



HOW TO USE CHART 1

"APPROX. THERMAL EFFICIENCY" is the firing efficiency achieved in steady state test firing and is the rating assigned to power burner equipment and copper coil boilers, such as A. O. Smith model BTP, COF and HW models. These values should be reduced where the manufacturer shows a reduced efficiency rating. "APPROX. OVERALL HEATER EFFICIENCY" includes water heating stand by system losses based on the thermal efficiency and/or standby loss requirements of the U. S. Department of Energy and current edition of ASHRAE/IESNA 90.1.

CHART 1

TYPE OF FUEL	BTU CONTENT	PER	APPROX. THERMAL EFFICIENCY	APPROX. OVERALL HEATER EFFICIENCY
A. NATURAL GAS	1,050	Cu. ft.	80%	75%
B. PROPANE GAS	91,500	Gallon	80%	75%
C. FUEL OIL	140,000	Gallon	80%	75%
D. CENTRAL STEAM	10,000	Pound	90%	85%
E. COAL	25,000,000	Ton	60%	55%
F. ELECTRIC (resistance)	3,413	KWH	100%	95%
G. DRY HARD WOOD	24,000,000	Cord	60%	50%

Note: 1 Therm = 100,000 BTU. 1 CCF = 100 cu. ft.

HOW TO USE CHART 2

Select fuel being considered in columns "A" thru "G". (e.g.: Propane - "B") Find closest local fuel cost per billing unit (e.g.: Actual local cost is \$.95 per gal.: use \$.959 from chart). Then follow the line to the right to read the "Approx cost per 1,000 gal. hot water at 100° rise" in column "H", (e.g.: cost - \$10.80).

**CHART 2
COMPARATIVE FUEL COSTS**

A NATURAL GAS \$/CCF	B* PROP. GAS \$/Gal.	C FUEL OIL \$/Gal.	D STEAM \$/1,000 Lbs.	E COAL \$/Ton	F ELECTRIC \$/KW	G WOOD \$/Cord	H 1,000 Gal. 100°F. Δ T 825,000 BTU
0.34	0.296	0.453	3.67	59.95	0.0140	51.39	3.34
0.35	0.305	0.467	3.78	61.25	0.0144	52.90	3.44
0.36	0.314	0.480	3.89	63.00	0.0148	54.41	3.54
0.38	0.331	0.507	4.10	66.50	0.0156	57.44	3.73
0.40	0.349	0.533	4.32	70.00	0.0165	60.46	3.93
0.42	0.366	0.560	4.53	73.50	0.0173	63.48	4.13
0.44	0.383	0.587	4.75	77.00	0.0181	66.50	4.32
0.45	0.392	0.600	4.86	78.75	0.0185	68.02	4.42
0.46	0.401	0.613	4.97	80.51	0.0189	69.53	4.52
0.48	0.418	0.640	5.18	84.01	0.0198	72.55	4.71
0.55	0.479	0.733	5.94	96.26	0.0226	83.13	5.40
0.58	0.501	0.767	6.21	100.63	0.0237	86.91	5.65
0.60	0.523	0.800	6.48	105.01	0.0247	90.69	5.89
0.65	0.566	0.867	7.02	113.76	0.0268	98.25	6.38
0.70	0.610	0.933	7.56	122.51	0.0288	105.80	6.88
0.75	0.654	1.000	8.10	131.26	0.0309	113.36	7.37
0.80	0.697	1.067	8.64	140.01	0.0329	120.92	7.86
0.85	0.741	1.133	9.18	148.76	0.0350	128.48	8.35
0.90	0.784	1.200	9.71	157.51	0.0371	136.03	8.84
0.95	0.828	1.267	10.25	166.26	0.0391	143.59	9.33
1.00	0.871	1.333	10.79	175.01	0.0412	151.15	9.82
1.05	0.915	1.400	11.33	183.76	0.0432	158.70	10.31
1.10	0.959	1.467	11.87	192.51	0.0453	166.26	10.80
1.15	1.002	1.533	12.41	201.26	0.0474	173.82	11.29
1.20	1.046	1.600	12.95	210.01	0.0494	181.38	11.79
1.25	1.089	1.667	13.49	218.76	0.0515	188.93	12.28
1.30	1.133	1.733	14.03	227.51	0.0535	196.49	12.77
1.35	1.176	1.800	14.57	236.26	0.0556	204.05	13.26
1.40	1.220	1.867	15.11	245.02	0.0576	211.61	13.75
1.45	1.264	1.933	15.65	253.77	0.0597	219.16	14.24
1.50	1.307	2.000	16.19	262.52	0.0618	226.72	14.73
1.55	1.351	2.067	16.73	271.27	0.0638	234.28	15.22
1.60	1.394	2.133	17.27	280.02	0.0659	241.84	15.71
1.65	1.438	2.200	17.81	288.77	0.0679	249.39	16.21
1.70	1.481	2.267	18.35	297.52	0.0700	256.95	16.70
1.75	1.525	2.333	18.89	306.27	0.0721	264.51	17.19

CHART CONTINUED ON BACK

FUEL COST COMPARISONS

A NATURAL GAS \$/CCF	B* PROP. GAS \$/Gal.	C FUEL OIL \$/Gal.	D STEAM \$/1,000 Lbs.	E COAL \$/Ton	F ELECTRIC \$/KW	G WOOD \$/Cord	H 1,000 Gal. 100°F. Δ T
1.80	1.569	2.400	19.43	315.02	0.0741	272.06	17.68
1.85	1.612	2.467	19.97	323.77	0.0762	279.62	18.17
1.90	1.656	2.533	20.51	332.52	0.0782	287.18	18.66
1.95	1.699	2.600	21.05	341.27	0.0803	294.74	19.15
2.00	1.743	2.667	21.59	350.02	0.0824	302.29	19.64
2.05	1.786	2.733	22.13	358.77	0.0844	309.85	20.13
2.10	1.830	2.800	22.67	367.52	0.0865	317.41	20.63
2.15	1.874	2.867	23.21	376.27	0.0885	324.97	21.12
2.20	1.917	2.933	23.75	385.02	0.0906	332.52	21.61
2.25	1.961	3.000	24.29	393.77	0.0926	340.08	22.10
2.30	2.004	3.067	24.83	402.53	0.0947	347.64	22.59
2.35	2.048	3.133	25.37	411.28	0.0968	355.20	23.08
2.40	2.091	3.200	25.91	420.03	0.0988	362.75	23.57
2.45	2.135	3.267	26.45	428.78	0.1009	370.31	24.06
2.50	2.179	3.333	26.99	437.53	0.1029	377.87	24.55
2.55	2.222	3.400	27.53	446.28	0.1050	385.43	25.04
2.60	2.266	3.467	28.06	455.03	0.1071	392.98	25.54
2.65	2.309	3.533	28.60	463.78	0.1091	400.54	26.03
2.70	2.353	3.600	29.14	472.53	0.1112	408.10	26.52
2.75	2.396	3.667	29.68	481.28	0.1132	415.65	27.01
2.80	2.440	3.733	30.22	490.03	0.1153	423.21	27.50
2.85	2.484	3.800	30.76	498.78	0.1174	430.77	27.99
2.90	2.527	3.867	31.30	507.53	0.1194	438.33	28.48
2.95	2.571	3.933	31.84	516.28	0.1215	445.88	28.97
3.00	2.614	4.000	32.38	525.03	0.1235	453.44	29.46
3.10	2.701	4.133	33.46	542.53	0.1276	468.56	30.45
3.20	2.789	4.267	34.54	560.04	0.1318	483.67	31.43
3.30	2.876	4.400	35.62	577.54	0.1359	498.79	32.41
3.40	2.963	4.533	36.70	595.04	0.1400	513.90	33.39
3.50	3.050	4.667	37.78	612.54	0.1441	529.01	34.38
3.60	3.137	4.800	38.86	630.04	0.1482	544.13	35.36
3.70	3.224	4.933	39.94	647.54	0.1524	559.24	36.34
3.80	3.311	5.067	41.02	665.04	0.1565	574.36	37.32
3.90	3.399	5.200	42.10	682.54	0.1606	589.47	38.30
4.00	3.486	5.333	43.18	700.04	0.1647	604.59	39.29
4.10	3.573	5.467	44.26	717.54	0.1688	619.70	40.27
4.20	3.660	5.600	45.34	735.05	0.1729	634.82	41.25
4.30	3.747	5.733	46.41	752.55	0.1771	649.93	42.23
4.40	3.834	5.867	47.49	770.05	0.1812	665.05	43.21
4.50	3.921	6.000	48.57	787.55	0.1853	680.16	44.20
4.60	4.009	6.133	49.65	805.05	0.1894	695.28	45.18
4.70	4.096	6.267	50.73	822.55	0.1935	710.39	46.16
4.80	4.183	6.400	51.81	840.05	0.1976	725.51	47.14
4.90	4.270	6.533	52.89	857.55	0.2018	740.62	48.13
5.00	4.357	6.667	53.97	875.05	0.2059	755.74	49.11

*Where Propane Gas is purchased by the pound, the equivalent price per pound is determined by multiplying the gallon price in column "B" by .235.

Before using chart 3 for gas fired heaters rated at 70% Et multiply "H" by 1.143.
 Before using chart 3 for gas fired heaters rated at 75% Et multiply "H" by 1.0666.
 Before using chart 3 for gas fired heaters rated at 90% Et multiply "H" by .933.

HOW TO USE CHART 3

Where the water must be raised more or less than 100°F., multiply the cost in column "H" by the adjustment factor in chart 3, based on the actual number of degrees which the water must be raised. (e.g.: in Florida with its warmer ground water, 80° temperature rise is common. Therefore, multiply .8 x \$11.64 for the locally adjusted cost for heating water).

FOR MONTHLY COST

1. Establish total daily demand from sizing guide. (e.g.: 5,000 gal./day)
2. Multiply cost per 1,000 gal. (H) times demand. (\$11.64/1,000 gal. x 5 = \$58.20/day).
3. Multiply cost per day times days used per month. (e.g.: \$58.20 x 30 days = \$1,746.00 estimated cost for propane gas).

CHART 3

WHERE WATER MUST BE RAISED:	Multiply cost/1,000 gal. (Col. "H") by ADJUSTMENT FACTOR
60°F	.6
70°F	.7
80°F	.8
90°F	.9
110°F	1.1
120°F	1.2
130°F	1.3
140°F	1.4