F = Stored Heat
2. Stored Heat X % Standby Loss X Hours on standby = Standby BTU
3. $\frac{\text{Standby BTU} \times \$ \text{ per gallon}}{138,500 \text{ BTU}}$ = Standby Cost Per Day

Example:

$$(32 \times 8.25 \times 90^\circ\text{F}) \times (.03) \times 23.2 = 16,537 \text{ BTUs}$$

$$\frac{22,049.28 \times 1.10}{138,500} = \$0.175 \text{ per day} \times 365 = \$63.91 \text{ per yr}$$

To reduce standby loss by 1%:

$$23760 \times .03 \times 23.2 = \frac{16,375}{38,500} \times 1.10 = \$0.131 \text{ per day}$$

$$\times 365 = \$47.94$$

Add \$30 to \$40 for piping losses
for an accurate prediction of water heating costs.

Equivalencies	
1 gal. fuel oil	= 140,000 BTUs
1 gal. propane	= 90,000 BTUs
1 lb. propane	= 21,500 BTUs
1 gal. butane	= 100,000 BTUs
1 lb. butane	= 21,000 BTUs
1 kWh	= 3,413 BTUs
1 gal. water	= 8.34 lbs.
1 cubic ft. water	= 7.5 gal.

ENERGY / POWER CONVERSIONS

1 btu	= 1.055 kJ
1 kJ	= 0.9478 BTU
1 BTU/hr	= 0.2931 kW
1 W	= 3.412 BTU/hr
1 hp (550 ft/lbs)	= 0.7457 kW
1 kW	= 1.341 hp
1 hp	= 2545 BTU/hr
1 BTU/hr	= 0.000393 hp
1 BTU	= 252 cal

Raising one gallon of water:	Requires a BTUH input of:
140°F	1666
120°F	1428
100°F	1190
90°F	1071
80°F	852
70°F	833
60°F	714
50°F	595
40°F	476

TABLE 21

Capacity of Type B Double-Wall Gas Vents (when connected directly to a single Category 1 appliance)

Height H (ft)	Lateral L (ft)	Vent Diameter – D																				
		3"			4"			5"			6"			7"			8"			9"		
		FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max
6	0	0	78	46	0	152	86	0	251	141	0	375	205	0	524	285	0	698	370	0	897	470
	2	13	51	36	18	97	67	27	157	105	32	232	157	44	321	217	53	425	285	63	543	370
	4	21	49	34	30	94	64	39	153	103	50	227	153	66	316	211	79	419	279	93	536	362
	6	25	46	32	36	91	61	47	149	100	59	223	149	78	310	205	93	413	273	110	530	354
8	0	0	84	50	0	165	94	0	276	155	0	415	235	0	583	320	0	780	415	0	1006	537
	2	12	57	40	16	109	75	25	178	120	28	263	180	42	365	247	50	483	322	60	619	418
	5	23	53	38	32	103	71	42	171	115	53	255	173	70	356	237	83	473	313	99	607	407
	8	28	49	35	39	98	66	51	164	109	64	247	165	84	347	227	99	463	303	117	596	396
10	0	0	88	53	0	175	100	0	295	166	0	447	255	0	631	345	0	847	450	0	1096	585
	2	12	61	42	17	118	81	23	194	129	26	289	195	40	402	273	48	533	355	57	684	457
	5	23	57	40	32	113	77	41	187	124	52	280	188	68	392	263	81	522	346	95	671	446
	10	30	51	36	41	104	70	54	176	115	67	267	175	88	376	245	104	504	330	122	651	427
15	0	0	94	58	0	191	112	0	327	187	0	502	285	0	716	390	0	970	525	0	1263	682
	2	11	69	48	15	136	93	20	226	150	22	339	225	38	475	316	45	633	414	53	815	544
	5	22	65	45	30	130	87	39	219	142	49	330	217	64	463	300	76	620	403	90	800	529
	10	29	59	41	40	121	82	51	206	135	64	315	208	84	445	288	99	600	386	116	777	507
	15	35	53	37	48	112	76	61	195	128	76	301	198	98	429	275	115	580	373	134	755	491
20	0	0	97	61	0	202	119	0	349	202	0	540	307	0	776	430	0	1057	575	0	1384	752
	2	10	75	51	14	149	100	18	250	166	20	377	249	33	531	346	41	711	470	50	917	612
	5	21	71	48	29	143	96	38	242	160	47	367	241	62	519	337	73	697	460	86	902	599
	10	28	64	44	38	133	89	50	229	150	62	351	228	81	499	321	95	675	443	112	877	576
	15	34	58	40	46	124	84	59	217	142	73	337	217	94	481	308	111	654	427	129	853	557
	20	48	52	35	55	116	78	69	206	134	84	322	206	107	464	295	125	634	410	145	830	537
30	0	0	100	64	0	213	128	0	374	220	0	587	336	0	853	475	0	1173	650	0	1548	855
	2	9	81	56	13	166	112	14	283	185	18	432	280	27	613	394	33	826	535	42	1072	700
	5	21	77	54	28	160	108	36	275	176	45	421	273	58	600	385	69	811	524	82	1055	688
	10	27	70	50	37	150	102	48	262	171	59	405	261	77	580	371	91	788	507	107	1028	668
	15	33	64	NA	44	141	96	57	249	163	70	389	249	90	560	357	105	765	490	124	1002	648
	20	56	58	NA	53	132	90	66	237	154	80	374	237	102	542	343	119	743	473	139	977	628
	30	NA	NA	NA	73	113	NA	88	214	NA	104	346	219	131	507	321	149	702	444	171	929	594
50	0	0	101	67	0	216	134	0	397	232	0	633	363	0	392	518	0	1297	708	0	1730	952
	2	8	86	61	11	183	122	14	320	206	15	497	314	22	715	445	26	975	615	33	1276	813
	5	20	82	NA	27	177	119	35	312	200	43	487	308	55	702	438	65	960	605	77	1259	798
	10	26	76	NA	35	168	114	45	299	190	56	471	298	73	681	426	86	935	589	101	1230	773
	15	59	70	NA	42	158	NA	54	287	180	66	455	288	85	662	413	100	911	572	117	1203	747
	20	NA	NA	NA	50	149	NA	63	275	169	76	440	278	97	642	401	113	888	556	131	1176	722
	30	NA	NA	NA	69	131	NA	84	250	NA	99	410	259	123	605	376	141	844	522	161	1125	670
100	0	NA	NA	NA	0	218	NA	0	407	NA	0	665	400	0	997	560	0	1411	770	0	1908	1040
	2	NA	NA	NA	10	194	NA	12	354	NA	13	566	375	18	831	510	21	1155	700	25	1536	935
	5	NA	NA	NA	26	189	NA	33	347	NA	40	557	369	52	820	504	60	1141	692	71	1519	926
	10	NA	NA	NA	33	182	NA	43	335	NA	53	542	361	68	801	493	80	1118	679	94	1492	910
	15	NA	NA	NA	40	174	NA	50	312	NA	62	528	353	80	782	482	93	1095	666	109	1465	895
	20	NA	NA	NA	47	166	NA	59	311	NA	71	513	344	90	763	471	105	1073	653	122	438	880
	30	NA	NA	NA	NA	NA	NA	78	290	NA	92	483	NA	115	726	449	131	1029	627	149	1387	849
	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	147	428	NA	180	651	405	197	944	575	217	1288	787

TABLE 21 ...continued

Capacity of Type B Double-Wall Gas Vents (when connected directly to a single Category 1 appliance)

Vent Diameter – D

Height H (ft)	Lateral L (ft)	10"			12"			14"			16"			18"			20"			22"			24"		
		FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max
6	0	0	1121	570	0	1645	850	0	2267	1170	0	2983	1530	0	3802	1960	0	4721	2430	0	5737	2950	0	6853	3520
	2	75	675	455	103	982	650	138	1346	890	178	1769	1170	225	2250	1480	296	2782	1850	360	3377	2220	426	4030	2670
	4	110	668	445	147	975	640	191	1338	880	242	1761	1160	300	2242	1475	390	2774	1835	469	3370	2215	555	4023	2660
	6	128	661	435	171	967	630	219	1330	870	276	1753	1150	341	2235	1470	437	2767	1820	523	3363	2210	618	4017	2650
8	0	0	1261	660	0	1858	970	0	2571	1320	0	3399	1740	0	4333	2220	0	5387	2750	0	6555	3360	0	7838	4010
	2	71	770	515	98	1124	745	130	1543	1020	168	2030	1340	212	2584	1700	278	3196	2110	336	3882	2560	401	4634	3050
	5	115	758	503	154	1110	733	199	1528	1010	251	2013	1330	311	2563	1685	398	3180	2090	476	3863	2545	562	4612	3040
	8	137	746	490	180	1097	720	231	1514	1000	289	2000	1320	354	2552	1670	450	3163	2070	537	3850	2530	630	4602	3030
10	0	0	1377	720	0	2036	1060	0	2825	1450	0	3742	1925	0	4782	2450	0	5955	3050	0	7254	3710	0	8682	4450
	2	68	852	560	93	1244	850	124	1713	1130	161	2256	1480	202	2868	1890	264	3556	2340	319	4322	2840	378	5153	3390
	5	112	839	547	149	1229	829	192	1696	1105	243	2238	1461	300	2849	1871	382	3536	2318	458	4301	2818	540	5132	3371
	10	142	817	525	187	1204	795	238	1669	1080	298	2209	1430	364	2818	1840	459	3504	2280	546	4268	2780	641	5099	3340
15	0	0	1596	840	0	2380	1240	0	3323	1720	0	4423	2270	0	5678	2900	0	7099	3620	0	8665	4410	0	10393	5300
	2	63	1019	675	86	1495	985	114	2062	1350	147	2719	1770	186	3467	2260	239	4304	2800	290	5232	3410	346	6251	4080
	5	105	1003	600	140	1476	967	182	2041	1327	229	2696	1748	283	3442	2235	355	4278	2777	426	5204	3385	501	6222	4057
	10	135	977	635	177	1446	936	227	2009	1289	283	2659	1712	346	3402	2193	432	4234	2739	510	5159	3343	599	6175	4019
	15	155	953	610	202	1418	905	257	1976	1250	318	2632	1675	385	3363	2150	479	4192	2700	564	5115	3300	554	6129	3980
20	0	0	1756	930	0	2637	1350	0	3701	1900	0	4948	2520	0	6376	3250	0	7988	4060	0	9785	4980	0	11753	6000
	2	59	1150	755	81	1694	1100	107	2343	1520	139	3097	2000	175	3955	2570	220	4916	3200	269	5983	3910	321	7154	4700
	5	101	1133	738	135	1674	1079	174	2320	1489	219	3071	1978	270	3926	2544	337	4885	3174	403	5950	3880	475	7119	4662
	10	130	1105	710	172	1641	1045	220	2282	1460	273	3029	1940	334	3880	2500	413	4835	3130	489	5896	3830	573	7063	4600
	15	150	1078	688	195	1609	1018	248	2245	1425	306	2988	1910	372	3835	2465	459	4786	3090	541	5844	3795	631	7007	4575
	20	167	1052	665	217	1578	990	273	2210	1390	335	2948	1880	404	3791	2430	495	4737	3050	585	5792	3760	689	6953	4550
30	0	0	1977	1060	0	3004	1550	0	4252	2170	0	5725	2920	0	7420	3770	0	9341	4750	0	11483	5850	0	13848	7060
	2	54	1351	865	74	2004	1310	98	2786	1800	127	3696	2380	159	4734	3050	199	5900	3810	241	7194	4650	285	8617	5600
	5	96	1332	851	127	1981	1289	164	2759	1775	206	3666	2350	252	4701	3020	312	5863	3783	373	7155	4622	439	8574	5552
	10	125	1301	829	164	1944	1254	209	2716	1733	259	3617	2300	316	4647	2970	386	5803	3739	456	7090	4574	535	8505	5471
	15	143	1272	807	187	1908	1220	237	2674	1692	292	3570	2250	354	4594	2920	431	5744	3695	507	7026	4527	590	8437	5391
	20	160	1243	784	207	1873	1185	260	2633	1650	319	3523	2200	384	4542	2870	467	5686	3650	548	6964	4480	639	8370	5310
	30	195	1189	745	246	1807	1130	305	2555	1585	369	3433	2130	440	4442	2785	540	5574	3565	635	6842	4375	739	8239	5225
50	0	0	2231	1195	0	3441	1825	0	4934	2550	0	6711	3440	0	8774	4460	0	11129	5635	0	13767	6940	0	16694	8430
	2	41	1620	1010	66	2431	1513	86	3409	2185	113	4554	2840	141	5864	3670	171	7339	4630	209	8980	5695	251	10788	6860
	5	90	1600	996	118	2406	1495	151	3380	2102	191	4520	2813	234	5826	3639	283	7295	4597	336	8933	5654	394	10737	6818
	10	118	1567	972	154	2366	1466	196	3332	2064	243	4464	2767	295	5763	3585	355	7224	4542	419	8855	5585	491	10652	6749
	15	136	1536	948	177	2327	1437	222	3285	2026	274	4409	2721	330	5701	3534	396	7155	4511	465	8779	5546	542	10570	6710
	20	151	1505	924	195	2288	1408	244	3239	1987	300	4356	2675	361	5641	3481	433	7086	4479	506	8704	5506	586	10488	6670
	30	183	1446	876	232	2214	1349	287	3150	1910	347	4253	2631	412	5523	3431	494	6953	4421	577	8557	5444	672	10328	6603
100	0	0	2491	1310	0	3925	2050	0	5729	2950	0	7914	4050	0	10485	5300	0	13454	6700	0	16817	8600	0	20578	10300
	2	30	1975	1170	44	3027	1830	72	4313	2550	95	5834	3500	120	7591	4600	138	9577	5800	169	11803	7200	204	14264	8800
	5	82	1955	1159	107	3002	1803	136	4282	2531	172	5797	3475	208	7548	4566	245	9528	5769	293	11748	7162	341	14204	8756
	10	108	1923	1142	142	2961	1775	180	4231	2500	223	5737	3434	268	7478	4509	318	9447	5717	374	11658	7100	436	14105	8683
	15	126	1892	1124	163	2920	1747	206	4182	2469	252	5678	3392	304	7409	4451	358	9367	5665	418	11569	7037	487	14007	8610
	20	141	1861	1107	181	2880	1719	226	4133	2438	277	5619	3351	330	7341	4394	387	9289	5613	452	11482	6975	523	13910	8537
	30	170	1802	1071	215	2803	1663	265	4037	2375	319	5505	3267	378	7209	4279	446	9136	5509	514	11310	6850	592	13720	8391
50	241	1688	1000	292	2657	1550	350	3856	2250	415	5289	3100	486	6956	4050	572	8841	5300	659	10979	6600	752	13354	8100	

TABLE 22

Capacity of Type B Double-Wall Gas Vents (with single-wall metal connectors serving a single Category 1 appliance)

Height H (ft)		Lateral L (ft)		Vent Diameter – D																											
				3"			4"			5"			6"			7"			8"			9"			10"			12"			
				FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	
6	0	38	77	45	59	151	85	85	249	140	126	373	204	165	522	284	211	695	369	267	894	469	371	1118	569	537	1639	849			
	2	39	51	36	60	96	66	85	156	104	123	231	156	159	320	213	201	423	284	251	541	368	347	673	453	498	979	648			
	4	NA	NA	33	74	92	63	102	152	102	146	225	152	187	313	208	237	416	277	295	533	360	409	664	443	584	971	638			
	6	NA	NA	31	83	89	60	114	147	99	163	220	148	207	307	203	263	409	271	327	526	352	449	656	433	638	962	627			
8	0	37	83	50	58	164	93	83	273	154	123	412	234	161	580	319	206	777	414	258	1002	536	360	1257	658	521	1852	967			
	2	39	56	39	59	108	75	83	176	119	121	261	179	155	363	246	197	482	321	246	617	417	339	768	513	486	1120	743			
	5	NA	NA	37	77	102	69	107	168	114	151	252	171	193	352	235	245	470	311	305	604	404	418	754	500	598	1104	730			
	8	NA	NA	33	90	95	64	122	161	107	175	243	163	223	342	225	280	458	300	344	591	392	470	740	486	665	1089	715			
10	0	37	87	53	57	174	99	82	293	165	120	444	254	158	628	344	202	844	449	253	1093	584	351	1373	718	507	2031	1057			
	2	39	61	41	59	117	80	82	193	128	119	287	194	153	400	272	193	531	354	242	681	456	332	849	559	475	1242	848			
	5	52	56	39	76	111	76	105	185	122	148	277	186	190	388	261	241	518	344	299	667	443	409	834	544	584	1224	825			
	10	NA	NA	34	97	100	68	132	171	112	188	261	171	237	369	241	296	497	325	363	643	423	492	808	520	688	1194	788			
15	0	36	93	57	56	190	111	80	325	186	116	499	283	153	713	388	195	966	523	244	1259	681	336	1591	838	488	2374	1237			
	2	38	69	47	57	136	93	80	225	149	115	337	224	148	473	314	187	631	413	232	812	543	319	1015	673	457	1491	983			
	5	51	63	44	75	128	86	102	216	140	144	326	217	182	459	298	231	616	400	287	795	526	392	997	657	562	1469	963			
	10	NA	NA	39	95	116	79	128	201	131	182	308	203	228	438	284	284	592	381	349	768	501	470	966	628	664	1433	928			
	15	NA	NA	NA	NA	NA	72	158	186	124	220	290	192	272	418	269	334	568	367	404	742	484	540	937	601	750	1399	894			
20	0	35	96	60	54	200	118	78	346	201	114	537	306	149	772	428	190	1053	573	238	1379	750	326	1751	927	473	2631	1346			
	2	37	74	50	56	148	99	78	248	165	113	375	248	144	528	344	182	708	468	227	914	611	309	1146	754	443	1689	1098			
	5	50	68	47	73	140	94	100	239	158	141	363	239	178	514	334	224	692	457	279	896	596	381	1126	734	547	1665	1074			
	10	NA	NA	41	93	129	86	125	223	146	177	344	224	222	491	316	277	666	437	339	866	570	457	1092	702	646	1626	1037			
	15	NA	NA	NA	NA	NA	80	155	208	136	216	325	210	264	469	301	325	640	419	393	838	549	526	1060	677	730	1587	1005			
	20	NA	NA	NA	NA	NA	NA	186	192	126	254	306	196	309	448	285	374	616	400	448	810	526	592	1028	651	808	1550	973			
30	0	34	99	63	53	211	127	76	372	219	110	584	334	144	849	472	184	1168	647	229	1542	852	312	1971	1056	454	2996	1545			
	2	37	80	56	55	164	111	76	281	183	109	429	279	139	610	392	175	823	533	219	1069	698	296	1346	863	424	1999	1308			
	5	49	74	52	72	157	106	98	271	173	136	417	271	171	595	382	215	806	521	269	1049	684	366	1324	846	524	1971	1283			
	10	NA	NA	NA	91	144	98	122	255	168	171	397	257	213	570	367	265	777	501	327	1017	662	440	1287	821	620	1927	1243			
	15	NA	NA	NA	115	131	NA	151	239	157	208	377	242	255	547	349	312	750	481	379	985	638	507	1251	794	702	1884	1205			
	20	NA	NA	NA	NA	NA	NA	181	223	NA	246	357	228	298	524	333	360	723	461	433	955	615	570	1216	768	780	1841	1166			
	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	389	477	305	461	670	426	541	895	574	704	1147	720	937	1759	1101			
50	0	33	99	66	51	213	133	73	394	230	105	629	361	138	928	515	176	1292	704	220	1724	948	295	2223	1189	428	3432	1818			
	2	36	84	61	53	181	121	73	318	205	104	495	312	133	712	443	168	971	613	209	1273	811	280	1615	1007	401	2426	1509			
	5	48	80	NA	70	174	117	94	308	198	131	482	305	164	696	435	204	953	602	257	1252	795	347	1591	991	496	2396	1490			
	10	NA	NA	NA	89	160	NA	118	292	186	162	461	292	203	671	420	253	923	583	313	1217	765	418	1551	963	589	2347	1455			
	15	NA	NA	NA	112	148	NA	145	275	174	199	441	280	244	646	405	299	894	562	363	1183	736	481	1512	934	668	2299	1421			
	20	NA	NA	NA	NA	NA	NA	176	257	NA	236	420	267	285	622	389	345	866	543	415	1150	708	544	1473	906	741	2251	1387			
	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	315	376	NA	373	573	NA	442	809	502	521	1086	649	674	1399	848	892	2159	1318			
100	0	NA	NA	NA	49	214	NA	69	403	NA	100	659	395	131	991	555	166	1404	765	207	1900	1033	273	2479	1300	395	3912	2042			
	2	NA	NA	NA	51	192	NA	70	351	NA	98	563	373	125	828	508	158	1152	698	196	1532	933	259	1970	1168	571	3021	1817			
	5	NA	NA	NA	67	186	NA	90	342	NA	125	551	366	156	813	501	194	1134	688	240	1511	921	322	1945	1153	460	2990	1796			
	10	NA	NA	NA	85	175	NA	113	324	NA	153	532	354	191	789	486	238	1104	672	293	1477	902	389	1905	1133	547	2938	1763			
	15	NA	NA	NA	132	162	NA	138	310	NA	188	511	343	230	764	473	281	1075	656	342	1443	884	447	1865	1110	618	2888	1730			
	20	NA	NA	NA	NA	NA	NA	168	295	NA	224	487	NA	270	739	458	325	1046	639	391	1410	864	507	1825	1087	690	2838	1696			
	30	NA	NA	NA	NA	NA	NA	231	264	NA	301	448	NA	355	685	NA	418	988	NA	491	1343	824	631	1747	1041	834	2739	1627			
50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	540	584	NA	617	866	NA	711	1205	NA	895	1591	NA	1138	2547	1489				

TABLE 23

Capacity of Masonry Chimney Flue with Type B Double-Wall Vent Connectors
(serving a single Category 1 appliance)

Type B Double-Wall Connector Diameter – D
(to be used with chimney areas within the size limits at bottom)

Appliance input rating in thousands of BTUs per hour

Height H (ft)	Lateral L (ft)	3"			4"			5"			6"			7"			8"			9"			10"			12"		
		FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max
6	2	NA	NA	28	NA	NA	52	NA	NA	86	NA	NA	130	NA	NA	180	NA	NA	247	NA	NA	320	NA	NA	401	NA	NA	581
	5	NA	NA	25	NA	NA	49	NA	NA	82	NA	NA	117	NA	NA	165	NA	NA	231	NA	NA	298	NA	NA	376	NA	NA	561
8	2	NA	NA	29	NA	NA	55	NA	NA	93	NA	NA	145	NA	NA	198	NA	NA	266	84	590	350	100	728	446	139	1024	651
	5	NA	NA	26	NA	NA	52	NA	NA	88	NA	NA	134	NA	NA	183	NA	NA	247	NA	NA	328	149	711	423	201	1007	640
	8	NA	NA	24	NA	NA	48	NA	NA	83	NA	NA	127	NA	NA	175	NA	NA	239	NA	NA	318	173	695	410	231	990	623
10	2	NA	NA	31	NA	NA	61	NA	NA	103	NA	NA	162	NA	NA	221	68	519	298	82	655	388	98	810	491	136	1144	724
	5	NA	NA	28	NA	NA	57	NA	NA	96	NA	NA	148	NA	NA	204	NA	NA	277	124	638	365	146	791	466	196	1124	712
	10	NA	NA	25	NA	NA	50	NA	NA	87	NA	NA	139	NA	NA	191	NA	NA	263	155	610	347	182	762	444	240	1093	668
15	2	NA	NA	35	NA	NA	67	NA	NA	114	NA	NA	179	53	475	250	64	613	336	77	779	441	92	968	562	127	1376	841
	5	NA	NA	35	NA	NA	62	NA	NA	107	NA	NA	164	NA	NA	231	99	594	313	118	759	416	139	946	533	186	1352	828
	10	NA	NA	28	NA	NA	55	NA	NA	97	NA	NA	153	NA	NA	216	126	565	296	148	727	394	173	912	567	229	1315	777
	15	NA	NA	NA	NA	NA	48	NA	NA	89	NA	NA	141	NA	NA	201	NA	NA	281	171	698	375	198	880	485	259	1280	742
20	2	NA	NA	38	NA	NA	74	NA	NA	124	NA	NA	201	51	522	274	61	678	375	73	867	491	87	1083	627	121	1548	953
	5	NA	NA	36	NA	NA	68	NA	NA	116	NA	NA	184	80	503	254	95	658	350	113	845	463	133	1059	597	179	1523	933
	10	NA	NA	NA	NA	NA	60	NA	NA	107	NA	NA	172	NA	NA	237	122	627	332	143	811	440	167	1022	566	221	1482	879
	15	NA	NA	NA	NA	NA	NA	NA	NA	97	NA	NA	159	NA	NA	220	NA	NA	314	165	780	418	191	987	541	251	1443	840
	20	NA	NA	NA	NA	NA	NA	NA	NA	83	NA	NA	148	NA	NA	206	NA	NA	296	186	750	397	214	955	513	277	1406	807
30	2	NA	NA	41	NA	NA	82	NA	NA	137	NA	NA	216	47	581	303	57	762	421	68	985	558	81	1240	717	111	1793	1112
	5	NA	NA	NA	NA	NA	76	NA	NA	128	NA	NA	198	75	561	281	90	741	393	106	962	526	125	1216	683	169	1766	1094
	10	NA	NA	NA	NA	NA	67	NA	NA	115	NA	NA	184	NA	NA	263	115	709	373	135	927	500	138	1176	648	210	1721	1025
	15	NA	NA	NA	NA	NA	NA	NA	NA	107	NA	NA	171	NA	NA	243	NA	NA	353	156	893	476	181	1139	621	239	1679	981
	20	NA	NA	NA	NA	NA	NA	NA	NA	91	NA	NA	159	NA	NA	227	NA	NA	332	176	860	450	203	1103	592	264	1638	940
	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	188	NA	NA	288	NA	NA	416	249	1035	555	318	1560	877
50	2	NA	NA	NA	NA	NA	92	NA	NA	161	NA	NA	251	NA	NA	351	51	840	477	61	1106	633	72	1413	812	99	2080	1243
	5	NA	NA	NA	NA	NA	NA	NA	NA	151	NA	NA	230	NA	NA	323	83	819	445	98	1083	596	116	1387	774	155	2052	1225
	10	NA	NA	NA	NA	NA	NA	NA	NA	138	NA	NA	215	NA	NA	304	NA	NA	424	126	1047	567	147	1347	733	195	2006	1147
	15	NA	NA	NA	NA	NA	NA	NA	NA	127	NA	NA	199	NA	NA	282	NA	NA	400	146	1010	539	170	1307	702	222	1961	1099
	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	185	NA	NA	264	NA	NA	376	165	977	511	190	1269	669	246	1916	1050
	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	327	NA	NA	468	233	1196	623	295	1832	984
Minimum internal area of chimney in sq. inches		12			19			28			38			50			63			78			95			132		
Maximum internal area of chimney in sq. inches		49			88			137			198			269			352			445			550			792		

TABLE 24

Capacity of Masonry Chimney Flue with Single-Wall Vent Connectors
(serving a single Category 1 appliance)

Single-Wall Metal Connector Diameter – D
(to be used with chimney areas within the size limits at bottom)
Appliance input rating in thousands of BTUs per hour

Height H (ft)	Lateral L (ft)	3"			4"			5"			6"			7"			8"			9"			10"			12"		
		FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max
6	2	NA	NA	28	NA	NA	52	NA	NA	86	NA	NA	130	NA	NA	180	NA	NA	247	NA	NA	319	NA	NA	400	NA	NA	580
	5	NA	NA	25	NA	NA	48	NA	NA	81	NA	NA	116	NA	NA	164	NA	NA	230	NA	NA	297	NA	NA	375	NA	NA	560
8	2	NA	NA	29	NA	NA	55	NA	NA	93	NA	NA	145	NA	NA	197	NA	NA	265	NA	NA	349	382	725	445	549	1021	650
	5	NA	NA	26	NA	NA	51	NA	NA	87	NA	NA	133	NA	NA	182	NA	NA	246	NA	NA	327	NA	NA	422	673	1003	638
	8	NA	NA	23	NA	NA	47	NA	NA	82	NA	NA	126	NA	NA	174	NA	NA	237	NA	NA	317	NA	NA	408	747	985	621
10	2	NA	NA	31	NA	NA	61	NA	NA	102	NA	NA	161	NA	NA	220	216	518	297	271	654	387	373	808	490	536	1142	722
	5	NA	NA	28	NA	NA	56	NA	NA	95	NA	NA	147	NA	NA	203	NA	NA	276	334	635	364	459	789	465	657	1121	710
	10	NA	NA	24	NA	NA	49	NA	NA	86	NA	NA	137	NA	NA	189	NA	NA	261	NA	NA	345	547	758	441	771	1088	665
15	2	NA	NA	35	NA	NA	67	NA	NA	113	NA	NA	178	166	473	249	211	611	335	264	776	440	362	965	560	520	1373	840
	5	NA	NA	32	NA	NA	61	NA	NA	106	NA	NA	163	NA	NA	230	261	591	312	325	755	414	444	942	531	637	1348	825
	10	NA	NA	27	NA	NA	54	NA	NA	96	NA	NA	151	NA	NA	214	NA	NA	294	392	722	392	531	907	504	749	1309	774
	15	NA	NA	NA	NA	NA	46	NA	NA	87	NA	NA	138	NA	NA	198	NA	NA	278	452	692	372	606	873	481	841	1272	738
20	2	NA	NA	38	NA	NA	73	NA	NA	123	NA	NA	200	163	520	273	206	675	374	258	864	490	252	1079	625	508	1544	950
	5	NA	NA	35	NA	NA	67	NA	NA	115	NA	NA	183	NA	NA	252	255	655	348	317	842	461	433	1055	594	623	1518	930
	10	NA	NA	NA	NA	NA	59	NA	NA	105	NA	NA	170	NA	NA	235	312	622	330	382	806	437	517	1016	562	733	1475	875
	15	NA	NA	NA	NA	NA	NA	NA	NA	95	NA	NA	156	NA	NA	217	NA	NA	311	442	773	414	591	979	539	823	1435	835
30	20	NA	NA	NA	NA	NA	NA	NA	NA	80	NA	NA	144	NA	NA	202	NA	NA	292	NA	NA	392	663	944	510	911	1394	800
	2	NA	NA	41	NA	NA	81	NA	NA	136	NA	NA	215	158	578	302	200	759	420	249	982	556	340	1237	715	489	1789	1110
	5	NA	NA	NA	NA	NA	75	NA	NA	127	NA	NA	196	NA	NA	279	245	737	391	306	958	524	417	1210	680	600	1760	1090
	10	NA	NA	NA	NA	NA	66	NA	NA	113	NA	NA	182	NA	NA	260	300	703	370	370	920	496	500	1168	644	708	1713	1020
	15	NA	NA	NA	NA	NA	NA	NA	NA	105	NA	NA	168	NA	NA	240	NA	NA	349	428	884	471	572	1128	615	798	1668	975
	20	NA	NA	NA	NA	NA	NA	NA	NA	88	NA	NA	155	NA	NA	223	NA	NA	327	NA	NA	445	643	1089	585	883	1624	932
50	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	182	NA	NA	281	NA	NA	408	NA	NA	544	1055	1539	865	
	2	NA	NA	NA	NA	NA	91	NA	NA	160	NA	NA	250	NA	NA	350	191	837	475	238	1103	631	323	1408	810	463	2076	1240
	5	NA	NA	NA	NA	NA	NA	NA	NA	149	NA	NA	228	NA	NA	321	NA	NA	442	293	1078	593	398	1381	770	571	2044	1220
	10	NA	NA	NA	NA	NA	NA	NA	NA	136	NA	NA	212	NA	NA	301	NA	NA	420	355	1038	562	447	1337	728	674	1994	1140
	15	NA	NA	NA	NA	NA	NA	NA	NA	124	NA	NA	195	NA	NA	278	NA	NA	395	NA	NA	533	546	1294	695	761	1945	1090
30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	180	NA	NA	258	NA	NA	370	NA	NA	504	616	1251	660	844	1898	1040	
		Minimum internal area of chimney in sq. inches		12	19		28		38		50		63		78		95		132									
		Maximum internal area of chimney in sq. inches		49	88		137		198		269		352		445		550		792									

TABLE 25

Capacity of Single-Wall Metal Pipe or Type B Cement Vents

(serving a single draft hood-equipped appliance)

Height H (ft)	Lateral L (ft)	3"	4"	5"	6"	7"	8"	10"	12"
		6	0	39	70	116	170	232	312
	2	31	55	94	141	194	260	415	620
	5	28	51	88	128	177	242	390	600
8	0	42	76	126	185	252	340	542	815
	2	32	61	102	154	210	284	451	680
	5	29	56	95	141	194	264	430	648
	10	24	49	86	131	180	250	406	625
10	0	45	84	138	202	279	372	606	912
	2	35	67	111	168	233	311	505	760
	5	32	61	104	153	215	289	480	724
	10	27	54	94	143	200	274	455	700
	15	NA	46	84	130	186	258	432	666
15	0	49	91	151	223	312	420	684	1040
	2	39	72	122	186	260	350	570	865
	5	35	67	110	170	240	325	540	825
	10	30	58	103	158	223	308	514	795
	15	NA	50	93	144	207	291	488	760
	20	NA	NA	82	132	195	273	466	726
20	0	53	101	163	252	342	470	770	1190
	2	42	80	136	210	286	392	641	990
	5	38	74	123	192	264	364	610	945
	10	32	65	115	178	246	345	571	910
	15	NA	55	104	163	228	326	550	870
	20	NA	NA	91	149	214	306	525	832
30	0	56	108	183	276	384	529	878	1370
	2	44	84	148	230	320	441	730	1140
	5	NA	78	137	210	296	410	694	1080
	10	NA	68	125	196	274	388	656	1050
	15	NA	NA	113	177	258	366	625	1000
	20	NA	NA	99	163	240	344	596	960
	30	NA	NA	NA	192	295	540	890	
50	0	NA	120	210	310	443	590	980	1550
	2	NA	95	171	260	370	492	820	1290
	5	NA	NA	159	234	342	474	780	1230
	10	NA	NA	146	221	318	456	730	1190
	15	NA	NA	NA	200	292	407	705	1130
	20	NA	NA	NA	185	276	384	670	1080
	30	NA	NA	NA	222	330	605	1010	

TABLE 26

Capacity of Single-Wall Metal Pipe of Type B Cement Vents

serving two or more draft hood-equipped appliances

VENT CONNECTOR CAPACITY

Total Vent Height H (ft)	Connector Rise R (ft)	Vent connector diameter – D					
		3"	4"	5"	6"	7"	8"
		Maximum appliance input rating in thousands of BTU per hour					
6-8	1	21	40	68	102	146	205
	2	28	53	86	124	178	235
	3	34	61	98	147	204	275
15	1	23	44	77	117	179	240
	2	30	56	92	134	194	265
	3	35	64	102	155	216	298
30 & up	1	25	49	84	129	190	270
	2	31	58	97	145	211	295
	3	36	68	107	164	232	321

COMMON VENT CAPACITY

Total Vent Height H (ft)	Common vent diameter							
	4"	5"	6"	7"	8"	10"	12"	
		Combined appliance input rating in thousands of BTU per hour						
6	48	78	111	155	205	320	NA	
8	55	89	128	175	234	365	505	
10	59	95	136	190	250	395	560	
15	71	115	168	228	305	480	690	
20	80	129	186	260	340	550	790	
30	NA	147	215	300	400	650	940	
50	NA	NA	NA	360	490	810	1190	

TABLE 27

Capacity of Type B Double-Wall Vents with Type B Double-Wall Connectors
(serving two or more Category 1 Appliances)

Vent Height H (ft)		Connector Rise R (ft)		Type B Double-Wall Vent and Connector Diameter – D																							
				3"			4"			5"			6"			7"			8"			9"			10"		
				FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max		
1	1	22	37	26	35	66	46	46	106	72	58	164	104	77	225	142	92	296	185	109	376	237	128	466	289		
	2	23	41	31	37	75	55	48	121	86	60	183	124	79	253	168	95	333	220	112	424	282	131	526	345		
	3	24	44	35	38	81	62	49	132	96	62	199	139	82	275	189	97	363	248	114	463	317	134	575	386		
6	1	22	40	27	35	72	48	49	114	76	64	176	109	84	243	148	100	320	194	118	408	248	138	507	303		
	2	23	44	32	36	80	57	51	128	90	66	195	129	86	269	175	103	356	230	121	454	294	141	564	358		
	3	24	47	36	37	87	64	53	139	101	67	210	145	88	290	198	105	384	258	123	492	330	143	612	402		
8	1	22	43	28	34	78	50	49	123	78	65	189	113	89	257	154	106	341	200	125	436	257	146	542	314		
	2	23	47	33	36	86	59	51	136	93	67	206	134	91	282	182	109	374	238	128	479	305	149	596	372		
	3	24	50	37	37	92	67	52	146	104	69	220	150	94	303	205	111	402	268	131	515	342	152	642	417		
10	1	21	50	30	33	89	53	47	142	83	64	220	120	88	298	163	110	389	214	134	493	273	162	609	333		
	2	22	53	35	35	96	63	49	153	99	66	235	142	91	320	193	112	419	263	137	532	323	165	658	394		
	3	24	55	40	36	102	71	51	163	111	68	248	160	93	339	218	115	445	286	140	565	365	167	700	444		
15	1	21	54	31	33	99	56	46	157	87	62	246	125	86	334	171	107	436	224	131	552	285	158	681	347		
	2	22	57	37	34	105	66	48	167	104	64	259	149	89	354	202	110	463	265	134	587	339	161	725	414		
	3	23	60	42	35	110	74	50	176	116	66	271	168	91	371	228	113	486	300	137	618	383	164	764	466		
20	1	20	62	33	31	113	59	45	181	93	60	288	134	83	391	182	103	512	238	125	649	305	151	802	372		
	2	21	64	39	33	118	70	47	190	110	62	299	158	85	408	215	105	535	282	129	679	360	155	840	439		
	3	22	66	44	34	123	79	48	198	124	64	309	178	88	423	242	108	555	317	132	706	405	158	874	494		
30	1	19	71	36	30	133	64	43	216	101	57	349	145	78	477	197	97	627	257	120	797	330	144	984	403		
	2	21	73	43	32	137	76	45	223	119	59	358	172	81	490	234	100	645	306	123	820	392	148	1014	478		
	3	22	75	48	33	141	86	46	229	134	61	366	194	83	502	263	103	661	343	126	842	441	151	1043	538		
50	1	18	82	37	28	158	66	40	262	104	53	442	150	73	611	204	91	810	266	112	1038	341	135	1285	417		
	2	19	83	44	30	161	79	42	267	123	55	447	178	75	619	242	94	822	316	115	1054	405	139	1306	494		
	3	20	84	50	31	163	89	44	272	138	57	452	200	78	627	272	97	834	355	118	1069	455	142	1327	555		

Common Vent Capacity

Vent Height H (ft)		Combined appliance input rating in thousands of BTU per hour																				
		Type B Double-Wall Common Vent Diameter – D																				
		4"			5"			6"			7"			8"			9"			10"		
		FAN	FAN	NAT	FAN	FAN	NAT	FAN	FAN	NAT	FAN	FAN	NAT	FAN	FAN	NAT	FAN	FAN	NAT	FAN	FAN	NAT
		+FAN	+NAT	+NAT	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT
6		92	81	65	140	116	103	204	161	147	309	248	200	404	314	260	547	434	335	672	520	410
8		101	90	73	155	129	114	224	178	163	339	275	223	444	348	290	602	440	378	740	577	465
10		110	97	79	169	141	124	243	194	178	367	299	242	477	377	315	649	522	405	800	627	495
15		125	112	91	195	164	144	283	228	206	427	352	280	556	444	365	753	612	465	924	733	565
20		136	123	102	215	183	160	314	255	229	475	394	310	621	499	405	842	688	523	1035	826	640
30		152	138	118	244	210	185	361	297	266	547	459	360	720	585	470	979	808	605	1209	975	740
50		167	153	134	279	244	214	421	353	310	641	547	423	854	706	550	1164	977	705	1451	1188	860
100		175	163	NA	311	277	NA	489	421	NA	751	658	479	1025	873	625	1408	1215	800	1784	1502	975

TABLE 27 ... continued

Vent Connector Capacity
Type B Double-Wall Vent and Connector Diameter – D

Vent Height H (ft)	Connector Rise R (ft)	12"		14"			16"			18"			20"			22"			24"			
		FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max
6	1	174	764	496	223	1046	653	281	1371	853	346	1772	1080	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2	180	897	616	230	1231	827	287	1617	1081	352	2069	1370	NA	NA	NA	NA	NA	NA	NA	NA	NA
	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
8	1	186	822	516	238	1126	696	298	1478	910	365	1920	1150	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2	192	952	644	244	1307	884	305	1719	1150	372	2211	1460	471	2737	1800	560	3319	2108	662	3957	2590
	3	198	1050	772	252	1445	1072	313	1902	1390	380	2434	1770	478	3018	2180	568	3665	2640	669	4373	3130
10	1	196	870	536	249	1195	730	311	1570	955	379	2049	1205	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2	201	997	664	256	1371	924	318	1804	1205	387	2332	1535	486	2887	1890	581	3502	2280	686	4175	2710
	3	207	1095	792	263	1509	1118	325	1989	1455	395	2556	1865	494	3169	2290	589	3849	2760	694	4593	3270
15	1	214	967	568	272	1334	790	336	1760	1030	408	2317	1305	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2	221	1085	712	279	1499	1006	344	1978	1320	416	2579	1665	523	3197	2060	624	3881	2490	734	4631	2960
	3	228	1181	856	286	1632	1222	351	2157	1610	424	2796	2025	533	3470	2510	634	4216	3030	743	5035	3600
20	1	223	1051	596	291	1443	840	357	1911	1095	430	2533	1385	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2	230	1162	748	298	1597	1064	365	2116	1395	438	2778	1765	554	3447	2180	661	4190	2630	1772	5005	3130
	3	237	1253	900	307	1726	1288	373	2287	1695	450	2984	2145	567	3708	2650	671	4511	3190	785	5392	3790
30	1	216	1217	632	286	1664	910	367	2183	1190	461	2891	1540	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2	223	1316	792	294	1802	1160	376	2366	1510	474	3110	1920	619	3840	2365	728	4861	2860	847	5606	3410
	3	231	1400	592	303	1920	1410	384	2524	1830	485	3299	2340	632	4080	2875	741	4976	3480	860	5961	4150
50	1	206	1479	689	273	2023	1007	350	2659	1315	435	3548	1665	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2	213	1561	860	281	2139	1291	359	2814	1685	447	3730	2135	581	4601	2633	709	5569	3185	851	6633	3790
	3	221	1631	1031	290	2242	1575	369	2951	2055	461	3893	2605	594	4808	3208	724	5826	3885	867	6943	4620
100	1	192	1923	712	254	2644	1050	326	3490	1370	402	4707	1740	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2	200	1984	888	263	2731	1346	336	3606	1760	414	4842	2220	523	5982	2750	639	7254	3330	769	8650	3950
	3	208	2035	1064	272	2811	1642	346	3714	2150	426	4968	2700	539	6143	3350	654	7453	4070	786	8892	4810

Common Vent Capacity

Combined appliance input rating in thousands of BTU per hour

Type B Double-Wall Common Vent Diameter – D

Vent Height H (ft)	12"			14"			16"			18"			20"			22"			24"		
	FAN	FAN	NAT	FAN	FAN	NAT	FAN	FAN	NAT	FAN	FAN	NAT	FAN	FAN	NAT	FAN	FAN	NAT	FAN	FAN	NAT
	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT
6	900	696	588	1284	990	815	1735	1336	1065	2253	1732	1345	2838	2180	1660	3488	2677	1970	4206	3226	2390
8	994	773	652	1423	1103	912	1927	1491	1190	2507	1936	1510	3162	2439	1860	3890	2998	2200	4695	3616	2680
10	1076	841	712	1342	1200	995	2093	1625	1300	2727	2113	1645	3444	2665	2030	4241	3278	2400	5123	3957	2920
15	1247	986	825	1794	1410	1158	2440	1910	1510	3184	2484	1910	4026	3133	2360	4971	3862	2970	6016	4670	3400
20	1405	1116	916	2006	1588	1290	2722	2147	1690	3561	2798	2140	4548	3552	2640	5573	4352	3120	6749	5261	3800
30	1658	1327	1025	2373	1892	1525	3220	2558	1990	4197	3326	2520	5303	4193	3110	6539	5157	3680	7940	6247	4480
50	2024	1640	1280	2911	2347	1863	3964	3183	2430	5184	4149	3075	6567	5240	3800	8116	6458	4500	9837	7813	5475
100	2569	2131	1670	3732	3076	2450	5125	4202	3200	6749	5509	4050	8597	6986	5000	10681	8648	5920	13004	10499	7200

TABLE 28

Capacity of Type B Double-Wall Vent with Single-Wall Connectors
(serving two or more Category 1 Appliances)

Vent Height H (ft)		Connector Rise R (ft)		Single-Wall Metal Vent Connector Diameter – D																							
				3"			4"			5"			6"			7"			8"			9"			10"		
				FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max
6	1	NA	NA	26	NA	NA	46	NA	NA	71	NA	NA	102	207	223	140	262	293	183	325	373	234	447	463	286		
	2	NA	NA	31	NA	NA	55	NA	NA	85	168	182	123	215	251	167	271	331	219	334	422	281	458	524	344		
	3	NA	NA	34	NA	NA	62	121	131	95	175	198	138	222	273	188	279	361	247	344	462	316	468	574	385		
8	1	NA	NA	27	NA	NA	48	NA	NA	75	NA	NA	106	226	240	145	285	316	191	352	403	244	481	502	299		
	2	NA	NA	32	NA	NA	57	125	126	89	184	193	127	234	266	173	293	353	228	360	450	292	492	560	355		
	3	NA	NA	35	NA	NA	64	130	138	100	191	208	144	241	287	197	302	381	256	370	489	328	501	609	400		
10	1	NA	NA	28	NA	NA	50	119	121	77	182	186	110	240	253	150	302	335	196	372	429	252	506	534	308		
	2	NA	NA	33	84	85	59	124	134	91	189	203	132	248	278	183	311	369	235	381	473	302	517	589	368		
	3	NA	NA	36	89	91	67	129	144	102	197	217	148	257	299	203	320	398	265	391	511	339	528	637	413		
15	1	NA	NA	29	79	87	52	116	138	81	177	214	116	238	291	158	312	380	208	397	482	266	556	596	324		
	2	NA	NA	34	83	94	62	121	150	97	185	230	138	246	314	189	321	411	248	407	522	317	568	646	387		
	3	NA	NA	39	87	100	70	127	160	109	193	243	157	255	333	215	331	438	281	418	557	360	579	690	437		
20	1	49	56	30	78	97	54	115	152	84	175	238	120	233	325	165	306	425	217	390	538	276	546	664	336		
	2	52	59	36	82	103	64	120	163	101	182	252	144	243	346	197	317	453	259	400	574	331	558	709	403		
	3	55	62	40	87	107	72	125	172	113	190	264	164	252	363	223	326	476	294	412	607	375	570	750	457		
30	1	47	60	31	77	110	57	112	175	89	169	278	129	226	380	175	296	497	230	378	630	294	528	779	358		
	2	51	62	37	81	115	67	117	185	106	177	290	152	236	397	208	307	521	274	389	662	349	541	819	425		
	3	54	64	42	85	119	76	122	193	120	185	300	172	244	412	235	316	542	309	400	690	394	555	855	482		
50	1	46	69	34	75	128	60	109	207	96	162	336	137	217	460	188	284	604	245	364	768	314	507	951	384		
	2	49	71	40	79	132	72	114	215	113	170	345	164	226	473	223	294	623	293	376	793	375	520	983	458		
	3	52	72	45	83	136	82	119	221	123	178	353	186	235	486	252	304	640	331	387	816	423	535	1013	518		
100	1	45	79	34	71	150	61	104	249	98	153	424	140	205	585	192	269	774	249	345	993	321	476	1236	393		
	2	48	80	41	75	153	73	110	255	115	160	428	167	212	593	228	279	788	299	358	1011	383	490	1259	469		
	3	51	81	46	79	157	85	114	260	129	168	433	190	222	603	256	289	801	339	368	1027	431	506	1280	527		

Common Vent Capacity

Combined appliance input rating in thousands of BTU per hour
Type B Double-Wall Common Vent Diameter – D

Vent Height H (ft)	4"			5"			6"			7"			8"			9"			10"		
	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT
6	NA	78	64	NA	113	99	200	158	144	304	244	196	398	310	257	541	429	332	665	515	407
8	NA	87	71	NA	126	111	218	173	159	331	269	218	436	342	285	592	473	373	730	569	460
10	NA	94	76	163	137	120	237	189	174	357	292	236	467	369	309	638	512	398	787	617	487
15	121	108	88	189	159	140	275	221	200	416	343	274	544	434	357	738	599	456	905	718	553
20	131	118	98	208	177	156	305	247	223	463	383	302	606	487	395	824	673	512	1013	808	626
30	145	132	113	236	202	180	350	286	257	533	446	349	703	570	459	958	790	593	1183	952	723
50	159	145	128	268	233	208	406	337	296	622	529	410	833	686	535	1139	954	689	1418	1157	838
100	166	153	NA	297	263	NA	469	398	NA	726	633	464	999	846	606	1378	1185	780	1741	1459	948

TABLE 29

Capacity of Masonry Chimney with Type B Double-Wall Connectors
(serving two or more Category 1 Appliances)

Vent Height H (ft)		Connector Rise R (ft)		Type B Double-Wall Vent Connector Diameter – D																							
				3"			4"			5"			6"			7"			8"			9"			10"		
				FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max	FAN Min	FAN Max	NAT Max
6	1	24	33	21	39	62	40	52	106	67	65	194	101	87	274	141	104	370	201	124	479	253	145	599	319		
	2	26	43	28	41	79	52	53	133	85	67	230	124	89	324	173	107	436	232	127	562	300	148	694	378		
	3	27	49	34	42	92	61	55	155	97	69	262	143	91	369	203	109	491	270	129	633	349	151	795	439		
8	1	24	39	22	39	72	41	55	117	69	71	213	105	94	304	148	113	414	210	134	539	267	156	682	335		
	2	26	47	29	40	87	53	57	140	86	73	246	127	97	350	179	116	473	240	137	615	311	160	776	394		
	3	27	52	34	42	97	62	59	159	98	75	269	145	99	383	206	119	517	276	139	672	358	163	848	424		
10	1	24	42	22	38	80	42	55	130	71	74	232	108	101	324	153	120	444	216	142	582	277	165	739	348		
	2	26	50	29	40	93	54	57	153	87	76	261	129	103	366	184	123	498	247	145	652	321	168	825	407		
	3	27	55	35	41	105	63	58	170	100	78	284	148	106	397	209	126	540	281	147	705	366	171	893	463		
15	1	24	48	23	38	93	44	54	154	74	72	277	114	100	384	164	125	511	229	153	658	297	184	824	375		
	2	25	55	31	39	105	55	56	174	89	74	299	134	103	419	192	128	558	260	156	718	339	187	900	432		
	3	26	59	35	41	115	64	57	189	102	76	319	153	105	448	215	131	597	292	159	760	382	190	960	486		
20	1	24	52	24	37	102	46	53	172	77	71	313	119	98	437	173	123	584	239	130	752	312	180	943	397		
	2	25	58	31	39	114	56	55	190	91	73	335	138	101	467	199	126	625	270	153	805	354	184	1011	452		
	3	26	63	35	40	123	65	57	204	104	75	353	157	104	493	222	129	661	301	156	851	396	187	1067	505		
30	1	24	54	25	37	111	48	52	192	82	69	357	127	96	504	187	119	680	255	145	883	337	175	1115	432		
	2	25	60	32	38	122	58	54	208	95	72	376	145	99	531	209	122	715	287	149	928	378	179	1171	484		
	3	26	64	36	40	131	66	56	221	107	74	392	163	101	554	233	125	746	317	152	968	418	182	1220	535		
50	1	23	51	25	36	116	51	51	209	89	67	405	143	92	582	213	113	798	294	140	1049	392	168	1334	506		
	2	24	59	32	37	127	61	53	225	102	70	421	161	95	604	235	118	827	326	143	1085	433	172	1379	558		
	3	26	64	36	39	135	69	55	237	115	72	435	180	98	624	260	121	854	357	147	1118	474	176	1421	611		
100	1	23	46	24	35	108	50	49	208	92	65	428	155	88	640	237	109	907	334	134	1222	454	161	1589	596		
	2	24	53	31	37	120	60	51	224	105	67	444	174	92	660	260	113	933	368	138	1253	497	165	1626	651		
	3	25	59	35	38	130	68	53	237	118	69	458	193	94	679	285	116	956	399	141	1282	540	169	1661	705		

Common Vent Capacity

Combined appliance input rating in thousands of BTU per hour
Minimum internal area of masonry chimney flue (in²)

Vent Height H (ft)	12			19			28			38			50			63			78			113			
	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	FAN +FAN	FAN +NAT	NAT +NAT	
6	NA	74	25	NA	119	46	NA	178	71	NA	257	103	NA	351	143	NA	458	188	NA	582	246	1041	853	NA	
8	NA	80	28	NA	130	53	NA	193	82	NA	279	119	NA	384	163	NA	501	218	724	636	278	1144	937	408	
10	NA	84	31	NA	138	56	NA	207	90	NA	299	131	NA	409	177	606	538	236	776	686	302	1226	1010	454	
15	NA	NA	36	NA	152	67	NA	233	106	NA	334	152	523	467	212	682	611	283	874	781	365	1374	1156	546	
20	NA	NA	41	NA	NA	75	NA	250	122	NA	368	172	565	508	243	742	668	325	955	858	419	1513	1286	648	
30	NA	NA	NA	NA	NA	NA	NA	270	137	NA	404	198	615	564	278	816	747	381	1062	969	496	1702	1473	749	
50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	620	328	879	831	461	1165	1089	606	1905	1692	922	
100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	348	NA	NA	499	NA	NA	669	2053	1921	1058

TABLE 30

Capacity of Masonry Chimney with Single-Wall Connectors

(serving two or more Category 1 Appliances)

Single-Wall Metal Vent Connector Diameter – D

Vent Height H (ft)	Connector Rise R (ft)	3"		4"			5"			6"			7"			8"			9"			10"			
		FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT
		Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max	Min	Max	Max
6	1	NA	NA	21	NA	NA	39	NA	NA	66	179	191	100	231	271	140	292	366	200	362	474	252	499	594	316
	2	NA	NA	28	NA	NA	52	NA	NA	84	186	227	123	239	321	172	301	432	231	373	557	299	509	696	376
	3	NA	NA	34	NA	NA	61	134	153	97	193	258	142	247	365	202	309	491	269	381	634	348	519	793	437
8	1	NA	NA	21	NA	NA	40	NA	NA	68	195	208	103	250	298	146	313	407	207	387	530	263	529	672	331
	2	NA	NA	28	NA	NA	52	137	139	85	202	240	125	258	343	177	323	465	238	397	607	309	540	766	391
	3	NA	NA	34	NA	NA	62	143	156	98	210	264	145	266	376	205	332	509	274	407	663	356	551	838	450
10	1	NA	NA	22	NA	NA	41	130	151	70	202	225	106	267	316	151	333	434	213	410	571	273	558	727	343
	2	NA	NA	29	NA	NA	53	136	150	86	210	255	128	276	358	181	343	489	244	420	640	317	569	813	403
	3	NA	NA	34	97	102	62	143	166	99	217	277	147	284	389	207	352	530	279	430	694	363	580	880	459
15	1	NA	NA	23	NA	NA	43	129	151	73	199	271	112	268	376	161	349	502	225	445	646	291	623	808	366
	2	NA	NA	30	92	103	54	135	170	88	207	295	132	277	411	189	359	548	256	456	706	334	634	884	424
	3	NA	NA	34	96	112	63	141	185	101	215	315	151	286	439	213	368	586	289	466	755	378	646	945	479
20	1	NA	NA	23	87	99	45	128	167	76	197	303	117	265	425	169	345	569	235	439	734	306	614	921	387
	2	NA	NA	30	91	111	55	134	185	90	205	325	136	274	455	195	355	610	266	450	717	348	627	986	443
	3	NA	NA	35	96	119	64	140	199	103	213	343	154	282	481	219	365	644	298	461	831	391	639	1042	496
30	1	NA	NA	24	86	108	47	126	187	80	193	347	124	259	492	183	338	665	250	430	864	330	600	1089	421
	2	NA	NA	31	91	119	57	132	203	93	201	366	142	269	518	205	348	699	282	442	908	372	613	1145	473
	3	NA	NA	35	95	127	65	138	216	105	209	381	160	277	540	229	358	729	312	452	946	412	626	1193	524
50	1	NA	NA	24	85	113	50	124	204	87	188	392	139	252	567	208	328	778	287	417	1022	383	582	1302	492
	2	NA	NA	31	89	123	60	130	218	100	196	408	158	262	588	230	339	806	320	429	1058	425	596	1346	545
	3	NA	NA	35	94	131	68	136	231	112	205	422	176	271	607	255	349	831	351	440	1090	466	610	1386	597
100	1	NA	NA	23	84	104	49	122	200	89	182	410	151	243	617	232	315	875	328	402	1181	444	560	1537	580
	2	NA	NA	30	88	115	59	127	215	102	190	425	169	253	636	254	326	899	361	415	1210	488	575	1570	634
	3	NA	NA	34	93	124	67	133	228	115	199	438	188	262	654	279	337	921	392	427	1238	529	589	1604	687

Common Vent Capacity

Combined appliance input rating in thousands of BTU per hour

Minimum internal area of masonry chimney flue (in²)

Vent Height H (ft)	12		19			28			38			50			63			78			113			
	FAN	FAN	NAT	FAN	FAN	NAT	FAN	FAN	NAT	FAN	FAN	NAT	FAN	FAN	NAT	FAN	FAN	NAT	FAN	FAN	NAT	FAN	FAN	NAT
	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT	+FAN	+NAT	+NAT
6	NA	NA	25	NA	118	45	NA	176	71	NA	255	102	NA	348	142	NA	455	187	NA	579	245	NA	846	NA
8	NA	NA	28	NA	128	52	NA	190	81	NA	276	118	NA	380	162	NA	497	217	NA	633	277	1136	928	405
10	NA	NA	31	NA	136	56	NA	205	89	NA	295	129	NA	405	175	NA	532	234	771	680	300	1216	1000	450
15	NA	NA	36	NA	NA	66	NA	230	105	NA	335	150	NA	400	210	677	602	280	866	772	360	1359	1139	540
20	NA	NA	NA	NA	NA	74	NA	247	120	NA	362	170	NA	503	240	765	661	321	947	849	415	1495	126	640
30	NA	NA	NA	NA	NA	NA	NA	NA	135	NA	398	195	NA	558	275	808	739	377	1052	957	490	1682	1447	740
50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	612	325	NA	821	456	1152	1076	600	1879	1672	910
100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	494	NA	NA	663	2006	1885	1046

INDIRECT WATER HEATER PERFORMANCE

TABLE 31

Model	Capacities		Performance					
	Actual Tank Volume (gal)	Coil Volume (gal)	First Hour Rating (gal)*	Continuous Draw Rating (GPH)*	First Draw Rating (gal)*	Minimum Coil Output (BTU/Hr)**	Standby Loss Rating (°F/hr)	Heat Source Friction Loss (ft. w.c.)
30SK	30	1.38	110	85	25	55,000	1.3	2.0
40SK	38	2.30	153	120	33	77,000	1.1	3.0
50SK	45	2.30	160	120	40	77,000	1.0	3.0
80SK	75	2.76	200	130	70	83,000	0.9	5.0
119SK	110	2.76	232	130	102	83,000	1.2	5.0

NOTES:

* Based on 77°F rise with 58°F potable water inlet temperature at 8 GPM heat source flow rate. Heat source temperature was 180°F.

** Minimum Coil output based on continuous boiler operation over 30 minutes.

All data obtained through testing in accordance with GAMA INDIRECT-FIRED WATER HEATER TESTING STANDARD IWH-TS-1_MARCH 2003

TABLE 32

Model	FIRST HOUR RATING (gal) @ Coil Output (Btu/hr)						
	180°F 6 GPM*	180°F 10 GPM*	180°F 12 GPM*	200°F 6 GPM*	200°F 8 GPM*	200°F 10 GPM*	200°F 12 GPM*
30SK	107 @ 53,000	114 @ 57,000	117 @ 59,000	129 @ 67,000	132 @ 69,000	136 @ 71,000	139 @ 73,000
40SK	141 @ 69,000	165 @ 84,000	177 @ 92,000	171 @ 88,000	183 @ 96,000	195 @ 104,000	207 @ 111,000
50SK	148 @ 69,000	172 @ 84,000	184 @ 92,000	178 @ 88,000	190 @ 96,000	202 @ 104,000	214 @ 111,000
80SK	188 @ 76,000	212 @ 91,000	224 @ 98,000	221 @ 97,000	233 @ 104,000	245 @ 112,000	257 @ 119,000
119SK	220 @ 76,000	244 @ 91,000	256 @ 98,000	253 @ 97,000	265 @ 104,000	277 @ 112,000	289 @ 119,000

NOTES:

First Hour Rating = First Draw + Continuous Draw

* Coil Input (temperature, flow rate). Ratings based on 77°F rise with 58°F inlet potable water.

All data obtained through testing in accordance with GAMA INDIRECT-FIRED WATER HEATER TESTING STANDARD IWH-TS-1_MARCH 2003

TABLE 33

DELIVERY AT 40°F RISE – POWER GAS, ATMOSPHERIC GAS, ENERGY SAVERS

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32PG/BCS	32	104,000	46	67	87	108	150	212	274	522	770	4.14	248	8
32PPG	32	104,000	46	67	88	109	150	212	275	524	773	4.15	249	8
33PG	33	104,000	46	67	87	108	148	210	271	516	761	4.08	245	8
40PG/BCS	40	126,000	57	82	108	133	183	259	335	637	940	5.04	303	8
50PG	50	140,000	65	91	118	144	198	277	357	677	996	5.32	319	9
51PG/BCS	50	152,000	69	99	129	159	218	308	397	755	1,114	5.97	358	8
71PG	68	173,000	82	114	145	177	241	336	432	813	1,195	6.36	382	11
72PG	67	199,000	90	128	167	205	282	396	511	971	1,431	7.66	460	9
73PG	67	242,000	98	144	190	236	329	468	607	1,162	1,718	9.26	556	7
120PG/BCS	113	155,000	118	148	178	208	268	358	448	809	1,169	6.01	361	19
190PG/BCS	113	190,000	121	157	193	229	301	408	516	946	1,377	7.18	431	16
241PG	109	277,000	136	189	242	295	401	560	719	1,355	1,991	10.60	636	10
361PG	91	385,000	147	223	298	374	525	752	978	1,886	2,793	15.12	907	6
541PG	83	623,000	180	298	416	533	769	1,121	1,474	2,886	4,298	23.53	1,412	4
150G-400	175	400,000	225	307	389	470	634	880	1,125	2,107	3,089	16.37	982	11
150G-600	166	600,000	259	381	504	627	872	1,241	1,609	3,082	4,555	24.55	1,473	7
150G-800	157	800,000	292	456	619	783	1,110	1,601	2,092	4,056	6,020	32.73	1,964	5
200G-450	245	450,000	293	385	477	569	753	1,029	1,305	2,410	3,516	18.42	1,105	13
200G-650	212	650,000	306	439	572	705	971	1,370	1,768	3,363	4,958	26.58	1,595	8
200G-850	204	850,000	341	514	688	862	1,210	1,731	2,253	4,339	6,425	34.77	2,086	6
200G-1150	191	1,150,000	391	627	862	1,097	1,568	2,273	2,979	5,802	8,625	47.05	2,823	4
250G-800	271	800,000	385	549	713	876	1,204	1,695	2,186	4,150	6,114	32.73	1,964	8
250G-1000	257	1,000,000	415	619	824	1,029	1,438	2,051	2,665	5,120	7,575	40.92	2,455	6
250G-1250	247	1,250,000	458	713	969	1,225	1,736	2,503	3,270	6,338	9,406	51.13	3,068	5
250G-1500	247	1,500,000	509	816	1,123	1,429	2,043	2,964	3,884	7,566	11,248	61.37	3,682	4
75G-8	67	135,000	81	108	135	162	216	297	378	702	1,026	5.40	324	12
80G	80	199,000	104	144	183	223	303	422	542	1,020	1,497	7.96	478	10
115G	115	199,000	132	172	211	251	331	450	570	1,048	1,525	7.96	478	14
75HN	75	80,000	76	92	108	125	157	205	254	448	642	3.23	194	23
75W-125SD	75	125,000	85	111	136	161	212	287	363	666	969	5.05	303	15
38W-155SD	38	155,000	62	93	124	156	218	312	406	782	1,158	6.26	376	6
75W-160SD	75	160,000	92	125	157	189	254	351	448	836	1,224	6.46	388	12
80W-180SD	80	180,000	100	137	173	209	282	391	500	937	1,373	7.27	436	11
80W-199SD	80	199,999	104	145	185	226	306	428	549	1,034	1,519	8.08	485	10
100W-199SD	98	199,999	119	159	200	240	321	442	563	1,048	1,533	8.08	485	12
80W-250SD	80	250,000	115	165	216	266	367	519	670	1,276	1,882	10.10	606	8
100W-250SD	98	250,000	129	179	230	280	381	533	684	1,291	1,897	10.10	606	10
100W-270SD	100	270,000	135	189	244	298	407	571	735	1,389	2,044	10.91	655	9
75W-300SD	75	300,000	121	181	242	302	424	605	787	1,515	2,242	12.12	727	6
100W-300SD	100	300,000	141	201	262	322	444	625	807	1,535	2,262	12.12	727	8
66W-370SD	65	370,000	127	201	276	351	500	725	949	1,846	2,743	14.95	897	4
66W-399SD	65	399,999	133	214	294	375	537	779	1,022	1,991	2,961	16.16	970	4
80W-425SD	80	425,000	150	236	322	407	579	837	1,094	2,125	3,155	17.17	1,030	5
80W-450SD	80	450,000	155	246	337	428	609	882	1,155	2,246	3,337	18.18	1,091	4
80W505SD	80	505,000	166	268	370	472	676	982	1,288	2,512	3,737	20.40	1,224	4
66W-625SD	65	625,000	178	305	431	557	810	1,188	1,567	3,082	4,597	25.25	1,515	3
80W-725SD	80	725,000	210	357	503	650	943	1,382	1,822	3,579	5,337	29.29	1,758	3

TABLE 34**DELIVERY AT 40°F RISE – OIL**

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32E/BCS	32	104,000	48	69	90	112	154	218	282	538	794	4.27	256	8
32PP	32	104,000	48	70	92	114	158	224	290	555	820	4.41	265	7
33E	33	104,000	47	68	89	110	151	214	276	526	775	4.16	250	8
40E/BCS	40	126,000	58	83	109	135	186	262	339	645	951	5.11	306	8
50E	50	140,000	69	97	126	154	211	296	381	721	1,062	5.67	340	9
51E/BCS	50	152,000	70	100	130	161	221	312	402	765	1,128	6.04	363	8
51PP	50	152,000	73	105	138	171	236	334	432	824	1,216	6.53	392	8
71E	68	173,000	85	118	151	184	251	350	449	846	1,244	6.62	397	10
72E	67	199,000	93	133	173	213	292	412	531	1,009	1,487	7.96	478	8
73E	67	242,000	102	150	199	247	344	489	635	1,216	1,797	9.68	581	7
120E/BCS	113	155,000	120	151	181	212	273	365	457	824	1,192	6.12	367	18
190E/BCS	113	190,000	126	163	201	238	313	424	536	984	1,432	7.46	448	15
241E	109	277,000	138	192	246	299	407	568	729	1,373	2,017	10.74	644	10
361E	91	415,000	156	239	322	405	571	820	1,069	2,066	3,062	16.61	996	5
541E	83	623,000	186	308	429	551	794	1,159	1,523	2,982	4,440	24.31	1,458	3
150E-400	175	400,000	230	314	398	482	650	901	1,153	2,159	3,165	16.77	1,006	10
150E-600	166	600,000	265	391	516	642	894	1,271	1,648	3,157	4,666	25.15	1,509	7
150E-800	157	800,000	299	467	635	802	1,138	1,641	2,144	4,156	6,168	33.53	2,012	5
200E-450	245	450,000	300	394	488	583	771	1,054	1,337	2,469	3,601	18.87	1,132	13
200E-650	212	650,000	314	450	586	723	995	1,404	1,813	3,448	5,083	27.25	1,635	8
200E-850	204	850,000	349	527	706	884	1,240	1,774	2,309	4,447	6,585	35.63	2,138	6
200E-1150	191	1,150,000	401	642	883	1,124	1,606	2,329	3,052	5,944	8,836	48.20	2,892	4
250E-800	271	800,000	396	564	733	901	1,237	1,742	2,247	4,266	6,285	33.65	2,019	8
250E-1000	257	1,000,000	430	641	853	1,065	1,489	2,124	2,760	5,302	7,844	42.37	2,542	6
250E-1250	247	1,250,000	467	728	990	1,251	1,773	2,556	3,339	6,472	9,605	52.22	3,133	5
250E-1500	247	1,500,000	528	846	1,164	1,482	2,118	3,073	4,027	7,845	11,663	63.63	3,818	4

TABLE 35

DELIVERY AT 50°F RISE – POWER GAS, ATMOSPHERIC GAS, ENERGY SAVERS

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32PG/BCS	32	104,000	42	59	75	92	125	174	224	422	621	3.31	199	10
32PPG	32	104,000	42	59	75	92	125	175	225	424	623	3.32	199	10
33PG	33	104,000	42	59	75	91	124	173	222	418	614	3.27	196	10
40PG/BCS	40	126,000	52	72	93	113	153	214	274	516	758	4.03	242	10
50PG	50	140,000	59	81	102	123	166	230	294	549	804	4.26	256	12
51PG/BCS	50	152,000	63	87	111	135	183	254	326	612	899	4.77	287	11
71PG	68	173,000	75	101	126	152	203	279	355	661	966	5.09	305	13
72PG	67	199,000	82	113	144	174	236	328	420	787	1,155	6.13	368	11
73PG	67	242,000	88	125	162	199	274	385	496	940	1,385	7.41	445	9
120PG/BCS	113	155,000	112	136	160	184	232	304	376	664	953	4.81	288	24
190PG/BCS	113	190,000	114	143	171	200	258	344	430	774	1,119	5.74	344	20
241PG	109	277,000	126	168	211	253	338	465	592	1,101	1,610	8.48	509	13
361PG	91	385,000	132	192	253	313	434	616	797	1,523	2,248	12.09	726	8
541PG	83	623,000	157	251	345	439	627	910	1,192	2,321	3,451	18.82	1,129	4
150G-400	175	400,000	208	274	339	405	536	732	928	1,713	2,498	13.08	785	13
150G-600	166	600,000	234	332	430	528	725	1,019	1,314	2,492	3,670	19.63	1,178	9
150G-800	157	800,000	259	390	521	652	914	1,307	1,699	3,270	4,841	26.18	1,571	6
200G-450	245	450,000	274	348	421	495	642	863	1,085	1,968	2,852	14.73	884	17
200G-650	212	650,000	280	386	492	599	811	1,130	1,449	2,725	4,001	21.27	1,276	10
200G-850	204	850,000	306	445	584	723	1,001	1,419	1,836	3,505	5,174	27.82	1,669	7
200G-1150	191	1,150,000	344	533	721	909	1,285	1,850	2,414	4,672	6,930	37.63	2,258	5
250G-800	271	800,000	353	483	614	745	1,007	1,400	1,793	3,364	4,935	26.18	1,571	10
250G-1000	257	1,000,000	374	538	701	865	1,192	1,683	2,174	4,138	6,102	32.73	1,964	8
250G-1250	247	1,250,000	407	611	816	1,020	1,430	2,043	2,657	5,112	7,567	40.92	2,455	6
250G-1500	247	1,500,000	447	693	938	1,184	1,674	2,411	3,147	6,092	9,037	49.08	2,945	5
75G-8	67	135,000	75	97	118	140	183	248	313	572	832	4.32	259	16
80G	80	199,000	96	128	160	191	255	351	446	828	1,211	6.37	382	13
115G	115	199,000	124	156	188	219	283	379	474	856	1,239	6.37	382	18
75HN	75	80,000	73	86	99	112	138	176	215	370	525	2.59	155	29
75W-125SD	75	125,000	80	100	121	141	181	242	302	545	787	4.04	242	19
38W-155SD	38	155,000	55	81	106	131	181	256	331	632	932	5.01	301	8
75W-160SD	75	160,000	86	112	138	163	215	293	370	681	991	5.17	310	15
80W-180SD	80	180,000	93	122	151	180	239	326	413	762	1,111	5.82	349	14
80W-199SD	80	199,999	96	129	161	193	258	355	452	840	1,228	6.46	388	12
100W-199SD	98	199,999	111	143	175	208	272	369	466	854	1,242	6.46	388	15
80W-250SD	80	250,000	104	145	185	226	306	428	549	1,034	1,519	8.08	485	10
100W-250SD	98	250,000	119	159	200	240	321	442	563	1,048	1,533	8.08	485	12
100W-270SD	100	270,000	124	167	211	255	342	473	604	1,127	1,651	8.73	524	11
75W-300SD	75	300,000	108	157	205	254	351	496	642	1,224	1,805	9.70	582	8
100W-300SD	100	300,000	128	177	225	274	371	516	662	1,244	1,825	9.70	582	10
66W-370SD	65	370,000	112	172	231	291	411	590	770	1,487	2,205	11.96	718	5
66W-399SD	65	399,999	117	181	246	311	440	634	828	1,604	2,379	12.93	776	5
80W-425SD	80	425,000	133	201	270	339	476	682	888	1,712	2,537	13.74	824	6
80W-450SD	80	450,000	137	209	282	355	500	719	937	1,809	2,682	14.55	873	6
80W-505SD	80	505,000	146	227	309	390	554	799	1,043	2,023	3,002	16.32	979	5
66W-625SD	65	652,000	153	254	355	456	658	961	1,264	2,476	3,688	20.20	1,212	3
80W-725SD	80	725,000	181	298	416	533	767	1,119	1,470	2,876	4,282	23.43	1,406	3

TABLE 36**DELIVERY AT 50°F RISE – OIL**

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32E/BCS	32	104,000	43	60	77	94	129	180	231	436	641	3.41	205	9
32PP	32	104,000	43	61	79	96	131	184	237	449	661	3.53	212	9
33E	33	104,000	43	60	76	93	126	176	226	426	626	3.33	200	10
40E/BCS	40	126,000	53	73	94	114	155	216	277	522	768	4.08	245	10
50E	50	140,000	63	86	109	131	177	245	313	585	857	4.54	272	11
51E/BCS	50	152,000	64	88	112	136	185	257	330	620	910	4.84	290	10
51PP	50	152,000	66	92	118	145	197	275	354	667	981	5.23	314	10
71E	68	173,000	78	105	131	158	211	290	370	688	1,005	5.30	318	13
72E	67	199,000	85	117	149	181	245	340	436	818	1,200	6.37	382	11
73E	67	242,000	92	131	170	209	286	402	518	983	1,448	7.75	465	9
120E/BCS	113	155,000	114	138	163	187	236	310	383	677	971	4.90	294	23
190E/BCS	113	190,000	119	148	178	208	268	357	447	805	1,163	5.97	358	19
241E	109	277,000	127	170	213	256	342	471	600	1,115	1,631	8.59	515	13
361E	91	415,000	139	206	272	339	471	671	870	1,667	2,464	13.29	797	7
541E	83	623,000	162	259	356	454	648	940	1,231	2,398	3,565	19.45	1,167	4
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150E-400	175	400,000	214	281	348	415	549	750	952	1,757	2,562	13.42	805	13
150E-600	166	600,000	240	340	441	541	743	1,044	1,346	2,553	3,760	20.12	1,207	8
150E-800	157	800,000	266	400	534	668	937	1,339	1,742	3,352	4,962	26.83	1,610	6
200E-450	245	450,000	281	356	431	507	658	884	1,110	2,015	2,920	15.08	905	16
200E-650	212	650,000	287	396	505	614	832	1,159	1,486	2,794	4,102	21.80	1,308	10
200E-850	204	850,000	313	456	598	741	1,026	1,453	1,881	3,591	5,301	28.50	1,710	7
200E-1150	191	1,150,000	353	546	739	931	1,317	1,896	2,474	4,788	7,102	38.57	2,314	5
250E-800	271	800,000	363	497	632	767	1,036	1,440	1,844	3,460	5,076	26.93	1,616	10
250E-1000	257	1,000,000	387	557	726	896	1,235	1,743	2,252	4,286	6,320	33.90	2,034	8
250E-1250	247	1,250,000	415	624	833	1,042	1,459	2,086	2,712	5,218	7,724	41.77	2,506	6
250E-1500	247	1,500,000	464	719	973	1,228	1,737	2,501	3,265	6,320	9,375	50.92	3,055	5

TABLE 37

DELIVERY AT 60°F RISE – POWER GAS, ATMOSPHERIC GAS, ENERGY SAVERS

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32PG/BCS	32	104,000	39	53	67	81	108	150	191	356	522	2.76	165	12
32PPG	32	104,000	39	53	67	81	109	150	192	358	524	2.77	166	12
33PG	33	104,000	40	53	67	80	108	148	189	353	516	2.72	163	12
40PG/BCS	40	126,000	49	66	82	99	133	183	234	435	637	3.36	202	12
50PG	50	140,000	56	73	91	109	144	198	251	464	677	3.55	213	14
51PG/BCS	50	152,000	59	79	99	119	159	218	278	517	755	3.98	239	13
71PG	68	173,000	71	92	114	135	177	241	304	559	813	4.24	254	16
72PG	67	199,000	77	103	128	154	205	282	358	665	971	5.11	307	13
73PG	67	242,000	82	113	144	175	236	329	422	792	1,162	6.17	370	11
120PG/BCS	113	155,000	108	128	148	168	208	268	328	568	809	4.01	240	28
190PG/BCS	113	190,000	109	133	157	181	229	301	372	659	946	4.78	287	24
241PG	109	277,000	119	154	189	225	295	401	507	931	1,355	7.07	424	15
361PG	91	385,000	122	172	223	273	374	525	676	1,281	1,886	10.08	605	9
541PG	83	623,000	141	220	298	376	533	768	1,004	1,945	2,886	15.69	941	5
150G-400	175	400,000	198	252	307	362	471	634	798	1,453	2,108	10.92	655	16
150G-600	166	600,000	218	299	381	463	627	872	1,118	2,100	3,082	16.37	982	10
150G-800	157	800,000	237	347	456	565	783	1,110	1,437	2,746	4,055	21.82	1,309	7
200G-450	245	450,000	262	323	384	446	568	752	936	1,672	2,408	12.27	736	20
200G-650	212	650,000	262	351	439	528	705	971	1,237	2,301	3,365	17.73	1,064	12
200G-850	204	850,000	283	399	515	631	862	1,210	1,558	2,949	4,340	23.18	1,391	9
200G-1150	191	1,150,000	313	470	627	784	1,097	1,568	2,038	3,920	5,802	31.37	1,882	6
250G-800	271	800,000	331	440	549	658	876	1,203	1,531	2,840	4,149	21.82	1,309	12
250G-1000	257	1,000,000	346	483	619	755	1,028	1,437	1,846	3,482	5,118	27.27	1,636	9
250G-1250	247	1,250,000	372	543	713	884	1,224	1,736	2,247	4,292	6,337	34.08	2,045	7
250G-1500	247	1,500,000	407	611	816	1,020	1,430	2,043	2,657	5,112	7,567	40.92	2,455	6
75G-8	67	135,000	72	90	108	126	162	216	270	486	702	3.60	216	19
80G	80	199,000	91	117	144	170	223	303	383	701	1,020	5.31	319	15
115G	115	199,000	119	145	172	198	251	331	411	729	1,048	5.31	319	22
75HN	75	80,000	71	82	92	103	125	157	189	319	448	2.15	129	35
75W-125SD	75	125,000	77	94	111	127	161	212	262	464	666	3.37	202	22
38W-155SD	38	155,000	51	72	93	114	156	218	281	531	782	4.18	251	9
75W-160SD	75	160,000	82	103	125	146	189	254	319	577	836	4.31	259	17
80W-180SD	80	180,000	88	112	137	161	209	282	355	646	937	4.85	291	17
80W-199SD	80	199,999	91	118	145	172	226	306	387	710	1,034	5.39	323	15
100W199SD	98	199,999	105	132	159	186	240	321	402	725	1,048	5.39	323	18
80W-250SD	80	250,000	98	131	165	199	266	367	468	872	1,276	6.73	404	12
100W-250SD	98	250,000	112	146	179	213	280	381	482	886	1,291	6.73	404	15
100W-270SD	100	270,000	116	153	189	225	298	407	516	953	1,389	7.27	436	14
75W-300SD	75	300,000	100	141	181	222	302	424	545	1,030	1,515	8.08	485	9
100W-300SD	100	300,000	120	161	201	242	322	444	565	1,050	1,535	8.08	485	12
66W-370SD	65	370,000	102	152	201	251	351	500	650	1,248	1,846	9.97	598	7
66W-399SD	65	399,999	106	160	214	267	375	537	698	1,345	1,991	10.77	646	6
80W-425SD	80	425,000	121	178	236	293	407	579	751	1,438	2,125	11.45	687	7
80W-450SD	80	450,000	125	185	246	306	428	609	791	1,519	2,246	12.12	727	7
80W-505SD	80	505,000	132	200	268	336	472	676	880	1,696	2,512	13.60	816	6
66W-625SD	65	625,000	136	220	305	389	557	810	1,062	2,072	3,082	16.84	1,010	4
80W-725SD	80	725,000	162	259	357	455	650	943	1,236	2,407	3,579	19.53	1,172	4

TABLE 38**DELIVERY AT 60°F RISE – OIL**

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32E/BCS	32	104,000	40	55	69	83	112	154	197	367	538	2.84	171	11
32PP	32	104,000	40	55	70	84	114	158	202	379	555	2.94	176	11
33E	33	104,000	40	54	68	82	110	151	193	359	526	2.77	166	12
40E/BCS	40	126,000	49	66	83	100	135	186	237	441	645	3.40	204	12
50E	50	140,000	59	78	97	116	154	211	267	494	721	3.78	227	13
51E/BCS	50	152,000	60	80	100	120	161	221	282	523	765	4.03	242	12
51PP	50	152,000	62	84	105	127	171	236	301	563	824	4.36	261	11
71E	68	173,000	74	96	118	140	184	251	317	582	846	4.41	265	15
72E	67	199,000	80	107	133	160	213	292	372	691	1,009	5.31	319	13
73E	67	242,000	86	118	150	183	247	344	441	828	1,216	6.46	387	10
120E/BCS	113	155,000	110	130	151	171	212	273	334	579	824	4.08	245	28
190E/BCS	113	190,000	114	138	163	188	238	313	387	686	984	4.97	298	23
241E	109	277,000	120	156	192	228	299	407	514	944	1,373	7.16	430	15
361E	91	415,000	128	184	239	294	405	571	737	1,401	2,066	11.07	664	8
541E	83	623,000	146	227	308	389	551	794	1,037	2,009	2,982	16.20	972	5
150E-400	175	400,000	203	259	314	370	482	650	818	1,489	2,160	11.18	671	16
150E-600	166	600,000	223	307	391	474	642	894	1,145	2,151	3,157	16.77	1,006	10
150E-800	157	800,000	243	355	467	579	802	1,137	1,473	2,814	4,155	22.35	1,341	7
200E-450	245	450,000	268	331	394	457	583	772	960	1,715	2,470	12.58	755	19
200E-650	212	650,000	269	359	450	541	723	995	1,268	2,358	3,448	18.17	1,090	12
200E-850	204	850,000	290	408	527	646	883	1,240	1,596	3,021	4,446	23.75	1,425	9
200E-1150	191	1,150,000	321	481	642	803	1,124	1,606	2,088	4,016	5,944	32.13	1,928	6
250E-800	271	800,000	340	452	564	677	901	1,237	1,574	2,920	4,266	22.43	1,346	12
250E-1000	257	1,000,000	359	500	641	783	1,065	1,489	1,913	3,608	5,303	28.25	1,695	9
250E-1250	247	1,250,000	380	554	728	902	1,250	1,772	2,294	4,382	6,470	34.80	2,088	7
250E-1500	247	1,500,000	422	634	846	1,058	1,482	2,118	2,754	5,299	7,844	42.42	2,545	6

TABLE 39

DELIVERY AT 70°F RISE – POWER GAS, ATMOSPHERIC GAS, ENERGY SAVERS

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32PG/BCS	32	104,000	37	49	61	73	96	132	167	309	451	2.36	142	14
32PPG	32	104,000	37	49	61	73	97	132	168	310	452	2.37	142	13
33PG	33	104,000	38	49	61	73	96	131	166	306	446	2.33	140	14
40PG/BCS	40	126,000	46	61	75	90	118	162	205	378	551	2.88	173	14
50PG	50	140,000	53	68	84	99	129	175	220	403	585	3.04	182	16
51PG/BCS	50	152,000	56	73	90	107	142	193	244	449	653	3.41	205	15
71PG	68	173,000	68	86	104	123	159	214	268	486	704	3.63	218	19
72PG	67	199,000	73	95	117	139	183	249	314	577	840	4.38	263	15
73PG	67	242,000	78	104	131	157	210	289	369	686	1,004	5.29	317	13
120PG/BCS	113	155,000	105	122	139	156	191	242	294	500	706	3.43	206	33
190PG/BCS	113	190,000	106	126	147	167	208	270	331	577	823	4.10	246	28
241PG	109	277,000	114	144	174	205	265	356	447	810	1,174	6.06	363	18
361PG	91	385,000	115	158	201	244	331	460	590	1,108	1,626	8.64	518	11
541PG	83	623,000	130	197	264	332	466	668	869	1,676	2,483	13.44	807	6
150G-400	175	400,000	190	237	283	330	424	564	704	1,265	1,826	9.35	561	19
150G-600	166	600,000	206	276	346	417	557	767	978	1,820	2,662	14.03	842	12
150G-800	157	800,000	222	315	409	502	689	970	1,250	2,372	3,494	18.70	1,122	8
200G-450	245	450,000	253	305	358	411	516	674	831	1,462	2,093	10.52	631	23
200G-650	212	650,000	249	325	401	477	629	857	1,085	1,997	2,909	15.20	912	14
200G-850	204	850,000	266	365	465	564	763	1,061	1,359	2,551	3,743	19.87	1,192	10
200G-1150	191	1,150,000	291	425	559	694	963	1,366	1,769	3,382	4,995	26.88	1,613	7
250G-800	271	800,000	315	409	502	596	783	1,063	1,344	2,466	3,588	18.70	1,122	14
250G-1000	257	1,000,000	327	444	561	678	912	1,262	1,613	3,016	4,419	23.38	1,403	11
250G-1250	247	1,250,000	348	494	640	786	1,078	1,517	1,955	3,708	5,461	29.22	1,753	8
250G-1500	247	1,500,000	377	553	728	903	1,254	1,780	2,306	4,410	6,514	35.07	2,104	7
75G-8	67	135,000	69	84	100	115	146	193	239	424	609	3.09	185	22
80G	80	199,000	87	110	132	155	201	269	337	610	883	4.55	273	18
115G	115	199,000	115	138	160	183	229	297	365	638	911	4.55	273	25
75HN	75	80,000	69	78	88	97	115	143	171	282	392	1.85	111	41
75W-125SD	75	125,000	74	89	103	118	147	190	233	406	579	2.89	173	26
38W-155SD	38	155,000	48	66	84	102	138	191	245	460	675	3.58	215	11
75W-160SD	75	160,000	78	97	115	134	171	226	282	503	725	3.69	222	20
80W-180SD	80	180,000	85	106	126	147	189	251	313	563	812	4.16	249	19
80W-199SD	80	199,999	87	110	133	156	203	272	341	618	895	4.62	277	17
100W-199SD	98	199,999	101	125	148	171	217	286	355	633	910	4.62	277	21
80W-250SD	80	250,000	93	122	151	179	237	324	410	757	1,103	5.77	346	14
100W-250SD	98	250,000	107	136	165	194	252	338	425	771	1,117	5.77	346	17
100W-270SD	100	270,000	111	142	174	205	267	361	454	828	1,202	6.23	374	16
75W-300SD	75	300,000	95	129	164	199	268	372	476	891	1,307	6.93	416	11
100W-300SD	100	300,000	115	149	184	219	288	392	496	911	1,327	6.93	416	14
66W-370SD	65	370,000	95	137	180	223	308	436	565	1,077	1,590	8.54	513	8
66W-399SD	65	399,999	98	144	191	237	329	468	606	1,160	1,714	9.24	554	7
80W-425SD	80	425,000	113	162	211	260	358	506	653	1,241	1,830	9.81	589	8
80W-450SD	80	450,000	116	168	220	272	376	532	687	1,311	1,934	10.39	623	8
80W-505SD	80	505,000	122	181	239	297	414	589	764	1,463	2,163	11.66	700	7
66W-625SD	65	625,000	124	196	268	341	485	701	918	1,784	2,649	14.43	866	5
80W-725SD	80	725,000	148	231	315	399	566	817	1,068	2,073	3,077	16.74	1,004	5

TABLE 40

DELIVERY AT 70°F RISE – OIL

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32E/BCS	32	104,000	38	51	63	75	99	136	172	319	465	2.44	146	13
32PP	32	104,000	38	51	63	76	101	139	177	328	479	2.52	151	13
33E	33	104,000	38	50	62	74	98	133	169	312	454	2.38	143	14
40E/BCS	40	126,000	47	62	76	91	120	164	207	382	557	2.92	175	14
50E	50	140,000	57	73	89	105	138	186	235	429	624	3.24	194	15
51E/BCS	50	152,000	57	74	92	109	143	195	247	454	661	3.45	207	14
51PP	50	152,000	59	77	96	115	152	208	264	488	712	3.73	224	13
71E	68	173,000	71	90	109	128	166	222	279	506	733	3.78	227	18
72E	67	199,000	76	99	122	145	190	258	327	600	873	4.55	273	15
73E	67	242,000	81	109	137	164	220	303	386	718	1,050	5.53	332	12
120E/BCS	113	155,000	107	124	142	159	194	247	299	509	719	3.50	210	32
190E/BCS	113	190,000	110	131	153	174	217	281	344	600	856	4.26	256	27
241E	109	277,000	115	146	177	207	269	361	453	821	1,189	6.14	368	18
361E	91	415,000	120	168	215	263	357	500	642	1,212	1,781	9.49	569	10
541E	83	623,000	134	204	273	343	481	690	898	1,731	2,565	13.89	833	6
150E-400	175	400,000	195	243	290	338	434	578	722	1,297	1,872	9.58	575	18
150E-600	166	600,000	211	283	355	426	570	786	1,001	1,863	2,725	14.37	862	12
150E-800	157	800,000	227	323	419	515	707	994	1,282	2,432	3,582	19.17	1,150	8
200E-450	245	450,000	259	313	367	421	529	691	852	1,499	2,146	10.78	647	23
200E-650	212	650,000	255	333	411	489	645	878	1,112	2,046	2,980	15.57	934	14
200E-850	204	850,000	273	375	477	578	782	1,088	1,393	2,615	3,837	20.37	1,222	10
200E-1150	191	1,150,000	298	436	573	711	987	1,400	1,813	3,466	5,119	27.55	1,653	7
250E-800	271	800,000	324	420	516	613	805	1,093	1,382	2,536	3,690	19.23	1,154	14
250E-1000	257	1,000,000	339	460	581	702	944	1,307	1,671	3,124	4,577	24.22	1,453	11
250E-1250	247	1,250,000	355	505	654	803	1,101	1,549	1,996	3,786	5,576	29.83	1,790	8
250E-1500	247	1,500,000	391	573	755	937	1,301	1,846	2,392	4,574	6,756	36.37	2,182	7

TABLE 41

DELIVERY AT 80°F RISE – POWER GAS, ATMOSPHERIC GAS, ENERGY SAVERS

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32PG/BCS	32	104,000	36	46	56	67	87	118	150	274	398	2.07	124	15
32PPG	32	104,000	36	46	57	67	88	119	150	275	399	2.07	124	15
33PG	33	104,000	36	46	57	67	87	118	148	271	393	2.04	123	16
40PG/BCS	40	126,000	45	57	70	82	108	145	183	335	486	2.52	151	16
50PG	50	140,000	51	65	78	91	118	158	198	357	517	2.66	160	19
51PG/BCS	50	152,000	54	69	84	99	129	174	218	397	576	2.98	179	17
71PG	68	173,000	66	82	98	114	145	193	241	432	622	3.18	191	21
72PG	67	199,000	71	90	109	128	167	224	282	511	741	3.83	230	17
73PG	67	242,000	74	98	121	144	190	260	329	607	885	4.63	278	14
120PG/BCS	113	155,000	103	118	133	148	178	223	268	448	628	3.00	180	38
190PG/BCS	113	190,000	103	121	139	157	193	247	301	516	731	3.59	215	31
241PG	109	277,000	110	136	163	189	242	322	401	719	1,037	5.30	318	21
361PG	91	385,000	109	147	185	223	298	412	525	978	1,432	7.56	454	12
541PG	83	623,000	121	180	239	298	416	592	768	1,474	2,180	11.76	706	7
150G-400	175	400,000	184	225	266	307	389	511	634	1,125	1,616	8.18	491	21
150G-600	166	600,000	197	258	320	381	504	688	872	1,608	2,344	12.27	736	14
150G-800	157	800,000	210	292	374	456	619	865	1,110	2,092	3,074	16.37	982	10
200G-450	245	450,000	246	292	338	384	476	614	752	1,304	1,856	9.20	552	27
200G-650	212	650,000	240	306	373	439	572	772	971	1,769	2,567	13.30	798	16
200G-850	204	850,000	254	341	428	514	688	949	1,210	2,253	3,296	17.38	1,043	12
200G-1150	191	1,150,000	274	391	509	627	862	1,214	1,567	2,978	4,389	23.52	1,411	8
250G-800	271	800,000	304	385	467	549	713	958	1,204	2,186	3,168	16.37	982	17
250G-1000	257	1,000,000	312	415	517	619	824	1,130	1,437	2,664	3,891	20.45	1,227	13
250G-1250	247	1,250,000	330	458	585	713	969	1,352	1,736	3,270	4,804	25.57	1,534	10
250G-1500	247	1,500,000	355	509	662	816	1,123	1,583	2,043	3,884	5,725	30.68	1,841	8
75G-8	67	135,000	67	81	94	108	135	175	216	378	540	2.70	162	25
80G	80	199,000	84	104	124	144	183	243	303	542	781	3.98	239	20
115G	115	199,000	112	132	152	172	211	271	331	570	809	3.98	239	29
75HN	75	80,000	68	76	84	92	108	133	157	254	351	1.62	97	46
75W-125SD	75	125,000	73	85	98	111	136	174	212	363	515	2.53	152	30
38W-155SD	38	155,000	46	62	77	93	124	171	218	406	594	3.13	188	12
75W-160SD	75	160,000	76	92	108	125	157	205	254	448	642	3.23	194	23
80W-180SD	80	180,000	82	100	119	137	173	228	282	500	719	3.64	218	22
80W-199SD	80	199,999	84	104	125	145	185	246	306	549	791	4.04	242	20
100W-199SD	98	199,999	99	119	139	159	200	260	321	563	806	4.04	242	24
80W-250SD	80	250,000	89	115	140	165	216	291	367	670	973	5.05	303	16
100W-250SD	98	250,000	104	129	154	179	230	306	381	684	987	5.05	303	19
100W-270SD	100	270,000	107	135	162	189	244	325	407	735	1,062	5.45	327	18
75W-300SD	75	300,000	90	121	151	181	242	333	424	787	1,151	6.06	364	12
100W-300SD	100	300,000	110	141	171	201	262	353	444	807	1,171	6.06	364	17
66W-370SD	65	370,000	89	127	164	201	276	388	500	949	1,397	7.47	448	9
66W-399SD	65	399,999	92	133	173	214	294	416	537	1,022	1,507	8.08	485	8
80W-425SD	80	425,000	107	150	193	236	322	450	579	1,094	1,609	8.59	515	9
80W-450SD	80	450,000	109	155	200	246	337	473	609	1,155	1,700	9.09	545	9
80W-505SD	80	505,000	115	166	217	268	370	523	676	1,288	1,900	10.20	612	8
66W-625SD	65	625,000	115	178	241	305	431	620	810	1,567	2,325	12.63	758	5
80W-725SD	80	725,000	137	210	284	357	503	723	943	1,822	2,700	14.65	879	5

TABLE 42**DELIVERY AT 80°F RISE – OIL**

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32E/BCS	32	104,000	37	48	58	69	90	122	154	282	410	2.13	128	15
32PP	32	104,000	37	48	59	70	92	125	158	290	423	2.21	132	15
33E	33	104,000	37	47	58	68	89	120	151	276	401	2.08	125	16
40E/BCS	40	126,000	45	58	71	83	109	147	186	339	492	2.55	153	16
50E	50	140,000	55	69	83	97	126	168	211	381	551	2.84	170	18
51E/BCS	50	152,000	55	70	85	100	130	176	221	402	584	3.02	181	17
51PP	50	152,000	56	72	87	103	135	182	229	418	607	3.15	189	15
71E	68	173,000	69	85	102	118	151	201	251	449	648	3.31	199	21
72E	67	199,000	74	93	113	133	173	233	292	531	770	3.98	239	17
73E	67	242,000	78	102	126	150	199	271	344	635	925	4.84	291	14
120E/BCS	113	155,000	105	120	135	151	181	227	273	457	641	3.06	184	37
190E/BCS	113	190,000	107	126	145	163	201	257	313	536	760	3.73	224	30
241E	109	277,000	111	138	165	192	246	326	407	729	1,051	5.37	322	20
361E	91	415,000	114	156	197	239	322	446	571	1,069	1,567	8.30	498	11
541E	83	623,000	126	186	247	308	429	612	794	1,523	2,252	12.15	729	7
150E-400	175	400,000	189	230	272	314	398	524	650	1,153	1,656	8.38	503	21
150E-600	166	600,000	202	265	328	391	517	705	894	1,649	2,404	12.58	755	13
150E-800	157	800,000	215	299	383	467	635	886	1,138	2,144	3,150	16.77	1,006	9
200E-450	245	450,000	253	300	347	394	488	630	771	1,337	1,903	9.43	566	26
200E-650	212	650,000	246	314	382	450	586	790	995	1,812	2,629	13.62	817	16
200E-850	204	850,000	260	349	438	527	705	973	1,240	2,309	3,378	17.82	1,069	11
200E-1150	191	1,150,000	281	401	522	642	883	1,245	1,606	3,052	4,498	24.10	1,446	8
250E-800	271	800,000	312	396	481	565	733	986	1,238	2,248	3,258	16.83	1,010	16
250E-1000	257	1,000,000	324	430	535	641	853	1,171	1,489	2,760	4,031	21.18	1,271	12
250E-1250	247	1,250,000	337	467	598	728	989	1,381	1,772	3,338	4,904	26.10	1,566	10
250E-1500	247	1,500,000	369	528	687	846	1,164	1,641	2,119	4,027	5,936	31.82	1,909	8

TABLE 43

DELIVERY AT 90°F RISE – POWER GAS, ATMOSPHERIC GAS, ENERGY SAVERS

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32PG/BCS	32	104,000	35	44	53	62	81	108	136	246	356	1.84	110	17
32PPG	32	104,000	35	44	53	62	81	109	136	247	358	1.84	111	17
33PG	33	104,000	35	44	53	62	80	108	135	244	353	1.81	109	18
40PG/BCS	40	126,000	43	54	66	77	99	133	166	301	435	2.24	134	18
50PG	50	140,000	50	62	73	85	109	144	180	322	464	2.37	142	21
51PG/BCS	50	152,000	53	66	79	92	119	159	198	358	517	2.65	159	19
71PG	68	173,000	64	78	92	107	135	177	220	389	559	2.83	170	24
72PG	67	199,000	69	86	103	120	154	205	256	460	665	3.41	204	20
73PG	67	242,000	72	92	113	134	175	236	298	545	792	4.12	247	16
120PG/BCS	113	155,000	101	114	128	141	168	208	248	408	568	2.67	160	42
190PG/BCS	113	190,000	101	117	133	149	181	229	277	468	659	3.19	191	35
241PG	109	277,000	107	130	154	178	225	295	366	649	931	4.71	283	23
361PG	91	385,000	105	139	172	206	273	374	475	878	1,281	6.72	403	14
541PG	83	623,000	115	167	220	272	376	533	690	1,317	1,945	10.46	627	8
150G-400	175	400,000	179	216	252	288	361	470	579	1,015	1,451	7.27	436	24
150G-600	166	600,000	190	245	300	354	463	627	791	1,446	2,101	10.92	655	15
150G-800	157	800,000	201	274	347	419	565	783	1,001	1,874	2,747	14.55	873	11
200G-450	245	450,000	241	282	323	364	446	569	691	1,182	1,673	8.18	491	30
200G-650	212	650,000	232	292	351	410	528	705	882	1,591	2,300	11.82	709	18
200G-850	204	850,000	244	321	399	476	630	862	1,094	2,021	2,948	15.45	927	13
200G-1150	191	1,150,000	261	365	470	575	784	1,098	1,411	2,666	3,921	20.92	1,255	9
250G-800	271	800,000	294	367	440	513	658	876	1,095	1,968	2,841	14.55	873	19
250G-1000	257	1,000,000	301	392	483	574	756	1,028	1,301	2,392	3,483	18.18	1,091	14
250G-1250	247	1,250,000	316	429	543	657	884	1,225	1,566	2,930	4,294	22.73	1,364	11
250G-1500	247	1,500,000	338	475	611	747	1,020	1,429	1,838	3,474	5,110	27.27	1,636	9
75G-8	67	135,000	66	78	90	102	126	162	198	342	486	2.40	144	28
80G	80	199,000	82	99	117	135	170	223	276	489	701	3.54	212	23
115G	115	199,000	110	127	145	163	198	251	304	517	729	3.54	212	32
75HN	75	80,000	67	74	82	89	103	125	146	232	319	1.44	86	52
75W-125SD	75	125,000	71	82	94	105	127	161	195	329	464	2.24	135	33
38W-155SD	38	155,000	44	58	72	86	114	156	197	364	531	2.78	167	14
75W-160SD	75	160,000	74	89	103	117	146	189	232	405	577	2.87	172	26
80W-180SD	80	180,000	80	96	112	129	161	209	258	452	646	3.23	194	25
80W-199SD	80	199,999	82	100	118	136	172	226	279	495	710	3.59	215	22
100W-199SD	98	199,999	96	114	132	150	186	240	294	509	725	3.59	215	27
80W-250SD	80	250,000	86	109	131	154	199	266	333	603	872	4.49	269	18
100W-250SD	98	250,000	101	123	146	168	213	280	348	617	886	4.49	269	22
100W-270SD	100	270,000	104	128	153	177	225	298	371	662	953	4.85	291	21
75W-300SD	75	300,000	87	114	141	168	222	302	383	706	1,030	5.39	323	14
100W-300SD	100	300,000	107	134	161	188	242	322	403	726	1,050	5.39	323	19
66W-370SD	65	370,000	85	118	152	185	251	351	451	849	1,248	6.64	399	10
66W-399SD	65	399,999	88	124	160	196	267	375	483	914	1,345	7.18	431	9
80W-425SD	80	425,000	102	140	178	217	293	407	522	980	1,438	7.63	458	10
80W-450SD	80	450,000	104	145	185	226	306	428	549	1,034	1,519	8.08	485	10
80W-505SD	80	505,000	109	155	200	245	336	472	608	1,152	1,696	9.07	544	9
66W-625SD	65	625,000	108	164	220	276	389	557	725	1,399	2,072	11.22	673	6
80W-725SD	80	725,000	129	194	259	324	455	650	845	1,626	2,407	13.02	781	6

TABLE 44**DELIVERY AT 90°F RISE – OIL**

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32E/BCS	32	104,000	36	45	55	64	83	112	140	254	367	1.90	114	17
32PP	32	104,000	35	45	55	65	84	114	143	261	379	1.96	118	16
33E	33	104,000	36	45	54	63	82	110	137	248	359	1.85	111	18
40E/BCS	40	126,000	44	55	66	78	100	135	169	305	441	2.27	136	18
50E	50	140,000	53	66	78	91	116	154	192	343	494	2.52	151	20
51E/BCS	50	152,000	53	67	80	93	120	161	201	362	523	2.69	161	19
51PP	50	152,000	54	68	82	96	124	166	208	376	544	2.80	168	18
71E	68	173,000	67	81	96	111	140	184	229	405	582	2.94	177	23
72E	67	199,000	71	89	107	124	160	213	266	478	691	3.54	212	19
73E	67	242,000	75	97	118	140	183	247	312	570	828	4.30	258	16
120E/BCS	113	155,000	103	116	130	144	171	212	253	416	579	2.72	163	42
190E/BCS	113	190,000	105	122	138	155	188	238	288	487	686	3.32	199	34
241E	109	277,000	108	132	156	180	228	299	371	657	944	4.77	286	23
361E	91	415,000	110	147	184	220	294	405	516	958	1,401	7.38	443	12
541E	83	623,000	119	173	227	281	389	551	713	1,361	2,009	10.80	648	8
150E-400	175	400,000	184	221	258	296	370	482	594	1,041	1,488	7.45	447	23
150E-600	166	600,000	195	251	307	363	475	642	810	1,481	2,152	11.18	671	15
150E-800	157	800,000	206	281	355	430	579	802	1,026	1,920	2,814	14.90	894	11
200E-450	245	450,000	247	289	331	373	457	583	708	1,211	1,714	8.38	503	29
200E-650	212	650,000	238	299	360	420	541	723	905	1,632	2,359	12.12	727	17
200E-850	204	850,000	250	329	408	488	646	883	1,121	2,071	3,021	15.83	950	13
200E-1150	191	1,150,000	267	374	482	589	803	1,125	1,446	2,732	4,018	21.43	1,286	9
250E-800	271	800,000	303	378	453	527	677	902	1,126	2,024	2,922	14.97	898	18
250E-1000	257	1,000,000	312	406	500	594	783	1,065	1,348	2,478	3,608	18.83	1,130	14
250E-1250	247	1,250,000	322	438	554	670	902	1,250	1,598	2,990	4,382	23.20	1,392	11
250E-1500	247	1,500,000	351	492	634	775	1,058	1,482	1,906	3,603	5,300	28.28	1,697	9

TABLE 45

DELIVERY AT 100°F RISE – POWER GAS, ATMOSPHERIC GAS, ENERGY SAVERS

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32PG/BCS	32	104,000	34	42	50	59	75	100	125	224	323	1.65	99	19
32PPG	32	104,000	34	42	50	59	75	100	125	225	324	1.66	100	19
33PG	33	104,000	34	42	50	59	75	99	124	222	320	1.63	98	20
40PG/BCS	40	126,000	42	52	62	72	93	123	153	274	395	2.02	121	20
50PG	50	140,000	49	59	70	81	102	134	166	293	421	2.13	128	23
51PG/BCS	50	152,000	51	63	75	87	111	147	182	326	469	2.39	143	21
71PG	68	173,000	63	75	88	101	126	164	203	355	508	2.54	153	27
72PG	67	199,000	67	82	98	113	144	190	236	419	603	3.07	184	22
73PG	67	242,000	70	88	107	125	162	218	273	496	718	3.70	222	18
120PG/BCS	113	155,000	100	112	124	136	160	196	232	376	520	2.40	144	47
190PG/BCS	113	190,000	100	114	128	143	171	214	258	430	602	2.87	172	39
241PG	109	277,000	105	126	147	168	211	274	338	592	847	4.24	254	26
361PG	91	385,000	102	132	162	192	253	344	434	797	1,160	6.05	363	15
541PG	83	623,000	110	157	204	251	345	486	627	1,192	1,757	9.41	565	9
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150G-400	175	400,000	176	209	241	274	340	438	536	929	1,322	6.55	393	27
150G-600	166	600,000	185	234	283	332	430	577	725	1,314	1,903	9.82	589	17
150G-800	157	800,000	194	259	325	390	521	717	913	1,698	2,483	13.08	785	12
200G-450	245	450,000	237	274	311	348	421	532	642	1,084	1,526	7.37	442	33
200G-650	212	650,000	227	280	333	386	492	652	811	1,449	2,087	10.63	638	20
200G-850	204	850,000	237	306	376	445	584	793	1,002	1,837	2,672	13.92	835	15
200G-1150	191	1,150,000	250	344	438	533	721	1,003	1,285	2,414	3,543	18.82	1,129	10
250G-800	271	800,000	287	352	418	483	614	810	1,007	1,792	2,577	13.08	785	21
250G-1000	257	1,000,000	292	374	456	538	701	947	1,192	2,174	3,156	16.37	982	16
250G-1250	247	1,250,000	304	406	509	611	815	1,122	1,429	2,656	3,883	20.45	1,227	12
250G-1500	247	1,500,000	325	448	570	693	939	1,307	1,675	3,148	4,621	24.55	1,473	10
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75G-8	67	135,000	64	75	86	97	118	151	183	313	443	2.16	130	31
80G	80	199,000	80	96	112	128	160	207	255	446	637	3.19	191	25
115G	115	199,000	108	124	140	156	188	235	283	474	665	3.19	191	36
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75HN	75	80,000	66	73	79	86	99	118	138	215	293	1.29	78	58
75W-125SD	75	125,000	70	80	90	100	121	151	181	302	424	2.02	121	37
38W-155SD	38	155,000	43	55	68	81	106	143	181	331	481	2.51	150	15
75W-160SD	75	160,000	73	86	99	112	138	176	215	370	525	2.59	155	29
80W-180SD	80	180,000	79	93	108	122	151	195	239	413	588	2.91	175	28
80W-199SD	80	199,999	80	96	112	129	161	209	258	452	646	3.23	194	25
100W-199SD	98	199,999	95	111	127	143	175	224	272	466	660	3.23	194	30
80W-250SD	80	250,000	84	104	125	145	185	246	306	549	791	4.04	242	20
100W-250SD	98	250,000	99	119	139	159	200	260	321	563	806	4.04	242	24
100W-270SD	100	270,000	102	124	145	167	211	276	342	604	865	4.36	262	23
75W-300SD	75	300,000	84	108	133	157	205	278	351	642	933	4.85	291	15
100W-300SD	100	300,000	104	128	153	177	225	298	371	662	953	4.85	291	21
66W-370SD	65	370,000	82	112	142	172	231	321	411	770	1,128	5.98	359	11
66W-399SD	65	399,999	84	117	149	181	246	343	440	828	1,216	6.46	388	10
80W-425SD	80	425,000	98	133	167	201	270	373	476	888	1,300	6.87	412	12
80W-450SD	80	450,000	100	137	173	209	282	391	500	937	1,373	7.27	436	11
80W-505SD	80	505,000	105	146	186	227	309	431	554	1,043	1,533	8.16	490	10
66W-625SD	65	625,000	103	153	204	254	355	507	658	1,264	1,870	10.10	606	6
80W-725SD	80	725,000	123	181	240	298	416	591	767	1,470	2,173	11.72	703	7

TABLE 46

DELIVERY AT 100°F RISE – OIL

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32E/BCS	32	104,000	35	43	52	60	77	103	129	231	333	1.71	102	19
32PP	32	104,000	34	43	52	61	79	105	131	237	343	1.76	106	18
33E	33	104,000	35	43	51	60	76	101	126	226	326	1.66	100	20
40E/BCS	40	126,000	43	53	63	73	94	124	155	277	400	2.04	123	20
50E	50	140,000	52	63	75	86	109	143	177	313	449	2.27	136	22
51E/BCS	50	152,000	52	64	76	88	112	149	185	330	475	2.42	145	21
51PP	50	152,000	53	65	78	90	116	153	191	342	494	2.52	151	20
71E	68	173,000	65	78	92	105	131	171	211	370	529	2.65	159	26
72E	67	199,000	70	85	101	117	149	197	245	436	627	3.19	191	21
73E	67	242,000	73	92	112	131	170	228	286	518	751	3.87	232	17
120E/BCS	113	155,000	102	114	126	138	163	200	236	383	530	2.45	147	46
190E/BCS	113	190,000	104	119	133	148	178	223	268	447	626	2.98	179	38
241E	109	277,000	106	127	149	170	213	278	342	600	858	4.30	258	25
361E	91	415,000	106	139	172	206	272	372	471	870	1,268	6.64	399	14
541E	83	623,000	113	162	211	259	356	502	648	1,231	1,815	9.72	583	9
150E-400	175	400,000	180	214	247	281	348	448	549	951	1,353	6.70	402	26
150E-600	166	600,000	190	240	290	341	441	592	743	1,347	1,951	10.07	604	16
150E-800	157	800,000	199	266	333	400	534	735	937	1,742	2,547	13.42	805	12
200E-450	245	450,000	243	281	319	356	432	545	658	1,111	1,564	7.55	453	32
200E-650	212	650,000	232	287	341	396	505	668	832	1,486	2,140	10.90	654	19
200E-850	204	850,000	242	313	385	456	598	812	1,026	1,881	2,736	14.25	855	14
200E-1150	191	1,150,000	256	353	449	546	739	1,028	1,317	2,474	3,631	19.28	1,157	10
250E-800	271	800,000	295	363	430	497	632	834	1,036	1,844	2,652	13.47	808	20
250E-1000	257	1,000,000	302	387	472	557	726	980	1,235	2,252	3,269	16.95	1,017	15
250E-1250	247	1,250,000	311	415	519	624	833	1,146	1,459	2,712	3,965	20.88	1,253	12
250E-1500	247	1,500,000	337	464	591	718	973	1,355	1,736	3,263	4,790	25.45	1,527	10

TABLE 47

DELIVERY AT 120°F RISE – POWER GAS, ATMOSPHERIC GAS, ENERGY SAVERS

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32PG/BCS	32	104,000	32	39	46	53	67	87	108	191	274	1.38	83	23
32PPG	32	104,000	33	39	46	53	67	88	109	192	275	1.38	83	23
33PG	33	104,000	33	40	46	53	67	87	108	189	271	1.36	82	24
40PG/BCS	40	126,000	40	49	57	66	82	108	133	234	335	1.68	101	24
50PG	50	140,000	47	56	65	74	91	118	144	251	357	1.77	106	28
51PG/BCS	50	152,000	49	59	69	79	99	129	159	278	397	1.99	119	25
71PG	68	173,000	61	71	82	92	114	145	177	304	432	2.12	127	32
72PG	67	199,000	64	77	90	103	128	167	205	358	511	2.55	153	26
73PG	67	242,000	67	82	98	113	144	190	236	422	607	3.09	185	22
120PG/BCS	113	155,000	98	108	118	128	148	178	208	328	448	2.00	120	56
190PG/BCS	113	190,000	97	109	121	133	157	193	229	372	516	2.39	144	47
241PG	109	277,000	101	119	136	154	189	242	295	507	719	3.53	212	31
361PG	91	385,000	97	122	147	172	223	298	374	676	978	5.04	302	18
541PG	83	623,000	102	141	180	220	298	416	533	1,004	1,474	7.84	471	11
150G-400	175	400,000	170	198	225	252	307	388	470	797	1,124	5.45	327	32
150G-600	166	600,000	177	218	259	299	381	504	627	1,118	1,609	8.18	491	20
150G-800	157	800,000	183	238	292	347	456	620	783	1,438	2,093	10.92	655	14
200G-450	245	450,000	231	262	292	323	384	476	568	936	1,304	6.13	368	40
200G-650	212	650,000	218	262	306	351	439	572	705	1,237	1,769	8.87	532	24
200G-850	204	850,000	225	283	340	398	514	688	862	1,557	2,252	11.58	695	18
200G-1150	191	1,150,000	235	313	391	470	627	862	1,097	2,038	2,979	15.68	941	12
250G-800	271	800,000	276	331	386	440	549	713	877	1,532	2,187	10.92	655	25
250G-1000	257	1,000,000	278	346	415	483	619	824	1,028	1,846	2,664	13.63	818	19
250G-1250	247	1,250,000	287	373	458	543	714	969	1,225	2,248	3,271	17.05	1,023	14
250G-1500	247	1,500,000	304	407	509	611	815	1,122	1,429	2,656	3,883	20.45	1,227	12
75G-8	67	135,000	63	72	81	90	108	135	162	270	378	1.80	108	37
80G	80	199,000	77	91	104	117	144	183	223	383	542	2.65	159	30
115G	115	199,000	105	119	132	145	172	211	251	411	570	2.65	159	43
75HN	75	80,000	65	71	76	82	92	108	125	189	254	1.08	65	70
75W-125SD	75	125,000	68	77	85	94	111	136	161	262	363	1.68	101	45
38W-155SD	38	155,000	41	51	62	72	93	124	156	281	406	2.09	125	18
75W-160SD	75	160,000	71	82	92	103	125	157	189	319	448	2.15	129	35
80W-180SD	80	180,000	76	88	100	112	137	173	209	355	500	2.42	145	33
80W-199SD	80	199,999	77	91	104	118	145	185	226	387	549	2.69	162	30
100W-199SD	98	199,999	92	105	119	132	159	200	240	402	563	2.69	162	36
80W-250SD	80	250,000	81	98	115	131	165	216	266	468	670	3.37	202	24
100W-250SD	98	250,000	95	112	129	146	179	230	280	482	684	3.37	202	29
100W-270SD	100	270,000	98	116	135	153	189	244	298	516	735	3.64	218	28
75W-300SD	75	300,000	80	100	121	141	181	242	302	545	787	4.04	242	19
100W-300SD	100	300,000	100	120	141	161	201	262	322	565	807	4.04	242	25
66W-370SD	65	370,000	77	102	127	152	201	276	351	650	949	4.98	299	13
66W-399SD	65	399,999	79	106	133	160	214	294	375	698	1,022	5.39	323	12
80W-425SD	80	425,000	93	121	150	178	236	322	407	751	1,094	5.72	343	14
80W-450SD	80	450,000	94	125	155	185	246	337	428	791	1,155	6.06	364	13
80W-505SD	80	505,000	98	132	166	200	268	370	472	880	1,288	6.80	408	12
66W-625SD	65	625,000	94	136	178	220	305	431	557	1,062	1,567	8.42	505	8
80W-725SD	80	725,000	113	162	210	259	357	503	650	1,236	1,822	9.76	586	8

TABLE 48**DELIVERY AT 120°F RISE – OIL**

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32E/BCS	32	104,000	33	40	48	55	69	90	112	197	282	1.42	85	23
32PP	32	104,000	33	40	48	55	70	92	114	202	290	1.47	88	22
33E	33	104,000	33	40	47	54	68	89	110	193	276	1.39	83	24
40E/BCS	40	126,000	41	49	58	66	83	109	135	237	339	1.70	102	24
50E	50	140,000	50	59	69	78	97	126	154	267	381	1.89	113	26
51E/BCS	50	152,000	50	60	70	80	100	130	161	282	402	2.01	121	25
51PP	50	152,000	51	61	72	82	103	135	166	292	418	2.10	126	24
71E	68	173,000	63	74	85	96	118	151	184	317	449	2.21	132	31
72E	67	199,000	67	80	93	107	133	173	213	372	531	2.65	159	25
73E	67	242,000	70	86	102	118	150	199	247	441	635	3.23	194	21
120E/BCS	113	155,000	99	110	120	130	151	181	212	334	457	2.04	122	55
190E/BCS	113	190,000	101	114	126	138	163	201	238	387	536	2.49	149	45
241E	109	277,000	102	120	138	156	192	246	299	514	729	3.58	215	30
361E	91	415,000	100	128	156	184	239	322	405	737	1,069	5.54	332	16
541E	83	623,000	105	146	186	227	308	429	551	1,037	1,523	8.10	486	10
150E-400	175	400,000	174	202	230	258	314	398	482	817	1,152	5.58	335	31
150E-600	166	600,000	181	223	265	307	391	516	642	1,145	1,648	8.38	503	20
150E-800	157	800,000	188	243	299	355	467	635	803	1,474	2,145	11.18	671	14
200E-450	245	450,000	237	268	299	331	394	488	582	959	1,336	6.28	377	39
200E-650	212	650,000	223	269	314	359	450	586	723	1,268	1,813	9.08	545	23
200E-850	204	850,000	230	290	349	409	528	706	884	1,597	2,310	11.88	713	17
200E-1150	191	1,150,000	240	321	401	481	642	883	1,124	2,088	3,052	16.07	964	12
250E-800	271	800,000	284	340	396	452	564	733	901	1,574	2,247	11.22	673	24
250E-1000	257	1,000,000	288	359	429	500	641	853	1,065	1,912	2,759	14.12	847	18
250E-1250	247	1,250,000	293	380	467	554	728	989	1,250	2,294	3,338	17.40	1,044	14
250E-1500	247	1,500,000	316	422	528	634	846	1,164	1,483	2,756	4,029	21.22	1,273	12

TABLE 49

DELIVERY AT 140°F RISE – POWER GAS, ATMOSPHERIC GAS, ENERGY SAVERS

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32PG/BCS	32	104,000	Not recommended for 180°F water											
32PPG	32	104,000	Not recommended for 180°F water											
33PG	33	104,000	Not recommended for 180°F water											
40PG/BCS	40	126,000	Not recommended for 180°F water											
50PG	50	140,000	46	53	61	68	84	106	129	220	312	1.52	91	33
51PG/BCS	50	152,000	48	56	65	73	90	116	142	244	346	1.71	102	29
71PG	68	173,000	59	68	77	86	104	132	159	268	377	1.82	109	37
72PG	67	199,000	63	73	84	95	117	150	183	314	446	2.19	131	31
73PG	67	242,000	64	78	91	104	131	170	210	369	527	2.65	159	25
120PG/BCS	113	155,000	96	105	113	122	139	165	191	294	397	1.72	103	66
190PG/BCS	113	190,000	96	106	116	126	147	178	208	331	454	2.05	123	55
241PG	109	277,000	99	114	129	144	174	220	265	447	629	3.03	182	36
361PG	91	385,000	93	115	136	158	201	266	331	590	849	4.32	259	21
541PG	83	623,000	96	130	163	197	264	365	466	869	1,273	6.72	403	12
150G-400	175	400,000	167	190	214	237	284	354	424	705	986	4.68	281	37
150G-600	166	600,000	171	206	241	276	346	452	557	978	1,399	7.02	421	24
150G-800	157	800,000	175	222	269	315	409	549	689	1,250	1,811	9.35	561	17
200G-450	245	450,000	227	253	280	306	359	438	517	833	1,149	5.27	316	47
200G-650	212	650,000	211	249	287	325	401	515	629	1,085	1,541	7.60	456	28
200G-850	204	850,000	216	266	316	365	465	614	763	1,359	1,955	9.93	596	21
200G-1150	191	1,150,000	223	290	358	425	559	761	962	1,768	2,574	13.43	806	14
250G-800	271	800,000	268	315	362	409	502	642	783	1,344	1,905	9.35	561	29
250G-1000	257	1,000,000	269	327	385	444	561	736	911	1,612	2,313	11.68	701	22
250G-1250	247	1,250,000	275	348	421	494	641	860	1,079	1,956	2,833	14.62	877	17
250G-1500	247	1,500,000	290	377	465	553	728	991	1,254	2,306	3,358	17.53	1,052	14
75G-8	67	135,000	61	69	77	84	100	123	146	239	331	1.54	93	43
80G	80	199,000	75	87	98	110	132	166	201	337	474	2.28	137	35
115G	115	199,000	103	115	126	138	160	194	229	365	502	2.28	137	51
75HN	Not recommended for 180 deg. water.													
75W-125SD	75	125,000	67	74	82	89	103	125	147	233	320	1.44	87	52
38W-155SD	38	155,000	39	48	57	66	84	111	138	245	352	1.79	107	21
75W-160SD	75	160,000	69	78	88	97	115	143	171	282	392	1.85	111	41
80W-180SD	80	180,000	74	85	95	106	126	158	189	313	438	2.08	125	39
80W-199SD	80	199,999	76	87	99	110	133	168	203	341	480	2.31	139	35
100W-199SD	98	199,999	90	101	113	125	148	182	217	355	494	2.31	139	42
80W-250SD	80	250,000	78	93	107	122	151	194	237	410	583	2.89	173	28
100W-250SD	98	250,000	93	107	122	136	165	208	252	425	598	2.89	173	34
100W-270SD	100	270,000	96	111	127	142	174	220	267	454	641	3.12	187	32
75W-300SD	75	300,000	77	95	112	129	164	216	268	476	683	3.46	208	22
100W-300SD	100	300,000	97	115	132	149	184	236	288	496	703	3.46	208	29
66W-370SD	65	370,000	73	95	116	137	180	244	308	565	821	4.27	256	15
66W-399SD	65	399,999	75	98	121	144	191	260	329	606	883	4.62	277	14
80W-425SD	80	425,000	89	113	138	162	211	285	358	653	947	4.91	294	16
80W-450SD	80	450,000	90	116	142	168	220	298	376	687	999	5.19	312	15
80W-505SD	80	505,000	93	122	151	181	239	326	414	764	1,113	5.83	350	14
66W-625SD	65	625,000	88	124	160	196	268	377	485	918	1,351	7.22	433	9
80W-725SD	80	725,000	106	148	190	231	315	441	566	1,068	1,570	8.37	502	10

TABLE 50

DELIVERY AT 140°F RISE – OIL

MODEL	Volume	Input	5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.	RECOVERY (GPM)	RECOVERY (GPH)	MINS. TO RECOVER CONTENTS
32E/BCS	32	104,000	Not recommended for 180°F water											
32PP	32	104,000	Not recommended for 180°F water											
33E	33	104,000	Not recommended for 180°F water											
40E/BCS	40	126,000	Not recommended for 180°F water											
50E	50	140,000	49	57	65	73	89	113	138	235	332	1.62	97	31
51E/BCS	50	152,000	48	57	66	74	92	117	143	247	351	1.73	104	29
51PP	50	152,000	49	58	67	76	94	121	148	256	364	1.80	108	28
71E	68	173,000	61	71	80	90	109	137	166	279	392	1.89	113	36
72E	67	199,000	65	76	88	99	122	156	190	327	463	2.28	137	29
73E	67	242,000	67	81	95	109	137	178	220	386	552	2.77	166	24
120E/BCS	113	155,000	98	107	116	124	142	168	194	299	404	1.75	105	65
190E/BCS	113	190,000	99	110	121	131	153	185	217	344	472	2.13	128	53
241E	109	277,000	100	115	130	146	177	223	269	453	637	3.07	184	36
361E	91	415,000	97	120	144	168	215	286	357	642	927	4.74	285	19
541E	83	623,000	99	134	169	204	273	377	481	898	1,315	6.94	417	12
150E-400	175	400,000	170	194	218	242	290	362	433	720	1,007	4.78	287	37
150E-600	166	600,000	175	211	247	283	355	462	570	1,001	1,432	7.18	431	23
150E-800	157	800,000	180	227	275	323	419	563	707	1,282	1,857	9.58	575	16
200E-450	245	450,000	232	259	286	313	367	447	528	851	1,174	5.38	323	46
200E-650	212	650,000	217	255	294	333	411	528	645	1,112	1,579	7.78	467	27
200E-850	204	850,000	222	273	324	375	477	629	782	1,393	2,004	10.18	611	20
200E-1150	191	1,150,000	229	298	366	435	573	779	986	1,812	2,638	13.77	826	14
250E-800	271	800,000	276	324	372	420	516	661	805	1,382	1,959	9.62	577	28
250E-1000	257	1,000,000	278	339	399	460	581	762	944	1,670	2,396	12.10	726	21
250E-1250	247	1,250,000	281	355	430	505	654	877	1,101	1,996	2,891	14.92	895	17
250E-1500	247	1,500,000	300	391	482	573	755	1,028	1,301	2,392	3,483	18.18	1,091	14

TABLE 51

Measuring Combustion Efficiency Using Oxygen (O₂)

		NET STACK TEMPERATURE IN DEGREES FAHRENHEIT (°F)																
FUEL	%O ₂	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900
NATURAL GAS	1	87.9	86.8	85.7	84.6	83.6	82.5	81.4	80.3	79.2	78.2	77.1	76.0	74.9	73.9	72.8	71.7	70.6
	2	87.8	86.7	85.5	84.4	83.3	82.2	81.0	79.9	78.8	77.7	76.5	75.4	74.3	73.2	72.1	70.9	69.8
	3	87.7	86.5	85.3	84.2	83.0	81.8	80.6	79.5	78.3	77.1	75.9	74.8	73.6	72.4	71.2	70.1	68.9
	4	87.6	86.3	85.1	83.9	82.7	81.4	80.2	79.0	77.7	76.5	75.3	74.0	72.8	71.6	70.4	69.1	67.9
	5	87.5	86.2	84.9	83.6	82.3	81.0	79.7	78.4	77.1	75.8	74.5	73.2	71.9	70.6	69.3	68.0	66.8
	6	87.3	85.9	84.6	83.2	81.8	80.5	79.1	77.8	76.4	75.0	73.7	72.3	70.9	69.6	68.2	66.8	65.5
	7	87.1	85.7	84.3	82.8	81.4	79.9	78.5	77.0	75.6	74.1	72.7	71.2	69.8	68.3	66.9	65.4	64.0
	8	87.0	85.4	83.9	82.3	80.8	79.2	77.7	76.2	74.6	73.1	71.5	70.0	68.5	66.9	65.4	63.8	62.3
	9	86.7	85.1	83.4	81.8	80.1	78.5	76.8	75.2	73.5	71.9	70.2	68.6	66.9	65.3	63.6	62.0	60.3
	10	86.5	84.7	82.9	81.1	79.3	77.1	75.8	74.0	72.2	70.4	68.6	66.9	65.1	63.3	61.5	59.7	58.0
	11	86.2	84.2	82.3	80.3	78.4	76.5	74.5	72.6	70.6	68.7	66.8	64.8	62.9	60.9	59.0	57.1	55.1
	12	85.8	83.6	81.5	79.4	77.2	75.1	73.0	70.9	68.7	66.6	64.5	62.3	60.2	58.1	55.9	53.8	51.7
	13	85.3	82.9	80.5	78.2	75.8	73.4	71.1	68.7	66.3	63.9	61.6	59.2	56.8	54.0	52.1	49.7	47.3
	14	84.7	82.0	79.3	76.6	73.9	71.3	68.6	65.9	63.2	60.5	57.8	55.1	52.5	49.8	47.1	44.4	41.7
NO. 2 GRADE FUEL OIL	1	91.8	90.7	89.6	88.4	87.3	86.2	85.1	84.0	82.9	81.7	80.6	79.5	78.4	77.3	76.2	75.0	73.9
	2	91.7	90.5	89.4	88.2	87.0	85.9	84.7	83.6	82.4	81.2	80.1	78.9	77.7	76.6	75.4	74.2	73.1
	3	91.6	90.4	89.2	87.9	86.7	85.5	84.3	83.1	81.9	80.7	79.4	78.2	77.0	75.8	74.6	73.4	72.1
	4	91.5	90.2	88.9	87.7	86.4	85.1	83.8	82.6	81.3	80.0	78.7	77.5	76.2	74.9	73.6	72.4	71.1
	5	91.3	90.0	88.7	87.3	86.0	84.6	83.3	82.0	80.6	79.3	77.9	76.6	75.3	73.9	72.6	71.2	69.9
	6	91.2	89.8	88.4	87.0	85.5	84.1	82.7	81.3	79.9	78.5	77.0	75.6	74.2	72.8	71.4	70.0	68.6
	7	91.0	89.5	88.0	86.5	85.0	83.5	82.0	80.5	79.0	77.5	76.0	74.5	73.0	71.5	70.0	68.5	67.0
	8	90.8	89.2	87.6	86.0	84.4	82.8	81.2	79.6	78.0	76.4	74.8	73.2	71.6	70.0	68.4	66.8	65.2
	9	90.6	88.9	87.2	85.5	83.7	82.0	80.3	78.6	76.9	75.2	73.5	71.7	70.0	68.3	66.6	64.9	63.2
	10	90.3	88.5	86.6	84.8	82.9	81.1	79.2	77.4	75.5	73.7	71.8	70.0	68.1	66.3	64.4	62.6	60.7
	11	90.0	88.0	86.0	84.0	81.9	79.9	77.9	75.9	73.9	71.9	69.8	67.8	65.8	63.8	61.8	59.8	57.8
	12	89.6	87.4	85.2	82.9	80.7	78.5	76.3	74.1	71.9	69.7	67.4	65.2	63.0	60.8	58.6	56.4	54.1
	13	89.1	86.6	84.2	81.7	79.2	76.8	74.3	71.8	69.3	66.9	64.4	61.9	59.5	57.0	54.5	52.1	49.6
	14	88.4	85.7	82.9	80.1	77.3	74.5	71.7	68.9	66.1	63.3	60.5	57.7	54.9	52.1	49.3	46.6	43.8