

# BOCK ENGINEERING MANUAL TABLES

## VENT TABLES • pages 46-56

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:

- 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.
- Read down the Total Vent Height column (first column) to a height equal to or less than the total vent height.
- Select the horizontal row of the table for the appropriate Length of Lateral (use zero for straight vertical vents).
- 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.
- 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

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

#### Example:

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

$$\frac{22,049.28 \times 1.10}{138,500} = \$1.175 \text{ per day} \times 365 = \$63.91 \text{ per yr}$$

To reduce standby loss by 1%:

$$23760 \times .03 \times 23.2 = \frac{16,375}{38,500} \times 1.10 = \$1.131 \text{ per day}$$

$$\times 365 = \$47.94$$

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

#### Equivalencies

1 gal. fuel oil	=	140,000 BTU's
1 gal. propane	=	90,000 BTU's
1 lb. propane	=	21,500 BTU's
1 gal. butane	=	100,000 BTU's
1 lb. butane	=	21,000 BTU's
1 kWh	=	3,413 BTU's
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	1,666
120°F	1,428
100°F	1,190
90°F	1,071
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)	Appliance Input Rating in Thousands of BTU per Hour																				
		3"			4"			5"			6"			7"			8"			9"		
		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	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	1,006	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	1,096	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	1,263	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	1,057	575	0	1,384	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	1,173	650	0	1,548	855
	2	9	81	56	13	166	112	14	283	185	18	432	280	27	613	394	33	826	535	42	1,072	700
	5	21	77	54	28	160	108	36	275	176	45	421	273	58	600	385	69	811	524	82	1,055	688
	10	27	70	50	37	150	102	48	262	171	59	405	261	77	580	371	91	788	507	107	1,028	668
	15	33	64	NA	44	141	96	57	249	163	70	389	249	90	560	357	105	765	490	124	1,002	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	932	518	0	1,297	708	0	1,730	952
	2	8	86	61	11	183	122	14	320	206	15	497	314	22	715	445	26	975	615	33	1,276	813
	5	20	82	NA	27	177	119	35	312	200	43	487	308	55	702	438	65	960	605	77	1,259	798
	10	26	76	NA	35	168	114	45	299	190	56	471	298	73	681	426	86	935	589	101	1,230	773
	15	59	70	NA	42	158	NA	54	287	180	66	455	288	85	662	413	100	911	572	117	1,203	747
	20	NA	NA	NA	50	149	NA	63	275	169	76	440	278	97	642	401	113	888	556	131	1,176	722
	30	NA	NA	NA	69	131	NA	84	250	NA	99	410	259	123	605	376	141	844	522	161	1,125	670
100	0	NA	NA	NA	0	218	NA	0	407	NA	0	665	400	0	997	560	0	1,411	770	0	1,908	1,040
	2	NA	NA	NA	10	194	NA	12	354	NA	13	566	375	18	831	510	21	1,155	700	25	1,536	935
	5	NA	NA	NA	26	189	NA	33	347	NA	40	557	369	52	820	504	60	1,141	692	71	1,519	926
	10	NA	NA	NA	33	182	NA	43	335	NA	53	542	361	68	801	493	80	1,118	679	94	1,492	910
	15	NA	NA	NA	40	174	NA	50	312	NA	62	528	353	80	782	482	93	1,095	666	109	1,465	895
	20	NA	NA	NA	47	166	NA	59	311	NA	71	513	344	90	763	471	105	1,073	653	122	1,438	880
	30	NA	NA	NA	NA	NA	NA	78	290	NA	92	483	NA	115	726	449	131	1,029	627	149	1,387	849
	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	147	428	NA	180	651	405	197	944	575	217	1,288	787

TABLE 21 ...continued

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

Height H (ft)	Lateral L (ft)	Appliance Input Rating in Thousands of BTU per Hour																							
		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							
6	0	0	1,121	570	0	1,645	850	0	2,267	1,170	0	2,983	1,530	0	3,802	1,960	0	4,721	2,430	0	5,737	2,950	0	6,853	3,520
	2	75	675	455	103	982	650	138	1,346	890	178	1,769	1,170	225	2,250	1,480	296	2,782	1,850	360	3,377	2,220	426	4,030	2,670
	4	110	668	445	147	975	640	191	1,338	880	242	1,761	1,160	300	2,242	1,475	390	2,774	1,835	469	3,370	2,215	555	4,023	2,660
	6	128	661	435	171	967	630	219	1,330	870	276	1,753	1,150	341	2,235	1,470	437	2,767	1,820	523	3,363	2,210	618	4,017	2,650
8	0	0	1,261	660	0	1,858	970	0	2,571	1,320	0	3,399	1,740	0	4,333	2,220	0	5,387	2,750	0	6,555	3,360	0	7,838	4,010
	2	71	770	515	98	1,124	745	130	1,543	1,020	168	2,030	1,340	212	2,584	1,700	278	3,196	2,110	336	3,882	2,560	401	4,634	3,050
	5	115	758	503	154	1,110	733	199	1,528	1,010	251	2,013	1,330	311	2,563	1,685	398	3,180	2,090	476	3,863	2,545	562	4,612	3,040
	8	137	746	490	180	1,097	720	231	1,514	1,000	289	2,000	1,320	354	2,552	1,670	450	3,163	2,070	537	3,850	2,530	630	4,602	3,030
10	0	0	1,377	720	0	2,036	1,060	0	2,825	1,450	0	3,742	1,925	0	4,782	2,450	0	5,955	3,050	0	7,254	3,710	0	8,682	4,450
	2	68	852	560	93	1,244	850	124	1,713	1,130	161	2,256	1,480	202	2,868	1,890	264	3,556	2,340	319	4,322	2,840	378	5,153	3,390
	5	112	839	547	149	1,229	829	192	1,696	1,105	243	2,238	1,461	300	2,849	1,871	382	3,536	2,318	458	4,301	2,818	540	5,132	3,371
	10	142	817	525	187	1,204	795	238	1,669	1,080	298	2,209	1,430	364	2,818	1,840	459	3,504	2,280	546	4,268	2,780	641	5,099	3,340
15	0	0	1,596	840	0	2,380	1,240	0	3,323	1,720	0	4,423	2,270	0	5,678	2,900	0	7,099	3,620	0	8,665	4,410	0	10,393	5,300
	2	63	1,019	675	86	1,495	985	114	2,062	1,350	147	2,719	1,770	186	3,467	2,260	239	4,304	2,800	290	5,232	3,410	346	6,251	4,080
	5	105	1,003	600	140	1,476	967	182	2,041	1,327	229	2,696	1,748	283	3,442	2,235	355	4,278	2,777	426	5,204	3,385	501	6,222	4,057
	10	135	977	635	177	1,446	936	227	2,009	1,289	283	2,659	1,712	346	3,402	2,193	432	4,234	2,739	510	5,159	3,343	599	6,175	4,019
20	0	0	1,756	930	0	2,637	1,350	0	3,701	1,900	0	4,948	2,520	0	6,376	3,250	0	7,988	4,060	0	9,785	4,980	0	11,753	6,000
	2	59	1,150	755	81	1,694	1,100	107	2,343	1,520	139	3,097	2,000	175	3,955	2,570	220	4,916	3,200	269	5,983	3,910	321	7,154	4,700
	5	101	1,133	738	135	1,674	1,079	174	2,320	1,489	219	3,071	1,978	270	3,926	2,544	337	4,885	3,174	403	5,950	3,880	475	7,119	4,662
	10	130	1,105	710	172	1,641	1,045	220	2,282	1,460	273	3,029	1,940	334	3,880	2,500	413	4,835	3,130	489	5,896	3,830	573	7,063	4,600
30	0	0	1,977	1,060	0	3,004	1,550	0	4,252	2,170	0	5,725	2,920	0	7,420	3,770	0	9,341	4,750	0	11,483	5,850	0	13,848	7,060
	2	54	1,351	865	74	2,004	1,310	98	2,786	1,800	127	3,696	2,380	159	4,734	3,050	199	5,900	3,810	241	7,194	4,650	285	8,617	5,600
	5	96	1,332	851	127	1,981	1,289	164	2,759	1,775	206	3,666	2,350	252	4,701	3,020	312	5,863	3,783	373	7,155	4,622	439	8,574	5,552
	10	125	1,301	829	164	1,944	1,254	209	2,716	1,733	259	3,617	2,300	316	4,647	2,970	386	5,803	3,739	456	7,090	4,574	535	8,505	5,471
50	0	0	2,231	1,195	0	3,441	1,825	0	4,934	2,550	0	6,711	3,440	0	8,774	4,460	0	11,129	5,635	0	13,767	6,940	0	16,694	8,430
	2	41	1,620	1,010	66	2,431	1,513	86	3,409	2,185	113	4,554	2,840	141	5,864	3,670	171	7,339	4,630	209	8,980	5,695	251	10,788	6,860
	5	90	1,600	996	118	2,406	1,495	151	3,380	2,102	191	4,520	2,813	234	5,826	3,639	283	7,295	4,597	336	8,933	5,654	394	10,737	6,818
	10	118	1,567	972	154	2,366	1,466	196	3,332	2,064	243	4,464	2,767	295	5,763	3,585	355	7,224	4,542	419	8,855	5,585	491	10,652	6,749
100	0	0	2,491	1,310	0	3,925	2,050	0	5,729	2,950	0	7,914	4,050	0	10,485	5,300	0	13,454	6,700	0	16,817	8,600	0	20,578	10,300
	2	30	1,975	1,170	44	3,027	1,830	72	4,313	2,550	95	5,834	3,500	120	7,591	4,600	138	9,577	5,800	169	11,803	7,200	204	14,264	8,800
	5	82	1,955	1,159	107	3,002	1,803	136	4,282	2,531	172	5,797	3,475	208	7,548	4,566	245	9,528	5,769	293	11,748	7,162	341	14,204	8,756
	10	108	1,923	1,142	142	2,961	1,775	180	4,231	2,500	223	5,737	3,434	268	7,478	4,509	318	9,447	5,717	374	11,658	7,100	436	14,105	8,683
100	15	126	1,892	1,124	163	2,920	1,747	206	4,182	2,469	252	5,678	3,392	304	7,409	4,451	358	9,367	5,665	418	11,569	7,037	487	14,007	8,610
	20	141	1,861	1,107	181	2,880	1,719	226	4,133	2,438	277	5,619	3,351	330	7,341	4,394	387	9,289	5,613	452	11,482	6,975	523	13,910	8,537
	30	170	1,802	1,071	215	2,803	1,663	265	4,037	2,375	319	5,505	3,267	378	7,209	4,279	446	9,136	5,509	514	11,310	6,850	592	13,720	8,391
	50	241	1,688	1,000	292	2,657	1,550	350	3,856	2,250	415	5,289	3,100	486	6,956	4,050	572	8,841	5,300	659	10,979	6,600	752	13,354	8,100

**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)	Appliance Input Rating in Thousands of BTU per Hour																										
		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	0	38	77	45	59	151	85	85	249	140	126	373	204	165	522	284	211	695	369	267	894	469	371	1,118	569	537	1,639	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	1,002	536	360	1,257	658	521	1,852	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	1,120	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	1,104	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	1,089	715
10	0	37	87	53	57	174	99	82	293	165	120	444	254	158	628	344	202	844	449	253	1,093	584	351	1,373	718	507	2,031	1,057
	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	1,242	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	1,224	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	1,194	788
15	0	36	93	57	56	190	111	80	325	186	116	499	283	153	713	388	195	966	523	244	1,259	681	336	1,591	838	488	2,374	1,237
	2	38	69	47	57	136	93	80	225	149	115	337	224	148	473	314	187	631	413	232	812	543	319	1,015	673	457	1,491	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	1,469	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	1,433	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	1,399	894	
20	0	35	96	60	54	200	118	78	346	201	114	537	306	149	772	428	190	1,053	573	238	1,379	750	326	1,751	927	473	2,631	1,346
	2	37	74	50	56	148	99	78	248	165	113	375	248	144	528	344	182	708	468	227	914	611	309	1,146	754	443	1,689	1,098
	5	50	68	47	73	140	94	100	239	158	141	363	239	178	514	334	224	692	457	279	896	596	381	1,126	734	547	1,665	1,074
	10	NA	NA	41	93	129	86	125	223	146	177	344	224	222	491	316	277	666	437	339	866	570	457	1,092	702	646	1,626	1,037
15	NA	NA	NA	NA	NA	80	155	208	136	216	325	210	264	469	301	325	640	419	393	838	549	526	1,060	677	730	1,587	1,005	
20	NA	NA	NA	NA	NA	NA	186	192	126	254	306	196	309	448	285	374	616	400	448	810	526	592	1,028	651	808	1,550	973	
30	0	34	99	63	53	211	127	76	372	219	110	584	334	144	849	472	184	1,168	647	229	1,542	852	312	1,971	1,056	454	2,996	1,545
	2	37	80	56	55	164	111	76	281	183	109	429	279	139	610	392	175	823	533	219	1,069	698	296	1,346	863	424	1,999	1,308
	5	49	74	52	72	157	106	98	271	173	136	417	271	171	595	382	215	806	521	269	1,049	684	366	1,324	846	524	1,971	1,283
	10	NA	NA	NA	91	144	98	122	255	168	171	397	257	213	570	367	265	777	501	327	1,017	662	440	1,287	821	620	1,927	1,243
15	NA	NA	NA	115	131	NA	151	239	157	208	377	242	255	547	349	312	750	481	379	985	638	507	1,251	794	702	1,884	1,205	
20	NA	NA	NA	NA	NA	NA	181	223	NA	246	357	228	298	524	333	360	723	461	433	955	615	570	1,216	768	780	1,841	1,166	
30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	389	477	305	461	670	426	541	895	574	704	1,147	720	937	1,759	1,101	
50	0	33	99	66	51	213	133	73	394	230	105	629	361	138	928	515	176	1,292	704	220	1,724	948	295	2,223	1,189	428	3,432	1,818
	2	36	84	61	53	181	121	73	318	205	104	495	312	133	712	443	168	971	613	209	1,273	811	280	1,615	1,007	401	2,426	1,509
	5	48	80	NA	70	174	117	94	308	198	131	482	305	164	696	435	204	953	602	257	1,252	795	347	1,591	991	496	2,396	1,490
	10	NA	NA	NA	89	160	NA	118	292	186	162	461	292	203	671	420	253	923	583	313	1,217	765	418	1,551	963	589	2,347	1,455
15	NA	NA	NA	112	148	NA	145	275	174	199	441	280	244	646	405	299	894	562	363	1,183	736	481	1,512	934	668	2,299	1,421	
20	NA	NA	NA	NA	NA	NA	176	257	NA	236	420	267	285	622	389	345	866	543	415	1,150	708	544	1,473	906	741	2,251	1,387	
30	NA	NA	NA	NA	NA	NA	NA	NA	NA	315	376	NA	373	573	NA	442	809	502	521	1,086	649	674	1,399	848	892	2,159	1,318	
100	0	NA	NA	NA	49	214	NA	69	403	NA	100	659	395	131	991	555	166	1,404	765	207	1,900	1,033	273	2,479	1,300	395	3,912	2,042
	2	NA	NA	NA	51	192	NA	70	351	NA	98	563	373	125	828	508	158	1,152	698	196	1,532	933	259	1,970	1,168	571	3,021	1,817
	5	NA	NA	NA	67	186	NA	90	342	NA	125	551	366	156	813	501	194	1,134	688	240	1,511	921	322	1,945	1,153	460	2,990	1,796
	10	NA	NA	NA	85	175	NA	113	324	NA	153	532	354	191	789	486	238	1,104	672	293	1,477	902	389	1,905	1,133	547	2,938	1,763
15	NA	NA	NA	132	162	NA	138	310	NA	188	511	343	230	764	473	281	1,075	656	342	1,443	884	447	1,865	1,110	618	2,888	1,730	
20	NA	NA	NA	NA	NA	NA	168	295	NA	224	487	NA	270	739	458	325	1,046	639	391	1,410	864	507	1,825	1,087	690	2,838	1,696	
30	NA	NA	NA	NA	NA	NA	231	264	NA	301	448	NA	355	685	NA	418	988	NA	491	1,343	824	631	1,747	1,041	834	2,739	1,627	
50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	540	584	NA	617	866	NA	711	1,205	NA	895	1,591	NA	1,138	2,547	1,489	

**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)

Height Lateral		Appliance Input Rating in Thousands of BTU per Hour																										
		3"			4"			5"			6"			7"			8"			9"			10"			12"		
		FAN	NAT	Max	FAN	NAT	Max	FAN	NAT	Max	FAN	NAT	Max	FAN	NAT	Max	FAN	NAT	Max	FAN	NAT	Max	FAN	NAT	Max	FAN	NAT	Max
H	L	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	1,024	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	1,007	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	1,144	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	1,124	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	1,093	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	1,376	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	1,352	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	1,315	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	1,280	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	1,083	627	121	1,548	953
	5	NA	NA	36	NA	NA	68	NA	NA	116	NA	NA	184	80	503	254	95	658	350	113	845	463	133	1,059	597	179	1,523	933
	10	NA	NA	NA	NA	NA	60	NA	NA	107	NA	NA	172	NA	NA	237	122	627	332	143	811	440	167	1,022	566	221	1,482	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	1,443	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	1,406	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	1,240	717	111	1,793	1,112
	5	NA	NA	NA	NA	NA	76	NA	NA	128	NA	NA	198	75	561	281	90	741	393	106	962	526	125	1,216	683	169	1,766	1,094
	10	NA	NA	NA	NA	NA	67	NA	NA	115	NA	NA	184	NA	NA	263	115	709	373	135	927	500	138	1,176	648	210	1,721	1,025
	15	NA	NA	NA	NA	NA	NA	NA	NA	107	NA	NA	171	NA	NA	243	NA	NA	353	156	893	476	181	1,139	621	239	1,679	981
	20	NA	NA	NA	NA	NA	NA	NA	NA	91	NA	NA	159	NA	NA	227	NA	NA	332	176	860	450	203	1,103	592	264	1,638	940
	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	188	NA	NA	288	NA	NA	416	249	1,035	555	318	1,560	877
50	2	NA	NA	NA	NA	NA	92	NA	NA	161	NA	NA	251	NA	NA	351	51	840	477	61	1,106	633	72	1,413	812	99	2,080	1,243
	5	NA	NA	NA	NA	NA	NA	NA	NA	151	NA	NA	230	NA	NA	323	83	819	445	98	1,083	596	116	1,387	774	155	2,052	1,225
	10	NA	NA	NA	NA	NA	NA	NA	NA	138	NA	NA	215	NA	NA	304	NA	NA	424	126	1,047	567	147	1,347	733	195	2,006	1,147
	15	NA	NA	NA	NA	NA	NA	NA	NA	127	NA	NA	199	NA	NA	282	NA	NA	400	146	1,010	539	170	1,307	702	222	1,961	1,099
	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	185	NA	NA	264	NA	NA	376	165	977	511	190	1,269	669	246	1,916	1,050
	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	327	NA	NA	468	233	1,196	623	295	1,832	984
<b>Minimum internal area of chimney in sq. inches</b>		12			19			28			38			50			63			78			95			132		
<b>Maximum internal area of chimney in sq. inches</b>		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)

Height H (ft)	Lateral L (ft)	Appliance Input Rating in Thousands of BTU per Hour																											
		3"			4"			5"			6"			7"			8"			9"			10"			12"			
		FAN	NAT	Max	FAN	NAT	Max	FAN	NAT	Max	FAN	NAT	Max	FAN	NAT	Max	FAN	NAT	Max	FAN	NAT	Max	FAN	NAT	Max	FAN	NAT	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	Min	Max	Max	Min
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	1,021	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	1,003	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	1,142	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	1,121	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	1,088	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	1,373	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	1,348	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	1,309	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	1,272	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	1,079	625	508	1,544	950	
	5	NA	NA	35	NA	NA	67	NA	NA	115	NA	NA	183	NA	NA	252	255	655	348	317	842	461	433	1,055	594	623	1,518	930	
	10	NA	NA	NA	NA	NA	59	NA	NA	105	NA	NA	170	NA	NA	235	312	622	330	382	806	437	517	1,016	562	733	1,475	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	1,435	835	
	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	1,394	800	
30	2	NA	NA	41	NA	NA	81	NA	NA	136	NA	NA	215	158	578	302	200	759	420	249	982	556	340	1,237	715	489	1,789	1,110	
	5	NA	NA	NA	NA	NA	75	NA	NA	127	NA	NA	196	NA	NA	279	245	737	391	306	958	524	417	1,210	680	600	1,760	1,090	
	10	NA	NA	NA	NA	NA	66	NA	NA	113	NA	NA	182	NA	NA	260	300	703	370	370	920	496	500	1,168	644	708	1,713	1,020	
	15	NA	NA	NA	NA	NA	NA	NA	NA	105	NA	NA	168	NA	NA	240	NA	NA	349	428	884	471	572	1,128	615	798	1,668	975	
	20	NA	NA	NA	NA	NA	NA	NA	NA	88	NA	NA	155	NA	NA	223	NA	NA	327	NA	NA	445	643	1,089	585	883	1,624	932	
	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	182	NA	NA	281	NA	NA	408	NA	NA	544	1,055	1,539	865	
50	2	NA	NA	NA	NA	NA	91	NA	NA	160	NA	NA	250	NA	NA	350	191	837	475	238	1,103	631	323	1,408	810	463	2,076	1,240	
	5	NA	NA	NA	NA	NA	NA	NA	NA	149	NA	NA	228	NA	NA	321	NA	NA	442	293	1,078	593	398	1,381	770	571	2,044	1,220	
	10	NA	NA	NA	NA	NA	NA	NA	NA	136	NA	NA	212	NA	NA	301	NA	NA	420	355	1,038	562	447	1,337	728	674	1,994	1,140	
	15	NA	NA	NA	NA	NA	NA	NA	NA	124	NA	NA	195	NA	NA	278	NA	NA	395	NA	NA	533	546	1,294	695	761	1,945	1,090	
	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	180	NA	NA	258	NA	NA	370	NA	NA	504	616	1,251	660	844	1,898	1,040	
	30	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	318	NA	NA	458	NA	NA	610	1,009	1,805	970	
<b>Minimum</b> internal area of chimney in sq. inches		12			19			28			38			50			63			78			95			132			
<b>Maximum</b> 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)	Appliance Input Rating in Thousands of BTU per Hour Maximum Appliance Input Rating in Thousands of Btu per Hour							
		3"	4"	5"	6"	7"	8"	10"	12"
6	0	39	70	116	170	232	312	500	750
	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	1,040
	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
	25	NA	NA	NA	NA	NA	NA	NA	NA
20	0	53	101	163	252	342	470	770	1,190
	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	1,370
	2	44	84	148	230	320	441	730	1,140
	5	NA	78	137	210	296	410	694	1,080
	10	NA	68	125	196	274	388	656	1,050
	15	NA	NA	113	177	258	366	625	1,000
	20	NA	NA	99	163	240	344	596	960
	25	NA	NA	NA	NA	192	295	540	890
	30	NA	NA	NA	NA	NA	NA	NA	NA
50	0	NA	120	210	310	443	590	980	1,550
	2	NA	95	171	260	370	492	820	1,290
	5	NA	NA	159	234	342	474	780	1,230
	10	NA	NA	146	221	318	456	730	1,190
	15	NA	NA	NA	200	292	407	705	1,130
	20	NA	NA	NA	185	276	384	670	1,080
	30	NA	NA	NA	NA	222	330	605	1,010

**TABLE 26**

**Capacity of Single-Wall Metal Pipe or Type B Cement Vents**  
(serving a two or more draft hood-equipped appliances)

Total Vent Height (ft)	Conn. Rise (ft)	Maximum Appliance Rating in Thousands of Btu per Hour					
		3"	4"	5"	6"	7"	8"
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 (ft)	Combined appliance input rating in thousands of Btu per hour						
	4"	5"	6"	7"	8"	10"	12"
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	1,190

**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)	Conn. Rise R (ft)	Appliance Input Rating Limit in Thousands of Btu per Hour																							
		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	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
8	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
10	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
15	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
20	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
30	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
50	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	1,014	478
	3	22	75	48	33	141	86	46	229	134	61	366	194	83	502	263	103	661	343	126	842	441	151	1,043	538
100	1	18	82	37	28	158	66	40	262	104	53	442	150	73	611	204	91	810	266	112	1,038	341	135	1,285	417
	2	19	83	44	30	161	79	42	267	123	55	447	178	75	619	242	94	822	316	115	1,054	405	139	1,306	494
	3	20	84	50	31	163	89	44	272	138	57	452	200	78	627	272	97	834	355	118	1,069	455	142	1,327	555

**Common Vent Capacity**

Vent Height H (ft)	Appliance Input Rating Limit in Thousands of Btu per Hour																				
	4"			5"			6"			7"			8"			9"			10"		
	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT
	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+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	480	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	1,035	826	640
30	152	138	118	244	210	185	361	297	266	547	459	360	720	585	470	979	808	605	1,209	975	740
50	167	153	134	279	244	214	421	353	310	641	547	423	854	706	550	1,164	977	705	1,451	1,188	860
100	175	163	NA	311	277	NA	489	421	NA	751	658	479	1,025	873	625	1,408	1,215	800	1,784	1,502	975



TABLE 27 ... continued

### Vent Connector Capacity

Type B Double-Wall Vent and Connector Diameter – D

Vent Height H (ft)	Conn. Rise R (ft)	Appliance Input Rating Limit in Thousands of Btu per Hour																				
		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	1,046	653	281	1,371	853	346	1,772	1,080	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2	180	897	616	230	1,231	827	287	1,617	1,081	352	2,069	1,370	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	1,126	696	298	1,478	910	365	1,920	1,150	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2	192	952	644	244	1,307	884	305	1,719	1,150	372	2,211	1,460	471	2,737	1,800	560	3,319	2,180	662	3,957	2,590
	3	198	1,050	772	252	1,445	1,072	313	1,902	1,390	380	2,434	1,770	478	3,018	2,180	568	3,665	2,640	669	4,373	3,130
10	1	196	870	536	249	1,195	730	311	1,570	955	379	2,049	1,205	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2	201	997	664	256	1,371	924	318	1,804	1,205	387	2,332	1,535	486	2,887	1,890	581	3,502	2,280	686	4,175	2,710
	3	207	1,095	792	263	1,509	1,118	325	1,989	1,455	395	2,556	1,865	494	3,169	2,290	589	3,849	2,760	694	4,593	3,270
15	1	214	967	568	272	1,334	790	336	1,760	1,030	408	2,317	1,305	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2	221	1,085	712	279	1,499	1,006	344	1,978	1,320	416	2,579	1,665	523	3,197	2,060	624	3,881	2,490	734	4,631	2,960
	3	228	1,181	856	286	1,632	1,222	351	2,157	1,610	424	2,796	2,025	533	3,470	2,510	634	4,216	3,030	743	5,035	3,600
20	1	223	1,051	596	291	1,443	840	357	1,911	1,095	430	2,533	1,385	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2	230	1,162	748	298	1,597	1,064	365	2,116	1,395	438	2,778	1,765	554	3,447	2,180	661	4,190	2,630	772	5,005	3,130
	3	237	1,253	900	307	1,726	1,288	373	2,287	1,695	450	2,984	2,145	567	3,708	2,650	671	4,511	3,190	785	5,392	3,790
30	1	216	1,217	632	286	1,664	910	367	2,183	1,190	461	2,891	1,540	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2	223	1,316	792	294	1,802	1,160	376	2,366	1,510	474	3,110	1,920	619	3,840	2,365	728	4,861	2,860	847	5,606	3,410
	3	231	1,400	592	303	1,920	1,410	384	2,524	1,830	485	3,299	2,340	632	4,080	2,875	741	4,976	3,480	860	5,961	4,150
50	1	206	1,479	689	273	2,023	1,007	350	2,659	1,315	435	3,548	1,665	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2	213	1,561	860	281	2,139	1,291	359	2,814	1,685	447	3,730	2,135	581	4,601	2,633	709	5,569	3,185	851	6,633	3,790
	3	221	1,631	1,031	290	2,242	1,575	369	2,951	2,055	461	3,893	2,605	594	4,808	3,208	724	5,826	3,885	867	6,943	4,620
100	1	192	1,923	712	254	2,644	1,050	326	3,490	1,370	402	4,707	1,740	NA	NA	NA	NA	NA	NA	NA	NA	NA
	2	200	1,984	888	263	2,731	1,346	336	3,606	1,760	414	4,842	2,220	523	5,982	2,750	639	7,254	3,330	769	8,650	3,950
	3	208	2,035	1,064	272	2,811	1,642	346	3,714	2,150	426	4,968	2,700	539	6,143	3,350	654	7,453	4,070	786	8,892	4,810

### Common Vent Capacity

Vent Height H (ft)	Combined Appliance Input Rating Limit in Thousands of Btu per Hour																				
	12"			14"			16"			18"			20"			22"			24"		
	FAN		Nat	FAN		Nat	FAN		Nat	FAN		Nat	FAN		Nat	FAN		Nat	FAN		Nat
	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT
6	900	696	588	1,284	990	815	1,735	1,336	1,065	2,253	1,732	1,345	2,838	2,180	1,660	3,488	2,677	1,970	4,206	3,226	2,390
8	994	773	652	1,423	1,103	912	1,927	1,491	1,190	2,507	1,936	1,510	3,162	2,439	1,860	3,890	2,998	2,220	4,695	3,616	2,680
10	1,076	841	712	1,342	1,200	995	2,093	1,625	1,300	2,727	2,113	1,645	3,444	2,665	2,030	4,241	3,278	2,400	5,123	3,957	2,920
15	1,247	986	825	1,794	1,410	1,158	2,440	1,910	1,510	3,184	2,484	1,910	4,026	3,133	2,360	4,971	3,862	2,790	6,016	4,670	3,400
20	1,405	1,116	916	2,006	1,588	1,290	2,722	2,147	1,690	3,561	2,798	2,140	4,548	3,552	2,640	5,573	4,352	3,120	6,749	5,261	3,800
30	1,658	1,327	1,025	2,373	1,892	1,525	3,220	2,558	1,990	4,197	3,326	2,520	5,303	4,193	3,110	6,539	5,157	3,680	7,940	6,247	4,480
50	2,024	1,640	1,280	2,911	2,347	1,863	3,964	3,183	2,430	5,184	4,149	3,075	6,567	5,240	3,800	8,116	6,458	4,500	9,837	7,813	5,475
100	2,569	2,131	1,670	3,732	3,076	2,450	5,125	4,202	3,200	6,749	5,509	4,050	8,597	6,986	5,000	10,681	8,648	5,920	13,004	10,499	7,200

**TABLE 28**

**Capacity of Type B Double-Wall Vent with Single-Wall Connectors**

(serving two or more Category 1 Appliances)

Vent Height H (ft)		Conn. Rise R (ft)		Appliance Input Rating Limit in Thousands of Btu per Hour																							
				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	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	1,013	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	1,236	393		
	2	48	80	41	75	153	73	110	255	115	160	428	167	212	593	228	279	788	299	358	1,011	383	490	1,259	469		
	3	51	81	46	79	157	85	114	260	129	168	433	190	222	603	256	289	801	339	368	1,027	431	506	1,280	527		

**Common Vent Capacity**

Vent Height H (ft)		Combined Appliance Input Rating Limit in Thousands of Btu per Hour																				
		4"			5"			6"			7"			8"			9"			10"		
		FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT
		+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+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	1,013	808	626	
30	145	132	113	236	202	180	350	286	257	533	446	349	703	570	459	958	790	593	1,183	952	723	
50	159	145	128	268	233	208	406	337	296	622	529	410	833	686	535	1,139	954	689	1,418	1,157	838	
100	166	153	NA	297	263	NA	469	398	NA	726	633	464	999	846	606	1,378	1,185	780	1,741	1,459	948	

**TABLE 29**

**Capacity of Masonry Chimney with Type B Double-Wall Connectors**

(serving two or more Category 1 Appliances)

		Appliance Input Rating Limit in Thousands of Btu per Hour																							
Vent Height H (ft)	Conn. 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	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	452
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	1,011	452
	3	26	63	35	40	123	65	57	204	104	75	353	157	104	493	222	129	661	301	156	851	396	187	1,067	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	1,115	432
	2	25	60	32	38	122	58	54	208	95	72	376	145	99	531	209	122	715	287	149	928	378	179	1,171	484
	3	26	64	36	40	131	66	56	221	107	74	392	163	101	554	233	125	746	317	152	968	418	182	1,220	535
50	1	23	51	25	36	116	51	51	209	89	67	405	143	92	582	213	113	798	294	140	1,049	392	168	1,334	506
	2	24	59	32	37	127	61	53	225	102	70	421	161	95	604	235	118	827	326	143	1,085	433	172	1,379	558
	3	26	64	36	39	135	69	55	237	115	72	435	180	98	624	260	121	854	357	147	1,118	474	176	1,421	611
100	1	23	46	24	35	108	50	49	208	92	65	428	155	88	640	237	109	907	334	134	1,222	454	161	1,589	596
	2	24	53	31	37	120	60	51	224	105	67	444	174	92	660	260	113	933	368	138	1,253	497	165	1,626	651
	3	25	39	35	38	130	68	53	237	118	69	458	193	94	679	285	116	956	399	141	1,282	540	169	1,661	705

**Common Vent Capacity**

**Minimum Internal Area of Masonry Chimney Flue (in<sup>2</sup>)**

		Combined Appliance Input Rating Limit in Thousands of Btu per Hour																							
Vent Height H (ft)		12"			19"			28"			38"			50"			63"			78"			113"		
		FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT
		+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT
6		NA	74	25	NA	119	46	NA	178	71	NA	257	103	NA	351	143	NA	458	188	NA	582	246	1,041	853	NA
8		NA	80	28	NA	130	53	NA	193	82	NA	279	119	NA	384	163	NA	501	218	724	636	278	1,144	937	408
10		NA	84	31	NA	138	56	NA	207	90	NA	299	131	NA	409	177	606	538	236	776	686	302	1,226	1,010	454
15		NA	NA	36	NA	152	67	NA	233	106	NA	334	152	523	467	212	682	611	283	874	781	365	1,374	1,156	546
20		NA	NA	41	NA	NA	75	NA	250	122	NA	368	172	565	508	243	742	668	325	955	858	419	1,513	1,286	648
30		NA	NA	NA	NA	NA	NA	NA	270	137	NA	404	198	615	564	278	816	747	381	1,062	969	496	1,702	1,473	749
50		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	620	328	879	831	461	1,165	1,089	606	1,905	1,692	922
100		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	348	NA	NA	499	NA	NA	669	2,053	1,921	1,058

**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)	Conn. Rise R (ft)	Appliance Input Rating Limit in Thousands of Btu per Hour																							
		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	1,042	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	1,089	421
	2	NA	NA	31	91	119	57	132	203	93	201	366	142	269	518	205	348	699	282	442	908	372	613	1,145	473
	3	NA	NA	35	95	127	65	138	216	105	209	381	160	277	540	229	358	729	312	452	946	412	626	1,193	524
50	1	NA	NA	24	85	113	50	124	204	87	188	392	139	252	567	208	328	778	287	417	1,022	383	582	1,302	492
	2	NA	NA	31	89	123	60	130	218	100	196	408	158	262	588	230	339	806	320	429	1,058	425	596	1,346	545
	3	NA	NA	35	94	131	68	136	231	112	205	422	176	271	607	255	349	831	351	440	1,090	466	610	1,386	597
100	1	NA	NA	23	84	104	49	122	200	89	182	410	151	243	617	232	315	875	328	402	1,181	444	560	1,537	580
	2	NA	NA	30	88	115	59	127	215	102	190	425	169	253	636	254	326	899	361	415	1,210	488	575	1,570	634
	3	NA	NA	34	93	124	67	133	228	115	199	438	188	262	654	279	337	921	392	427	1,238	529	589	1,604	687

**Common Vent Capacity**

Minimum internal area of masonry chimney flue (in<sup>2</sup>)

Vent Height H (ft)	Combined Appliance Input Rating Limit in Thousands of Btu per Hour																							
	12"			19"			28"			38"			50"			63"			78"			113"		
	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT	FAN		NAT
	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+NAT	+FAN	+FAN	+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	1,136	928	405
10	NA	NA	31	NA	136	56	NA	205	89	NA	295	129	NA	405	175	NA	532	234	771	680	300	1,216	1,000	450
15	NA	NA	36	NA	NA	66	NA	230	105	NA	335	150	NA	400	210	677	602	280	866	772	360	1,359	1,139	540
20	NA	NA	NA	NA	NA	74	NA	247	120	NA	362	170	NA	503	240	765	661	321	947	849	415	1,495	1,264	640
30	NA	NA	NA	NA	NA	NA	NA	NA	135	NA	398	195	NA	558	275	808	739	377	1,052	957	490	1,682	1,447	740
50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	612	325	NA	821	456	1,152	1,076	600	1,879	1,672	910
100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	494	NA	NA	663	2,006	1,885	1,046

## 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	1.4	119	92	27	59,000	1.5	2.3
40SK	38	2.3	198	165	33	105,000	1.5	3.4
50SK	45	2.3	205	165	40	105,000	1.1	3.4
80SK	75	2.8	259	189	70	120,000	0.8	3.5
119SK	110	2.8	291	189	102	120,000	1.2	3.5

**NOTES:**

\* Based on 77°F rise with 58°F potable water inlet temperature at 14 GPM heat source flow rate. Heat source temperature was 180°F.

\*\* Minimum Coil output based on continuous boiler operation over 30 minutes. See Section III for additional considerations.

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 8 GPM*	180°F 10 GPM*	180°F 12 GPM*	200°F 8 GPM*	200°F 10 GPM*	200°F 12 GPM*	200°F 14 GPM*
30SK	115 @ 56,000	117 @ 57,000	118 @ 58,000	138 @ 71,000	144 @ 75,000	149 @ 78,000	154 @ 81,000
40SK	173 @ 89,000	183 @ 96,000	191 @ 101,000	214 @ 115,000	226 @ 123,000	235 @ 129,000	243 @ 134,000
50SK	180 @ 89,000	190 @ 96,000	198 @ 101,000	221 @ 115,000	233 @ 123,000	242 @ 129,000	250 @ 134,000
80SK	233 @ 104,000	245 @ 111,000	254 @ 117,000	277 @ 132,000	292 @ 141,000	304 @ 149,000	314 @ 155,000
119SK	265 @ 104,000	277 @ 111,000	286 @ 117,000	309 @ 132,000	324 @ 141,000	336 @ 149,000	346 @ 155,000

**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	DELIVERY (GAL)										Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.				
OT125	99	125,000	99	129	159	189	249	339	429	790	1,150	6.00	360	16	
OT150	99	150,000	105	141	177	213	285	393	501	934	1,366	7.20	432	14	
OT199	99	199,000	117	165	213	260	356	499	643	1,216	1,789	9.56	573	10	
OT200	100	199,999	118	165	213	260	355	498	640	1,210	1,781	9.50	570	11	
OT250	100	250,000	129	188	246	305	423	599	775	1,481	2,186	11.75	705	9	
OT299	100	299,999	140	210	279	349	489	698	907	1,745	2,582	13.96	837	7	
OT300	125	300,000	159	230	301	373	515	729	943	1,798	2,654	14.26	855	9	
OT400	125	399,999	182	276	370	464	652	934	1,216	2,344	3,473	18.81	1,128	7	
OT500	125	500,000	204	320	436	553	785	1,134	1,483	2,879	4,274	23.26	1,396	5	
60HEC-125	60	125,000	88	118	148	178	238	328	418	778	1,138	6.00	360	10	
60HEC-150	60	150,000	91	126	160	195	265	370	474	893	1,312	6.98	419	9	
60HEC-199	60	199,000	101	147	193	238	330	467	605	1,154	1,704	9.16	549	7	
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	3,515	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	
75-76SKG	73	76,000	75	90	105	121	152	198	244	429	613	3.08	185	24	
100-76SKG	98	76,000	95	110	126	141	172	218	264	449	634	3.08	185	32	
EZ 75-76	75	76,000	75	90	106	121	151	197	242	425	607	3.04	182	25	
EZ 76-76PDV	75	76,000	76	92	107	122	153	199	246	430	615	3.08	185	24	
EZ 100-76	100	76,000	95	110	126	141	171	217	262	445	627	3.04	182	33	
EZ 100-76PDV	100	76,000	96	112	127	143	173	220	266	451	635	3.08	185	32	
EZ 75-135	67	135,000	81	108	135	162	216	297	378	702	1,026	5.40	324	12	
EZ 80-156	80	156,000	95	126	158	189	251	345	439	813	1,188	6.24	375	13	
EZ 80-199	80	199,000	104	144	183	223	303	422	542	1,020	1,497	7.96	478	10	
EZ 90-199	90	199,000	112	152	191	231	311	430	550	1,028	1,505	7.96	478	11	
EZ 100-199	100	199,000	120	160	199	239	319	438	558	1,036	1,513	7.96	478	13	
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	
80W-505SD	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	
72PG	67	199,000	90	128	167	205	282	396	511	971	1,431	7.66	460	9	
120PG	113	155,000	118	148	178	208	268	358	448	809	1,169	6.01	361	19	
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	768	1,121	1,474	2,886	4,298	23.53	1,412	4	



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

Model	Volume	Input	DELIVERY (GAL)									Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.			
32E	32	104,000	48	69	90	112	154	218	282	538	794	4.27	256	8
32PPC	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
50ES	50	140,000	69	97	126	154	211	296	381	721	1,062	5.67	340	9
51EC	50	152,000	70	101	131	162	222	314	405	770	1,135	6.08	365	8
51PPC	50	152,000	73	105	138	171	236	334	432	824	1,216	6.53	392	8
72E	67	199,000	93	133	173	213	292	412	531	1,009	1,487	7.96	478	8
120E	113	155,000	120	151	181	212	273	365	457	824	1,192	6.12	367	18
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	705	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	DELIVERY (GAL)									Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.			
OT125	99	125,000	93	117	141	165	213	285	357	646	934	4.80	288	21
OT150	99	150,000	98	127	156	185	242	329	415	761	1,107	5.76	346	17
OT199	99	199,000	108	146	184	222	299	413	528	987	1,445	7.64	459	13
OT200	100	199,999	108	146	184	222	298	412	526	982	1,439	7.60	456	13
OT250	100	250,000	117	164	211	258	352	493	634	1,198	1,763	9.40	564	11
OT299	100	299,999	126	182	237	293	405	572	740	1,410	2,080	11.16	670	9
OT300	125	300,000	145	202	259	316	430	601	772	1,456	2,140	11.40	684	11
OT400	125	399,999	163	238	313	388	539	765	990	1,893	2,796	15.05	903	8
OT500	125	500,000	181	274	367	460	646	925	1,204	2,320	3,437	18.61	1,116	7
60HEC-125	60	125,000	82	106	130	154	202	274	346	634	922	4.80	288	12
60HEC-150	60	150,000	84	112	140	167	223	307	391	726	1,061	5.58	335	11
60HEC-199	60	199,000	92	128	165	202	275	385	495	934	1,374	7.33	440	8
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	8
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	1,084	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
75-76SKG	73	76,000	71	84	96	108	133	170	207	355	503	2.46	148	30
100-76SKG	98	76,000	92	104	116	129	153	190	227	375	523	2.46	148	40
EZ 75-76	75	76,000	72	84	96	109	133	169	206	352	498	2.43	146	31
EZ 76-76PDV	75	76,000	73	85	98	110	135	172	209	356	504	2.46	148	30
EZ 100-76	100	76,000	92	104	116	129	153	189	226	372	518	2.43	146	41
EZ 100-76PDV	100	76,000	93	106	118	130	155	192	229	377	524	2.46	148	41
EZ 75-135	67	135,000	75	97	118	140	183	248	313	572	832	4.32	259	16
EZ 80-156	80	156,000	89	114	139	164	214	289	364	663	963	4.99	300	16
EZ 80-199	80	199,000	96	128	160	191	255	351	446	828	1,211	6.37	382	13
EZ 90-199	90	199,000	104	136	168	199	263	359	454	836	1,219	6.37	382	14
EZ 100-199	100	199,000	112	144	176	207	271	367	462	844	1,227	6.37	382	16
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	625,000	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
72PG	67	199,000	82	113	144	174	236	328	419	787	1,155	6.13	368	11
120PG	113	155,000	112	136	160	184	232	304	376	664	953	4.81	288	24
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

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

Model	Volume	Input	DELIVERY (GAL)										Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.				
32E	32	104,000	43	60	77	94	129	180	231	436	641	3.41	205	9	
32PPC	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	
50ES	50	140,000	63	86	109	131	177	245	313	585	857	4.54	272	11	
51EC	50	152,000	64	89	113	137	186	259	332	624	916	4.87	292	10	
51PPC	50	152,000	66	92	118	145	197	275	354	667	981	5.23	314	10	
72E	67	199,000	85	117	149	181	245	340	436	818	1,200	6.37	382	11	
120E	113	155,000	114	138	163	187	236	310	383	677	971	4.90	294	23	
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	
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	DELIVERY (GAL)									Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.			
OT125	99	125,000	89	109	129	149	189	249	309	549	790	4.00	240	25
OT150	99	150,000	93	117	141	165	213	285	357	646	934	4.80	288	21
OT199	99	199,000	101	133	165	197	260	356	452	834	1,216	6.37	382	16
OT200	100	199,999	102	133	165	197	260	355	450	830	1,210	6.34	380	16
OT250	100	250,000	109	148	188	227	305	423	540	1,010	1,481	7.84	470	13
OT299	100	299,999	117	163	210	256	349	489	628	1,186	1,745	9.30	558	11
OT300	125	300,000	135	183	230	278	373	515	658	1,228	1,798	9.50	570	13
OT400	125	399,999	150	213	276	338	464	652	840	1,592	2,344	12.54	752	10
OT500	125	500,000	165	243	320	398	553	785	1,018	1,948	2,879	15.51	930	8
60HEC-125	60	125,000	78	98	118	138	178	238	298	538	778	4.00	240	15
60HEC-150	60	150,000	79	102	126	149	195	265	335	614	893	4.65	279	13
60HEC-199	60	199,000	86	116	147	177	238	330	422	788	1,154	6.11	366	10
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
75-76SKG	73	76,000	69	80	90	100	121	152	182	305	429	2.05	123	36
100-76SKG	98	76,000	90	100	110	120	141	172	203	326	449	2.05	123	48
EZ 75-76	75	76,000	70	80	90	101	121	151	182	303	425	2.03	122	37
EZ 76-76PDV	75	76,000	71	81	92	102	122	153	184	307	430	2.05	123	37
EZ 100-76	100	76,000	90	100	110	121	141	171	202	323	445	2.03	122	49
EZ 100-76PDV	100	76,000	91	102	112	122	143	173	204	327	451	2.05	123	49
EZ 75-135	67	135,000	72	90	108	126	162	216	270	486	702	3.60	216	19
EZ 80-156	80	156,000	85	106	126	147	189	251	314	563	813	4.16	250	19
EZ 80-199	80	199,000	91	117	144	170	223	303	383	701	1,020	5.31	319	15
EZ 90-199	90	199,000	99	125	152	178	231	311	391	709	1,028	5.31	319	17
EZ 100-199	100	199,000	107	133	160	186	239	319	399	717	1,036	5.31	319	19
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
72PG	67	199,000	77	103	128	154	205	282	358	665	971	5.11	307	13
120PG	113	155,000	108	128	148	168	208	268	328	568	809	4.01	240	28
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

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

Model	Volume	Input	DELIVERY (GAL)									Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.			
32E	32	104,000	40	55	69	83	112	154	197	367	538	2.84	171	11
32PPC	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
50ES	50	140,000	59	78	97	116	154	211	267	494	721	3.78	227	13
51EC	50	152,000	60	81	101	121	162	222	283	527	770	4.05	243	12
51PPC	50	152,000	62	84	105	127	171	236	301	563	824	4.36	261	11
72E	67	199,000	80	107	133	160	213	292	372	691	1,009	5.31	319	13
120E	113	155,000	110	130	151	171	212	273	334	579	824	4.08	245	28
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	DELIVERY (GAL)									Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.			
OT125	99	125,000	86	104	121	138	172	224	275	481	687	3.43	206	29
OT150	99	150,000	90	110	131	152	193	255	316	563	810	4.12	247	24
OT199	99	199,000	97	124	151	179	233	315	397	725	1,052	5.46	328	18
OT200	100	199,999	97	124	151	179	233	314	396	722	1,048	5.43	326	18
OT250	100	250,000	104	137	171	204	272	372	473	876	1,279	6.72	403	15
OT299	100	299,999	110	150	190	229	309	429	548	1,027	1,505	7.97	478	13
OT300	125	300,000	128	169	210	250	332	454	576	1,065	1,554	8.15	489	15
OT400	125	399,999	141	195	249	302	410	571	732	1,377	2,022	10.75	645	12
OT500	125	500,000	154	220	287	353	486	686	885	1,682	2,480	13.29	797	9
60HEC-125	60	125,000	75	92	109	126	160	212	263	469	675	3.43	206	17
60HEC-150	60	150,000	76	96	116	136	175	235	295	534	774	3.99	239	15
60HEC-199	60	199,000	81	108	134	160	212	291	369	683	997	5.23	314	11
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
75-76SKG	73	76,000	68	77	86	94	112	138	165	270	376	1.76	106	41
100-76SKG	98	76,000	88	97	106	115	132	159	185	291	396	1.76	106	56
EZ 75-76	75	76,000	69	77	86	95	112	138	164	269	373	1.74	104	43
EZ 76-76PDV	75	76,000	70	78	87	96	114	140	166	272	377	1.76	106	43
EZ 100-76	100	76,000	89	97	106	115	132	158	184	289	393	1.74	104	58
EZ 100-76PDV	100	76,000	90	99	107	116	134	160	187	292	398	1.76	106	57
EZ 75-135	67	135,000	69	84	100	115	146	193	239	424	609	3.09	185	22
EZ 80-156	80	156,000	82	100	118	135	171	225	278	492	706	3.57	214	22
EZ 80-199	80	199,000	87	110	132	155	201	269	337	610	883	4.55	273	18
EZ 90-199	90	199,000	95	118	140	163	209	277	345	618	891	4.55	273	20
EZ 100-199	100	199,000	103	126	148	171	217	285	353	626	899	4.55	273	22
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	1,044	5
72PG	67	199,000	73	95	117	139	183	249	314	577	840	4.38	263	15
120PG	113	155,000	105	122	139	156	191	242	294	500	706	3.43	206	33
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



**TABLE 40****DELIVERY AT 70°F RISE – OIL**

Model	Volume	Input	DELIVERY (GAL)									Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.			
32E	32	104,000	38	51	63	75	99	136	172	319	465	2.44	146	13
32PPC	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
50ES	50	140,000	57	73	89	105	138	186	235	429	624	3.24	194	15
51EC	50	152,000	57	75	92	110	144	196	249	457	666	3.48	209	14
51PPC	50	152,000	59	77	96	115	152	208	264	488	712	3.73	224	13
72E	67	199,000	76	99	122	145	190	258	327	600	873	4.55	273	15
120E	113	155,000	107	124	142	159	194	247	299	509	719	3.50	210	32
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	DELIVERY (GAL)									Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.			
OT125	99	125,000	84	99	114	129	159	204	249	429	610	3.00	180	33
OT150	99	150,000	87	105	123	141	177	231	285	501	718	3.60	216	27
OT199	99	199,000	93	117	141	165	213	284	356	643	929	4.78	287	21
OT200	100	199,999	94	118	141	165	213	284	355	640	925	4.75	285	21
OT250	100	250,000	99	129	158	188	246	334	423	775	1,128	5.88	353	17
OT299	100	299,999	105	140	175	210	279	384	489	907	1,326	6.98	419	14
OT300	125	300,000	123	159	194	230	301	408	515	943	1,371	7.13	428	18
OT400	125	399,999	135	182	229	276	370	511	652	1,216	1,780	9.40	564	13
OT500	125	500,000	146	204	262	320	436	611	785	1,483	2,181	11.63	698	11
60HEC-125	60	125,000	73	88	103	118	148	193	238	418	598	3.00	180	20
60HEC-150	60	150,000	73	91	108	126	160	213	265	474	684	3.49	209	17
60HEC-199	60	199,000	78	101	124	147	193	261	330	605	879	4.58	275	13
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
75-76SKG	73	76,000	67	75	82	90	105	128	152	244	336	1.54	92	47
100-76SKG	98	76,000	87	95	102	110	126	149	172	264	357	1.54	92	64
EZ 75-76	75	76,000	68	75	83	90	106	128	151	242	334	1.52	91	49
EZ 76-76PDV	75	76,000	68	76	84	92	107	130	153	246	338	1.54	92	49
EZ 100-76	100	76,000	88	95	103	110	126	148	171	262	354	1.52	91	66
EZ 100-76PDV	100	76,000	89	96	104	112	127	150	173	266	358	1.54	92	65
EZ 75-135	67	135,000	67	81	94	108	135	175	216	378	540	2.70	162	25
EZ 80-156	80	156,000	80	95	111	126	158	204	251	439	626	3.12	187	26
EZ 80-199	80	199,000	84	104	124	144	183	243	303	542	781	3.98	239	20
EZ 90-199	90	199,000	92	112	132	152	191	251	311	550	789	3.98	239	23
EZ 100-199	100	199,000	100	120	140	160	199	259	319	558	797	3.98	239	25
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
72PG	67	199,000	71	90	109	128	167	224	282	511	741	3.83	230	17
120PG	113	155,000	103	118	133	148	178	223	268	448	628	3.00	180	38
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

**TABLE 42**

**DELIVERY AT 80°F RISE – OIL**

Model	Volume	Input	DELIVERY (GAL)									Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.			
32E	32	104,000	37	48	58	69	90	122	154	282	410	2.13	128	15
32PPC	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
50ES	50	140,000	55	69	83	97	126	168	211	381	551	2.84	170	18
51EC	50	152,000	55	70	86	101	131	177	222	405	587	3.04	182	16
51PPC	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	113	155,000	105	120	135	151	181	227	273	457	641	3.06	184	37
190E	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	9
250E-1500	247	1,500,000	369	528	687	846	1,164	1,641	2,118	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	DELIVERY (GAL)									Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.			
OT125	99	125,000	83	96	109	123	149	189	229	389	549	2.67	160	37
OT150	99	150,000	85	101	117	133	165	213	261	453	646	3.20	192	31
OT199	99	199,000	91	112	133	154	197	260	324	579	834	4.25	255	23
OT200	100	199,999	91	112	133	154	197	260	323	577	830	4.22	253	24
OT250	100	250,000	96	122	148	174	227	305	383	697	1,010	5.22	313	19
OT299	100	299,999	101	132	163	194	256	349	442	814	1,186	6.20	372	16
OT300	125	300,000	119	151	183	214	278	373	468	848	1,228	6.34	380	20
OT400	125	399,999	129	171	213	255	338	464	589	1,091	1,592	8.36	502	15
OT500	125	500,000	139	191	243	294	398	553	708	1,328	1,948	10.34	620	12
60HEC-125	60	125,000	71	84	98	111	138	178	218	378	538	2.67	160	22
60HEC-150	60	150,000	71	87	102	118	149	195	242	428	614	3.10	186	19
60HEC-199	60	199,000	76	96	116	137	177	238	299	544	788	4.07	244	15
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
75-76SKG	73	76,000	66	73	80	87	100	121	141	223	305	1.37	82	53
100-76SKG	98	76,000	86	93	100	107	120	141	161	244	326	1.37	82	72
EZ 75-76	75	76,000	67	74	80	87	101	121	141	222	303	1.35	81	55
EZ 76-76PDV	75	76,000	68	74	81	88	102	122	143	225	307	1.37	82	55
EZ 100-76	100	76,000	87	94	100	107	121	141	161	242	323	1.35	81	74
EZ 100-76PDV	100	76,000	88	95	102	108	122	143	163	245	327	1.37	82	73
EZ 75-135	67	135,000	66	78	90	102	126	162	198	342	486	2.40	144	28
EZ 80-156	80	156,000	78	92	106	119	147	189	230	397	563	2.77	166	29
EZ 80-199	80	199,000	82	99	117	135	170	223	276	489	701	3.54	212	23
EZ 90-199	90	199,000	90	107	125	143	178	231	284	497	709	3.54	212	25
EZ 100-199	100	199,000	98	115	133	151	186	239	292	505	717	3.54	212	28
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
72PG	67	199,000	69	86	103	120	154	205	256	460	665	3.41	204	20
120PG	113	155,000	101	114	128	141	168	208	248	408	568	2.67	160	42
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

**TABLE 44**

**DELIVERY AT 90°F RISE – OIL**

Model	Volume	Input	DELIVERY (GAL)									Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.			
32E	32	104,000	36	45	55	64	83	112	140	254	367	1.90	114	17
32PPC	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
50ES	50	140,000	53	66	78	91	116	154	192	343	494	2.52	151	20
51EC	50	152,000	54	67	81	94	121	162	202	364	527	2.70	162	18
51PPC	50	152,000	54	68	82	96	124	166	208	376	544	2.80	168	18
72E	67	199,000	71	89	107	124	160	213	266	478	691	3.54	212	19
120E	113	155,000	103	116	130	144	171	212	253	416	579	2.72	163	42
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	DELIVERY (GAL)									Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.			
OT125	99	125,000	81	93	105	117	141	177	213	357	501	2.40	144	41
OT150	99	150,000	84	98	113	127	156	199	242	415	588	2.88	173	34
OT199	99	199,000	88	108	127	146	184	241	299	528	757	3.82	229	26
OT200	100	199,999	89	108	127	146	184	241	298	526	754	3.80	228	26
OT250	100	250,000	94	117	141	164	211	282	352	634	916	4.70	282	21
OT299	100	299,999	98	126	154	182	237	321	405	740	1,075	5.58	335	18
OT300	125	300,000	116	145	173	202	259	344	430	772	1,114	5.70	342	22
OT400	125	399,999	125	163	200	238	313	426	539	990	1,442	7.52	451	17
OT500	125	500,000	134	181	227	274	367	506	646	1,204	1,762	9.30	558	13
60HEC-125	60	125,000	70	82	94	106	130	166	202	346	490	2.40	144	25
60HEC-150	60	150,000	70	84	98	112	140	181	223	391	558	2.79	167	21
60HEC-199	60	199,000	74	92	110	128	165	220	275	495	715	3.66	220	16
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
75-76SKG	73	76,000	65	71	78	84	96	115	133	207	281	1.23	74	59
100-76SKG	98	76,000	86	92	98	104	116	135	153	227	301	1.23	74	80
EZ 75-76	75	76,000	66	72	78	84	96	115	133	206	279	1.22	73	62
EZ 76-76PDV	75	76,000	67	73	79	85	98	116	135	209	282	1.23	74	61
EZ 100-76	100	76,000	86	92	98	104	116	135	153	226	299	1.22	73	82
EZ 100-76PDV	100	76,000	87	93	99	106	118	136	155	229	303	1.23	74	81
EZ 75-135	67	135,000	64	75	86	97	118	151	183	313	443	2.16	130	31
EZ 80-156	80	156,000	76	89	101	114	139	176	214	364	513	2.50	150	32
EZ 80-199	80	199,000	80	96	112	128	160	207	255	446	637	3.19	191	25
EZ 90-199	90	199,000	88	104	120	136	168	215	263	454	645	3.19	191	28
EZ 100-199	100	199,000	96	112	128	144	176	223	271	462	653	3.19	191	31
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
72PG	67	199,000	67	82	98	113	144	190	236	419	603	3.07	184	22
120PG	113	155,000	100	112	124	136	160	196	232	376	520	2.40	144	47
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



**TABLE 46****DELIVERY AT 100°F RISE – OIL**

Model	Volume	Input	DELIVERY (GAL)										Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.				
32E	32	104,000	35	43	52	60	77	103	129	231	333	1.71	102	19	
32PPC	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	
50ES	50	140,000	52	63	75	86	109	143	177	313	449	2.27	136	22	
51EC	50	152,000	52	64	76	89	113	149	186	332	478	2.43	146	21	
51PPC	50	152,000	53	65	78	90	116	153	191	342	494	2.52	151	20	
72E	67	199,000	70	85	101	117	149	197	245	436	627	3.19	191	21	
120E	113	155,000	102	114	126	138	163	200	236	383	530	2.45	147	46	
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	DELIVERY (GAL)									Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.			
OT125	99	125,000	79	89	99	109	129	159	189	309	429	2.00	120	49
OT150	99	150,000	81	93	105	117	141	177	213	357	501	2.40	144	41
OT199	99	199,000	85	101	117	133	165	213	260	452	643	3.19	191	31
OT200	100	199,999	86	102	118	133	165	213	260	450	640	3.17	190	32
OT250	100	250,000	90	109	129	148	188	246	305	540	775	3.92	235	26
OT299	100	299,999	93	117	140	163	210	279	349	628	907	4.65	279	21
OT300	125	300,000	111	135	159	183	230	301	373	658	943	4.75	285	26
OT400	125	399,999	119	150	182	213	276	370	464	840	1,216	6.27	376	20
OT500	125	500,000	126	165	204	243	320	436	553	1,018	1,483	7.75	465	16
60HEC-125	60	125,000	68	78	88	98	118	148	178	298	418	2.00	120	30
60HEC-150	60	150,000	67	79	91	102	126	160	195	335	474	2.33	140	26
60HEC-199	60	199,000	70	86	101	116	147	193	238	422	605	3.05	183	20
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	406	509	611	815	1,122	1,429	2,656	3,883	20.45	1,227	12
75-76SKG	73	76,000	64	69	75	80	90	105	121	182	244	1.03	62	71
100-76SKG	98	76,000	85	90	95	100	110	126	141	203	264	1.03	62	95
EZ 75-76	75	76,000	65	70	75	80	90	106	121	182	242	1.01	61	74
EZ 76-76PDV	75	76,000	66	71	76	81	92	107	122	184	246	1.03	62	73
EZ 100-76	100	76,000	85	90	95	100	110	126	141	202	262	1.01	61	99
EZ 100-76PDV	100	76,000	86	91	96	102	112	127	143	204	266	1.03	62	97
EZ 75-135	67	135,000	63	72	81	90	108	135	162	270	378	1.80	108	37
EZ 80-156	80	156,000	74	85	95	106	126	158	189	314	439	2.08	125	38
EZ 80-199	80	199,000	77	91	104	117	144	183	223	383	542	2.65	159	30
EZ 90-199	90	199,000	85	99	112	125	152	191	231	391	550	2.65	159	34
EZ 100-199	100	199,000	93	107	120	133	160	199	239	399	558	2.65	159	38
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
72PG	67	199,000	64	77	90	103	128	167	205	358	511	2.55	153	26
120PG	113	155,000	98	108	118	128	148	178	208	328	448	2.00	120	56
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

**TABLE48****DELIVERY AT 120°F RISE – OIL**

Model	Volume	Input	DELIVERY (GAL)									Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.			
32E	32	104,000	33	40	48	55	69	90	112	197	282	1.42	85	23
32PPC	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
50ES	50	140,000	50	59	69	78	97	126	154	267	381	1.89	113	26
51EC	50	152,000	50	60	70	81	101	131	162	283	405	2.03	122	25
51PPC	50	152,000	51	61	72	82	103	135	166	292	418	2.10	126	24
72E	67	199,000	67	80	93	107	133	173	213	372	531	2.65	159	25
120E	113	155,000	99	110	120	130	151	181	212	334	457	2.04	122	55
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	DELIVERY (GAL)									Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.			
OT125	99	125,000	78	86	95	104	121	146	172	275	378	1.71	103	58
OT150	99	150,000	80	90	100	110	131	162	193	316	440	2.06	123	48
OT199	99	199,000	83	97	110	124	151	192	233	397	561	2.73	164	36
OT200	100	199,999	84	97	111	124	151	192	233	396	559	2.72	163	37
OT250	100	250,000	87	104	120	137	171	221	272	473	675	3.36	202	30
OT299	100	299,999	90	110	130	150	190	249	309	548	788	3.99	239	25
OT300	125	300,000	108	128	149	169	210	271	332	576	821	4.07	244	31
OT400	125	399,999	114	141	168	195	249	329	410	732	1,055	5.37	322	23
OT500	125	500,000	121	154	187	220	287	387	486	885	1,284	6.65	399	19
60HEC-125	60	125,000	66	75	83	92	109	135	160	263	366	1.71	103	35
60HEC-150	60	150,000	66	76	86	96	116	146	175	295	415	1.99	120	30
60HEC-199	60	199,000	68	81	94	108	134	173	212	369	526	2.62	157	23
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
75-76SKG	73	76,000	64	68	72	77	86	99	112	165	217	0.88	53	83
100-76SKG	98	76,000	84	88	93	97	106	119	132	185	238	0.88	53	111
EZ 75-76	75	76,000	64	69	73	77	86	99	112	164	216	0.87	52	86
EZ 76-76PDV	75	76,000	65	70	74	78	87	100	114	166	219	0.88	53	85
EZ 100-76	100	76,000	84	89	93	97	106	119	132	184	236	0.87	52	115
EZ 100-76PDV	100	76,000	85	90	94	99	107	121	134	187	239	0.88	53	114
EZ 75-135	67	135,000	61	69	77	84	100	123	146	239	331	1.54	93	43
EZ 80-156	80	156,000	73	82	91	100	118	144	171	278	385	1.78	107	45
EZ 80-199	80	199,000	75	87	98	110	132	166	201	337	474	2.28	137	35
EZ 90-199	90	199,000	83	95	106	118	140	174	209	345	482	2.28	137	40
EZ 100-199	100	199,000	91	103	114	126	148	182	217	353	490	2.28	137	44
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
72PG	67	199,000	63	73	84	95	117	150	183	314	446	2.19	131	31
120PG	113	155,000	96	105	113	122	139	165	191	294	397	1.72	103	66
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

**TABLE 50**

**DELIVERY AT 140°F RISE – OIL**

Model	Volume	Input	DELIVERY (GAL)									Recovery (GPM)	Recovery (GPH)	Mins. to recover contents
			5 min.	10 min.	15 min.	20 min.	30 min.	45 min.	1 hr.	2 hr.	3 hr.			
32E	32	104,000	Not recommended for 180°F water											
32PPC	32	104,000	Not recommended for 180°F water											
33E	33	104,000	Not recommended for 180°F water											
50ES	50	140,000	49	57	65	73	89	113	138	235	332	1.62	97	31
51EC	50	152,000	49	57	66	75	92	118	144	249	353	1.74	104	29
51PPC	50	152,000	49	58	67	76	94	121	148	256	364	1.80	108	28
72E	67	199,000	65	76	88	99	122	156	190	327	463	2.28	137	29
120E	113	155,000	98	107	116	124	142	168	194	299	404	1.75	105	65
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 (O<sub>2</sub>)**

FUEL	%O <sub>2</sub>	NET STACK TEMPERATURE IN DEGREES FAHRENHEIT (°F)																
		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

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## GLOSSARY OF TERMS

**A.F.U.E.** - Annual Fuel Usage Efficiency. Ratio of annual output of useful energy or heat to annual energy input to heater. Only heat leaving as hot water deemed usable and calculated as part of space heating efficiency.

**A.S.M.E.** - American Society of Mechanical Engineers.

**BAROMETER** - Device for measuring atmospheric pressure.

**BAFFLE** - Object placed in appliance to change direction of or retard flow of air, gas or mixtures of flue gases.

**BTU** (British Thermal Unit) - Energy required to raise the temperature of 1 lb of water from 60°F to 61°F at 1 atmosphere pressure.

**CALORIE** - Energy required to raise the temperature of 1 gram of water by 1°C at 1 atmosphere pressure.

**CENTRAL SYSTEM HEATING** - Unit that produces heat from a centralized location and distributes it throughout a structure.

### **CIRCULATING WATER HEATER -**

1. **Automatic** - Furnishes hot water to be stored in separate vessel. Storage tank temperatures controlled by thermostat installed on heater. Circulation either natural or forced.

2. **Noutomatic** - Same as automatic except thermostat installed in storage vessel.

**CIRCULATING TANK SYSTEM** - Water heater is connected to separate storage tank, allowing large amounts of hot water to be built up for use during short periods of peak demand. Recovery to storage ratio: 1 GPH recovery to 1 gallon stored.

**COIL CIRCULATION** - Water heater with heat transfer surface composed primarily of water tubes less than 1 1/2" in internal diameter and requiring circulation.

**COLD INLET TEMPERATURE** - Temperature of water coming into water heating system.

**COMBUSTION EFFICIENCY** - Measurement of how well the heating equipment is converting a specific fuel into usable heat energy at a specific period of time in the operation of a heating system.

**COMMERCIAL WATER HEATER** - Water heater with input rate of more than 75,000 BTU/HR (gas) and 105,000 BTU/HR (oil).

**CONDENSATE** - A liquid obtained by condensation (usually initiated by a reduction in temperature of a vapor).

**CONDUCTION** - Heat transfer through a material from more energetic particles to less energetic particles.

**CONVECTION** - Heat transfer occurring between a fluid in motion and a bounding surface when the two are at different temperatures.

**DELIVERY** - Amount of hot water a heater can supply, most commonly over the period of one hour. Delivery = Recovery + 80% of storage.

**DIRECT VENT** - System with indoor water heater, combustion air connections between heater and outside atmosphere, flue gas connections between heater and vent cap, vent cap for outdoors so all air for combustion is obtained from outside atmosphere and all flue gases are discharged to outside.

**DUCT** - A channel, typically made from sheet metal, through which a substance, such as air, may flow.

**ELECTRODE** - Conductor that transfers electric charges into or out of another conducting medium, or that influences the flow of current in another conducting medium.

**ENERGY FACTOR** - Measure of overall efficiency of heater based on model's recovery efficiency, standby loss and energy inputs.

**FORCED AIR** - Air that is mechanically moved using fans or blowers.

**FUEL OIL** - Petroleum products used as fuels.

#1 - distillate oil for vaporizing-type burners

#2 - distillate oil for general purpose burners

#4 - blended oil for use without preheating

#5 - blended oil for use with preheating

#6 - residual oil for use in burners with preheaters using high viscosity fuel

**FLOW CONTROL VALVE** - Devices installed between supply pipe and plumbing fixture (shower head, faucet, etc.) to regulate water flow. Recommended for large shower installations; can reduce water flow in half without disturbing spray pattern for water resulting in energy savings.

**FLOW RATE** - Amount of water in gallons flowing in plumbing fixture or pipe during period of time. Typically, measured in GPM (gallons per minute).



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## **GLOSSARY OF TERMS (continued)**

**GPH/GPM** - (Gallons Per Hour/Gallons Per Minute)- Amount of water flowing through plumbing fixture or pipe per hour/per minute.

**HEAT EXCHANGER** - Device specifically designed to transfer heat between two physically separate fluids.

**HYDRONICS** - Systems of heating or cooling involving heat transfer by a circulating fluid in a closed system of pipes.

**INSTANTANEOUS WATER HEATER** - Produces hot water on demand. Heater with rated minimum recovery of 3.5 GPH (at 100°F rise) and 4000 BTUs per hour per gallon of self-stored water.

**NATURAL GAS** - Combustible mixture of methane and higher hydrocarbons used chiefly as a fuel or raw material.

**N.P.T. INLETS** - National pipe thread standard.

**PROPANE** - Component of raw natural gas.

**RADIATION** - The combined processes of emission, transmission, and absorption of energy traveling as electromagnetic waves.

**REAR OUTLET UNIT** - Exhaust stack located at rear of unit (as opposed to the top).

**RECOVERY** - Amount of water per hour (GPH) heater will deliver not including storage.

**ROUGHING IN** - Sizes for space left around heater.

**SEMI-INSTANTANEOUS** - Heater has steam in tubes and water in shell (Instantaneous: steam in shell, water in tubes).

**SIZING** - Procedure to estimate the total demand on a heating unit. A properly sized heating unit will account for peak demand times where maximum delivery will occur.

**STANDBY LOSS** - Amount of heat lost per hour (measured in %) while heater is in standby mode (no water being drawn). Loss can occur through jacket or piping.

**TEMPERATURE RISE** - Number of degrees (F) that water temperature is raised to achieve the desired outlet temperature.

**THERM** - Measurement of heat. One (1) therm = 100,000 BTUs.

**VENTING** -

**Type A:** Three (3) walls of stainless steel, used for oil-fired water heaters. Withstands higher temperatures.

**Type B:** Single wall of aluminum, used for atmospheric gas water heaters only.

**Type L:** Two (2) walls, inner of stainless, outer of aluminum. For oil-fired and power gas heaters.

**THERMAL EFFICIENCY** - Ratio of output energy (in water) to input energy (fuel). Output only includes what is delivered from heater as hot water.

**VACUUM (psi)** - Any pressure less than 0 psi (gage) or 14.7 psi (absolute).

**VALVE** -

1. **Automatic** - Valve and operator controlling gas supply to burner(s) during normal operation of appliance. Operator may be actuated by gas pressure on flexible diaphragm, electrical or mechanical means or any other means.

2. **Semiautomatic** - Valve opens manually and closes automatically, or vice versa.

3. **Burner** - Manually or mechanically operated valve permitting control of gas flow.

4. **Diaphragm-type Automatic** - Device consisting of automatic valve actuated by application of gas pressure on flexible diaphragm.

5. **Electric-type Automatic** - Device actuated by electricity for controlling gas supply.

6. **Manual Main Shutoff** - Manually operated valve in gas line for completely turning on or shutting off gas supply to appliance (pilots may have independent shutoff valves).

7. **Safety Shutoff** - Valve automatically closed by safety control system or by emergency device. May be automatic or manual type.

**VENT-AIR TERMINAL** - Used with direct vent water heater, located on outside of tank. Takes in combustion air from outside atmosphere and discharges combustion products.

1. **Vent Terminal** - Fitting at end of vent pipe that directs flue products into outside atmosphere.

2. **Air Intake Terminal** - Fitting at inlet of air intake pipe allowing outside atmosphere into air intake pipe.

**VENT LIMITER** - Limits flow of air or gas from atmospheric diaphragm chamber of gas pressure regulator to atmosphere. May be device or orifice.

**VENTING SYSTEM** - Gas vent, chimney or single-wall pipe (and vent connector, if used) assembled to form continuous open passageway from gas appliance to outdoor atmosphere to remove vent gasses.

**ZONED HEATING** - Living areas separated into different spaces, with each space's heat controlled independently.



