



GENERAL INFORMATION

MATERIAL FEATURES

1. Tubes are $\frac{3}{4}$ " OD or $\frac{7}{8}$ " OD or 1" OD copper
2. Heads are cast IRON
3. Tube sheets and welding collars are pressure vessel quality steel.
4. Units are available with stainless steel 90/10 cupro nickel.
5. Many tank Heater application require lining the tank with various materials i.e. epoxy phenolic cement, etc.

DESIGN PRESSURES — STANDARD

Cast Iron Head — Steel Tube Sheet — copper tubes

Design Temperature 350°F

Tube Bundle Diameter	Design Pressure	Test Pressure
4"	150 PSI	300 PSI
6"	150 PSI	300 PSI
8"	150 PSI	300 PSI
10"	125 PSI	250 PSI
12"	125 PSI	250 PSI
14"	125 PSI	250 PSI

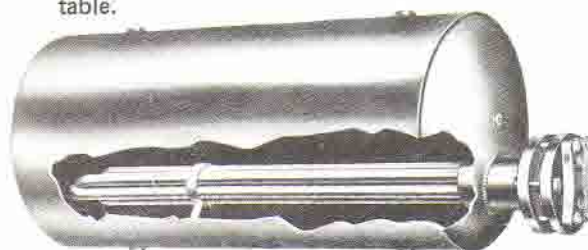
* For design pressure and design temperature for brass construction the buyer should contact the manufacture. The manufacture should also be contacted for design pressure and temperature higher than standard.



TANK HEATERS

SELECTION PROCEDURE

1. Determine capacity Required:
To determine the heat transfer capacity of the heat exchanger the following conditions of the operation must be known:
 - a. The amount of water to be heated in gallons per hour.
 - b. Inlet temperature of water and out let.
 - c. The steam pressure available at the heat exchanger. (Be sure allowance is made for pressure drop through the steam controller.) or if boiler water is the heating medium, the inlet temperature of the water.
 - a. First refer to proper temperature rise.
 - b. Next refer to proper steam temperature or boiler water temperature.
 - c. Select unit from appropriate table or tables.
 - d. Consult TEHRAN MOBADDEL for any temperature condition not covered in the table.
2. Select Unit:
Select the proper unit by referring to tables. Pages 5 to 8 as follows.



TANK AND HEATER ASSEMBLY

Typical Installations—TANK AND HEATER UNITS

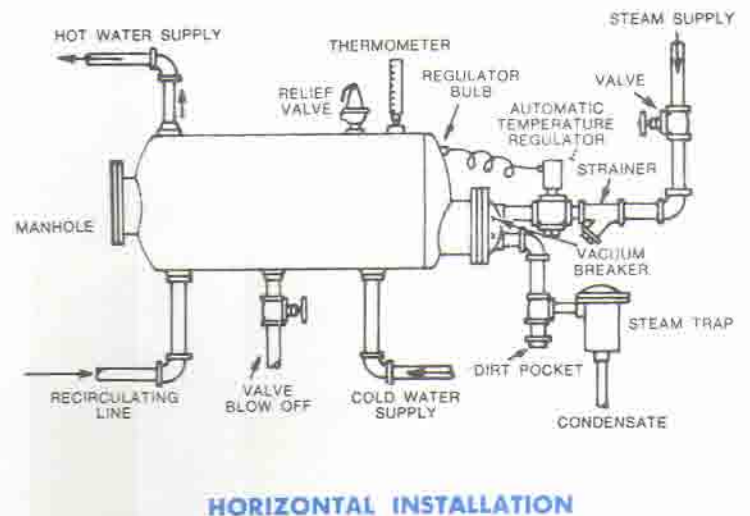
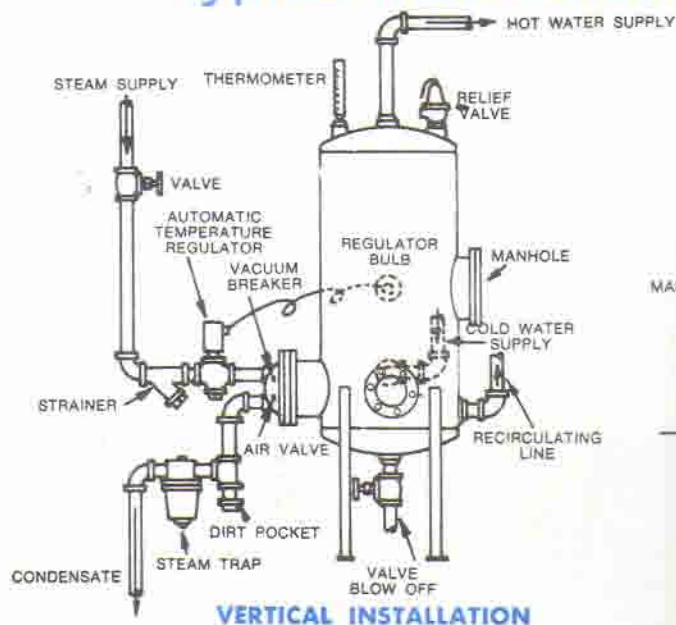


Table A — Hot water Demand per fixtures for various types of Buildings Gallons of water per hour fixture calculated at a final temperature of 140° F.

	Apartment House	Office Building	Private Residence	School	Club	Gymnasium	Hotel	Hospital	Industrial & Plant
1- Basins, private lavatory	2	2	2	2	2	2	2	2	2
2- Bathtubs	20	—	20	—	20	30	20	20	—
3- Dishwashers	15	—	15	20-100	50-150	—	50-200	50-150	20-100
4- Kitchen Sink	10	20	10	20	20	—	30	20	20
5- Basin, public lavatory	4	6	—	15	6	8	8	6	12
6- Foot basins	3	—	3	3	3	12	3	3	12
7- Pantry sink	5	10	5	10	10	—	10	10	—
8- Showers	30	30	30	225	150	225	75	75	225
9- Slop sink	20	20	15	20	20	—	30	20	20
10- Laundry, stationary tubs	20	—	20	—	28	—	28	28	—
11- Hubbard baths								600	
12- Leg baths								100	
13- Arm baths								35	
14- Hydro-therapeutic showers								400	
15- Semi-circular wash sinks								10	
16- Continuous-flow baths								165	
17- Circular wash sinks								20	
18- Sitz baths								30	
19- Demand factor	0.30	0.30	0.30	0.40	0.30	0.40	0.25	0.25	0.40
20- Storage capacity factor	1.25	2.00	0.70	1.00	0.90	1.00	0.80	0.60	1.00

The Above table may be used to determine the size of water heating equipment from the number of probable maximum, multiply the total quantity for the fixtures by the demand factor in line 19. The heater or coil should have a water heating capacity equal to this probable maximum demand. The storage tank should have a capacity equal to the probable maximum demand multiplied by the storage capacity factor in line 20. The following example will illustrate the procedure. Determination of heater and storage tank size for an apartment building from number of fixtures.

60 kitchen sinks x 10 = 600 gal per hr
 30 bathtubs x 20 = 600 gal per hr
 15 laundry tubs x 20 = 300 gal per hr
 30 showers x 30 = 900 gal per hr
 60 lavatories x 2 = 120 gal per hr

Possible maximum demand = 2520 gal per hr
 Probable maximum demand = 2520 x 0.30 = 756 gal per hr
 Heater or coil capacity = 756 gal per hr
 Storage tank capacity = 756 x 1.25 = 945 gal

Ratings.....Tehran Mobaddel Tank Heaters

Table 1- Adjustment Factors (Heating Water)

Temp Rise	Steam in Tubes - PSIG											
	0	2	5	10	15	20	30	40	50	75	100	125
40-100	0.490	0.497	0.504	0.514	0.520	0.525	0.531	0.536	0.540	0.546	0.550	0.553
40-120	0.716	0.722	0.728	0.736	0.741	0.745	0.752	0.754	0.757	0.762	0.765	0.767
40-140	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
40-160	1.381	1.362	1.346	1.326	1.314	1.304	1.292	1.284	1.277	1.267	1.261	1.256
40-180	1.957	1.883	1.821	1.751	1.709	1.681	1.642	1.618	1.600	1.572	1.555	1.543
50-100	0.422	0.427	0.433	0.440	0.444	0.448	0.453	0.457	0.459	0.464	0.467	0.469
50-120	0.649	0.653	0.657	0.663	0.666	0.668	0.672	0.675	0.677	0.679	0.681	0.683
50-140	0.934	0.932	0.930	0.928	0.926	0.924	0.923	0.921	0.920	0.918	0.917	0.916
50-160	1.316	1.297	1.277	1.255	1.241	1.230	1.215	1.205	1.198	1.186	1.178	1.172
50-180	1.894	1.821	1.754	1.681	1.637	1.608	1.567	1.541	1.522	1.490	1.473	1.460
60-100	0.350	0.353	0.357	0.362	0.365	0.368	0.371	0.373	0.375	0.378	0.380	0.381
60-120	0.577	0.579	0.582	0.585	0.587	0.588	0.590	0.591	0.592	0.594	0.595	0.596
60-140	0.863	0.859	0.855	0.803	0.847	0.845	0.841	0.838	0.836	0.833	0.831	0.829
60-160	1.247	1.225	1.205	1.180	1.163	1.151	1.134	1.122	1.115	1.101	1.093	1.086
60-180	1.832	1.751	1.686	1.608	1.563	1.529	1.488	1.458	1.439	1.406	1.387	1.374
70-100	0.272	0.274	0.277	0.280	0.282	0.283	0.285	0.287	0.288	0.289	0.290	0.291
70-120	0.500	0.501	0.502	0.503	0.504	0.504	0.505	0.505	0.505	0.505	0.505	0.505
70-140	0.787	0.782	0.777	0.770	0.765	0.762	0.756	0.752	0.750	0.745	0.741	0.740
70-160	1.174	1.149	1.127	1.100	1.081	1.068	1.050	1.037	1.028	1.013	1.004	0.997
70-180	1.761	1.681	1.610	1.529	1.481	1.449	1.404	1.374	1.353	1.319	1.299	1.284

SELECTION PROCEDURE (TCST) AND (TCYT) (HEATING WATER)

Enter the above table with the proper water temperature, rise and steam pressure to obtain the appropriate Adjustment Factor (AF). Multiply the Required GPH (gallons per hr) flow rate by the Adjustment Factor (RGPH x AF). This gives an Adjusted GPH (AGPH) value. Enter the appropriate chart on page 6 or 7 depending on whether a "TCST" or a "TCYT" is to be selected. Read down the proper steam pressure column until a value equal to or greater than the AGPH is reached.

Example:

Size a "TCST" type Tank Heater to heat 1500 GPH from 40°F to 160°F with 10 PSIG saturated steam.

Solution

- Obtain the correct Adjustment Factor from Table 1 (AF is 1.326).
- Multiply the Required GPH by the Adjustment Factor (1500 GPH x 1.326 = 1989 GPH).
- Enter table 2 on page 6 and read down 10 PSIG

column until a value equal to or greater than 1989 is reached. Reading across to the left gives a TCST 1060.

The capacities in tables 2 and 3 can be corrected for any of the temperature rises shown on the above table by dividing the capacity of any particular tank heater by the appropriate Adjustment Factor.

Example:

Given 30 PSIG saturated steam pressure what is the capacity of a TCST-842 in heating water from 40°F to 140°F.

Solution

- obtain the correct Adjustment Factor from table 1 (AF is 1.000)
- Enter table 2 on page 6 and read down the column to a TCST-842. Capacity is 1054 GPH.
- The Adjusted GPH capacity is 1054 divided by 0.841 = 1054 GPH

Ratings Tehran Mobaddel Tank Heaters

Capacities of T.M. Tank Heaters in table below are in GPH (gallons per hr.) when installed in steel tanks.

Table 2_Type TCST (3/4" or 7/8" O.D. COPPER TUBES)

STEAM IN TUBES - PSI

HEATER NO.	0	2	5	10	15	20	30	40	50	75	100	125
TCST-412	22	24	26	29	32	35	39	43	48	53	58	63
TCST-418	39	43	47	53	57	62	70	77	82	96	106	112
TCST-424	55	60	66	74	80	87	98	108	115	132	145	157
TCST-430	73	79	87	98	106	115	129	143	151	174	192	208
TCST-436	90	98	108	122	132	143	161	177	188	216	239	258
TCST-442	108	117	129	145	157	170	192	212	225	258	285	309
TCST-448	124	134	148	167	184	200	220	243	263	303	334	362
TCST-454	143	154	170	192	208	225	253	280	297	341	384	407
TCST-460	157	170	188	212	234	248	280	309	328	384	424	450
TCST-466	174	192	208	234	258	280	315	341	369	424	468	506
TCST-472	192	208	229	258	285	303	341	376	407	468	517	559
TCST-484	212	229	253	280	309	334	376	415	441	506	559	605
TCST-496	229	248	274	309	334	362	407	450	477	548	606	655
TCST-612	73	79	87	98	106	115	129	143	151	174	192	208
TCST-618	122	134	145	164	181	196	220	239	258	297	328	355
TCST-624	174	192	208	234	258	280	315	341	369	424	468	506
TCST-630	225	243	269	303	334	355	399	441	468	548	605	655
TCST-636	280	303	334	376	407	441	497	548	582	668	738	799
TCST-642	328	355	391	441	487	517	582	642	682	799	882	954
TCST-648	384	415	459	517	559	605	682	753	799	917	1013	1096
TCST-654	432	468	517	582	630	682	768	847	899	1033	1163	1235
TCST-660	487	527	582	655	709	768	864	954	1013	1163	1284	1390
TCST-666	537	582	642	723	783	847	954	1054	1118	1284	1418	1535
TCST-672	593	642	695	783	864	936	1054	1141	1235	1418	1566	1695
TCST-684	695	753	831	917	1013	1096	1235	1363	1447	1662	1835	1986
TCST-696	799	864	954	1075	1163	1259	1418	1566	1662	1909	2107	2281
TCST-818	243	263	285	321	355	384	432	468	506	582	642	695
TCST-824	328	355	391	441	487	517	582	642	682	799	882	954
TCST-830	415	450	497	559	617	655	738	815	864	1013	1118	1187
TCST-836	506	548	605	682	738	799	899	993	1054	1210	1336	1447
TCST-842	593	642	709	799	864	936	1054	1163	1235	1418	1597	1695
TCST-848	695	768	831	936	1033	1118	1259	1363	1475	1695	1871	2025
TCST-854	799	864	954	1075	1163	1259	1418	1566	1662	1947	2149	2281
TCST-860	899	973	1075	1210	1310	1418	1597	1763	1871	2149	2421	2569
TCST-866	993	1075	1187	1336	1447	1566	1763	1947	2086	2373	2620	2836
TCST-872	1075	1163	1284	1447	1566	1695	1909	2107	2236	2569	2893	3070
TCST-884	1284	1390	1505	1695	1871	2025	2281	2469	2672	3070	3389	3669
TCST-896	1475	1597	1763	1986	2149	2327	2620	2893	3070	3526	3893	4214
TCST-1024	593	642	709	799	864	936	1054	1163	1235	1418	1597	1695
TCST-1030	753	815	899	1013	1118	1187	1336	1475	1597	1835	2025	2192
TCST-1036	917	993	1096	1235	1363	1447	1629	1799	1909	2236	2469	2672
TCST-1042	1096	1187	1284	1447	1597	1729	1947	2107	2281	2620	2893	3131
TCST-1048	1235	1336	1475	1662	1799	1947	2192	2421	2569	2951	3258	3526
TCST-1054	1390	1505	1662	1871	2025	2192	2469	2726	2893	3389	3742	3971
TCST-1060	1566	1695	1871	2107	2281	2469	2780	3070	3258	3742	4132	4472
TCST-1066	1729	1871	2066	2327	2518	2726	3070	3389	3597	4132	4562	4938
TCST-1072	1871	2025	2236	2518	2780	3010	3389	3669	3971	4562	5036	5451
TCST-1084	2236	2421	2620	2951	3258	3526	3971	4298	4653	5345	5901	6387
TCST-1096	2569	2780	3010	3389	3742	4051	4562	4938	5345	6139	6778	7337
TCST-10108	2893	3131	3457	3817	4214	4562	5137	5561	6019	6914	7633	8263
TCST-1236	1336	1447	1597	1799	1947	2107	2373	2620	2780	3258	3597	3817
TCST-1242	1566	1695	1871	2107	2327	2518	2836	3070	3323	3817	4214	4562
TCST-1248	1835	1986	2149	2421	2672	2893	3258	3526	3817	4384	4841	5240
TCST-1254	2066	2236	2469	2780	3010	3258	3669	4051	4298	4938	5561	5901
TCST-1260	2281	2469	2726	3070	3323	3597	4051	4472	4746	5451	6139	6515
TCST-1266	2518	2726	3010	3389	3669	3971	4472	4938	5240	6139	6778	7193
TCST-1272	2780	3010	3323	3742	4051	4384	4938	5451	5785	6645	7337	7942
TCST-1278	3010	3258	3597	4051	4384	4746	5345	5901	6262	7193	8101	8596
TCST-1284	3194	3526	3817	4298	4746	5137	5785	6262	6778	7786	8596	9305
TCST-1296	3742	4051	4384	4938	5451	5901	6645	7193	7786	8944	9874	10688
TCST-12108	4214	4562	5036	5672	6139	6645	7484	8263	8768	10072	11120	12037
TCST-12120	4653	5036	5561	6262	6778	7337	8263	9122	9681	11120	12523	13290
TCST-1436	1835	1986	2149	2421	2672	2893	3258	3526	3817	4384	4841	5240
TCST-1442	2149	2327	2569	2893	3131	3389	3817	4214	4472	5137	5785	6139
TCST-1448	2469	2672	2951	3323	3597	3893	4384	4841	5137	5901	6515	7052
TCST-1454	2780	3010	3323	3742	4051	4384	4938	5451	5785	6778	7484	7942
TCST-1460	3131	3389	3742	4214	4562	4938	5561	6139	6515	7484	8263	8944
TCST-1466	3457	3742	4132	4653	5036	5451	6139	6778	7193	8263	9122	9874
TCST-1472	3742	4051	4472	5036	5451	5901	6645	7337	7786	9122	10072	10688
TCST-1478	4051	4384	4841	5451	6019	6515	7193	7942	8596	9874	10902	11801
TCST-1484	4384	4746	5240	5901	6387	6914	7786	8596	9122	10479	11801	12523
TCST-1496	5036	5451	6019	6778	7337	7942	8944	9874	10479	12278	13555	14385
TCST-14108	5672	6139	6778	7633	8263	8944	10072	11120	11801	13826	15266	16200
TCST-14120	6387	6914	7633	8428	9305	10072	11343	12278	13290	15266	16854	18244

Ratings.....Tehran Mobaddel Tank Heaters

Capacities of T.M Tank Heaters in table below are in GPH (gallons per hr.) when installed in steel tanks

Table 3_Type TCYT (1 1/4" O.D. COPPER TUBES)

STEAM IN TUBES – PSI												
HEATER NO.	0	2	5	10	15	20	30	40	50	75	100	125
TCYT-624	119	129	143	181	174	188	212	234	248	291	321	341
TCYT-630	151	164	181	204	225	239	269	297	321	369	407	441
TCYT-636	184	200	216	243	269	291	328	362	384	441	497	527
TCYT-642	212	234	253	285	315	341	384	424	450	517	570	617
TCYT-648	243	263	291	328	362	391	441	477	517	593	655	709
TCYT-654	280	303	334	376	407	441	497	548	582	682	753	799
TCYT-660	309	334	369	415	459	497	559	605	655	753	831	899
TCYT-666	341	369	407	459	497	537	605	668	709	831	917	993
TCYT-672	376	407	450	506	548	593	668	738	783	899	1013	1075
TCYT-684	432	468	517	582	642	695	783	847	917	1054	1163	1259
TCYT-696	497	537	593	668	738	799	899	973	1054	1210	1336	1447
TCYT-824	212	234	253	285	315	341	384	424	450	517	570	617
TCYT-830	274	297	328	369	399	432	487	537	570	655	738	783
TCYT-836	328	362	391	441	487	527	593	655	695	799	882	954
TCYT-842	391	424	468	527	570	617	695	768	815	936	1054	1118
TCYT-848	450	487	537	605	655	709	799	882	936	1096	1210	1284
TCYT-854	506	548	605	682	738	799	899	993	1054	1235	1363	1475
TCYT-860	559	617	668	753	831	899	1013	1118	1187	1363	1505	1629
TCYT-866	617	668	738	831	917	993	1118	1210	1310	1505	1662	1799
TCYT-872	682	738	815	917	993	1075	1210	1336	1418	1662	1835	1986
TCYT-884	763	847	936	1054	1141	1235	1390	1535	1629	1871	2107	2236
TCYT-896	899	973	1075	1210	1310	1418	1597	1763	1871	2192	2421	2569
TCYT-1030		44	48	548	605	642	723	799	864	993	1096	1187
TCYT-1036		548	605	682	738	799	899	993	1054	1235	1363	1475
TCYT-1042	582	630	695	783	864	917	1033	1141	1235	1418	1566	1695
TCYT-1048	655	723	783	882	973	1054	1187	1310	1390	1597	1763	1909
TCYT-1054	738	799	882	993	1096	1163	1310	1447	1566	1799	1986	2149
TCYT-1060	831	899	993	1118	1235	1336	1505	1629	1763	2025	2236	2421
TCYT-1066	917	993	1096	1235	1336	1447	1629	1799	1909	2236	2469	2672
TCYT-1072	993	1075	1187	1336	1447	1566	1763	1947	2066	2421	2672	2893
TCYT-1084	1163	1259	1390	1566	1729	1871	2066	2281	2469	2836	3131	3389
TCYT-1096	1310	1447	1566	1763	1947	2107	2373	2620	2780	3194	3526	3817
TCYT-10108	1505	1629	1799	2025	2192	2373	2672	2951	3131	3669	4051	4384
TCYT-1236	899	973	1075	1210	1310	1418	1597	1763	1871	2192	2421	2569
TCYT-1242	1054	1141	1259	1418	1535	1662	1871	2066	2192	2569	2836	3070
TCYT-1248	1187	1284	1418	1597	1729	1871	2107	2327	2518	2893	3194	3457
TCYT-1254	1336	1447	1597	1799	1986	2149	2421	2620	2836	3258	3597	3893
TCYT-1260	1505	1629	1799	2025	2192	2373	2672	2951	3131	3669	4051	4384
TCYT-1266	1662	1799	1986	2236	2421	2620	2951	3258	3457	4051	4472	4746
TCYT-1272	1799	1947	2149	2421	2672	2893	3258	3526	3817	4384	4841	5240
TCYT-1284	2107	2281	2518	2836	3070	3323	3742	4132	4384	5137	5672	6139
TCYT-1296	2421	2620	2893	3258	3526	3817	4298	4746	5036	5901	6515	7052
TCYT-12108	2726	2951	3258	3669	3971	4298	4841	5345	5672	6645	7337	7942
TCYT-12120	3010	3258	3597	4051	4472	4841	5451	5901	6387	7337	8101	8788

Ratings.....Tehran Mobaddel Tank Heaters

Capacities of T.M. Tank Heaters in table below are in GPH (gallons per hr.) when installed in steel tanks

Table 4_Type TCWT_(3/4" 7/8" O.D. COPPER TUBES) HEATING WATER 40°-140° F

BOILER WATER IN TUBES				
HEATER NO.	180° PUMPED	MIN.** B.W. REQ'D	212° PUMPED	MIN.** B.W. REQ'D
TCWT-418	10	1	22	2
TCWT-424	17	1	37	3
TCWT-430	27	2	54	5
TCWT-436	36	3	71	6
TCWT-442	46	4	90	8
TCWT-448	56	5	107	9
TCWT-454	67	6	126	11
TCWT-460	75	6	142	12
TCWT-466	86	7	160	14
TCWT-472	97	8	180	15
TCWT-484	107	9	199	17
TCWT-496	119	10	215	18
TCWT-612	0	0	29	2
TCWT-618	31	3	71	6
TCWT-624	58	5	121	10
TCWT-630	85	7	169	14
TCWT-636	114	10	224	19
TCWT-642	142	12	278	24
TCWT-648	173	15	332	28
TCWT-654	203	17	382	32
TCWT-660	233	20	438	37
TCWT-666	262	22	494	42
TCWT-672	295	25	545	46
TCWT-684	360	31	652	55
TCWT-696	421	36	763	65
TCWT-818	66	6	145	12
TCWT-824	110	9	228	19
TCWT-830	157	13	313	27
TCWT-836	207	18	405	34
TCWT-842	257	22	494	42
TCWT-848	319	27	602	51
TCWT-854	374	32	705	60
TCWT-860	430	36	810	69
TCWT-866	484	41	912	77
TCWT-872	534	45	1007	85
TCWT-884	652	55	1204	102
TCWT-896	779	66	1410	120
TCWT-1024	203	17	421	36
TCWT-1030	289	25	579	49
TCWT-1036	382	32	748	64
TCWT-1042	475	40	912	77
TCWT-1048	556	47	1069	91
TCWT-1054	652	55	1228	104
TCWT-1060	748	64	1410	120
TCWT-1066	843	72	1588	135
TCWT-1072	949	81	1754	149
TCWT-1084	1157	98	2096	178
TCWT-1096	1356	115	2455	208
TCWT-10108	1557	132	2820	239
TCWT-1236	556	47	1090	93
TCWT-1242	691	59	1329	113
TCWT-1246	826	70	1588	135
TCWT-1254	968	82	1824	155
TCWT-1260	1112	94	2054	174
TCWT-1266	1252	106	2314	196
TCWT-1272	1383	117	2606	221
TCWT-1278	1527	130	2820	239
TCWT-1284	1685	143	3053	259
TCWT-1296	1975	168	3577	304
TCWT-1210E	2268	193	4109	349
TCWT-12120	2554	217	4627	393
TCWT-1436	748	64	1467	125
TCWT-1442	949	81	1824	155
TCWT-1448	1112	94	2137	181
TCWT-1454	1303	111	2504	213
TCWT-1460	1497	127	2820	239
TCWT-1466	1719	146	3176	270
TCWT-1472	1898	161	3507	298
TCWT-1478	2096	178	3872	325
TCWT-1484	2268	193	4191	356
TCWT-1496	2658	226	4910	417
TCWT-14108	3053	259	5530	469
TCWT-14120	3438	292	6227	529

MAXIMUM BOILER WATER CAPACITIES Pumped Circulation in TCWT Units

Heater Diameter	Boiler water In Tubes
4"	34 GPM
6"	78 GPM
8"	175 GPM
10"	310 GPM
12"	310 GPM
14"	640 GPM

Pressure drop through all TCWT heaters at maximum flow is approximately .55 ft. for each foot of free tube length.

**Minimum Boiler Water (BW) required is given in GPM (gallons per minute) based on 20° drop. Size piping and select T.M. Circulating Pump for not less than capacity shown.

Dimensions... (in inches)

NOTE:

TCWT

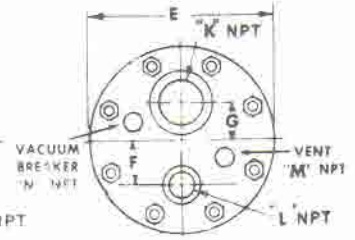
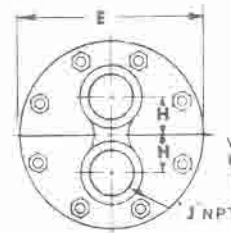
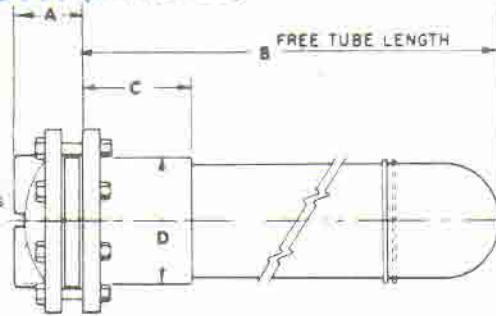
Indicates $\frac{3}{8}$ " or $\frac{1}{2}$ " O.D. Copper Tubes

TCST

Indicates $\frac{3}{8}$ " or $\frac{1}{2}$ " O.D. Copper Tubes

TCYT

Indicates $1\frac{1}{4}$ " O.D. Copper Tubes



TCWT HEAD STYLE
FOR BOILER WATER
IN TUBES

TCST OR TCYT HEAD
STYLE FOR STEAM
IN TUBES

Please indicate head and tube style
when ordering.

HEATER NO.	HEATING SURFACE SQ. FT.		A			B		C	D	E	F	G	H	J	K	L	M	N
	TCWT	TCST	TCWT	TCST	TCYT	TCWT	TCST											
TCWT-TCST-412	1.0	—	2 1/8	2 1/8	—	11 1/4	—	6 1/8	4 1/2	7 1/4	1 11/16	1 5/8	1 5/8	1 1/4	1 1/4	3/4	1/2	1/4
TCWT-TCST-418	1.8	—	2 1/8	2 1/8	—	17 1/4	—	6 1/8	4 1/2	7 1/4	1 11/16	1 5/8	1 5/8	1 1/4	1 1/4	3/4	1/2	1/4
TCWT-TCST-424	2.5	—	2 1/8	2 1/8	—	23 1/4	—	6 1/8	4 1/2	7 1/4	1 11/16	1 5/8	1 5/8	1 1/4	1 1/4	3/4	1/2	1/4
TCWT-TCST-430	3.3	—	2 1/8	2 1/8	—	29 1/4	—	6 1/8	4 1/2	7 1/4	1 11/16	1 5/8	1 5/8	1 1/4	1 1/4	3/4	1/2	1/4
TCWT-TCST-436	4.1	—	2 1/8	2 1/8	—	35 1/4	—	6 1/8	4 1/2	7 1/4	1 11/16	1 5/8	1 5/8	1 1/4	1 1/4	3/4	1/2	1/4
TCWT-TCST-442	4.9	—	2 1/8	2 1/8	—	41 1/4	—	6 1/8	4 1/2	7 1/4	1 11/16	1 5/8	1 5/8	1 1/4	1 1/4	3/4	1/2	1/4
TCWT-TCST-448	5.7	—	2 1/8	2 1/8	—	47 1/4	—	6 1/8	4 1/2	7 1/4	1 11/16	1 5/8	1 5/8	1 1/4	1 1/4	3/4	1/2	1/4
TCWT-TCST-454	6.5	—	2 1/8	2 1/8	—	53 1/4	—	6 1/8	4 1/2	7 1/4	1 11/16	1 5/8	1 5/8	1 1/4	1 1/4	3/4	1/2	1/4
TCWT-TCST-460	7.2	—	2 1/8	2 1/8	—	59 1/4	—	6 1/8	4 1/2	7 1/4	1 11/16	1 5/8	1 5/8	1 1/4	1 1/4	3/4	1/2	1/4
TCWT-TCST-466	8.0	—	2 1/8	2 1/8	—	65 1/4	—	6 1/8	4 1/2	7 1/4	1 11/16	1 5/8	1 5/8	1 1/4	1 1/4	3/4	1/2	1/4
TCWT-TCST-472	8.8	—	2 1/8	2 1/8	—	71 1/4	—	6 1/8	4 1/2	7 1/4	1 11/16	1 5/8	1 5/8	1 1/4	1 1/4	3/4	1/2	1/4
TCWT-TCST-484	10.4	—	2 1/8	2 1/8	—	83 1/4	—	6 1/8	4 1/2	7 1/4	1 11/16	1 5/8	1 5/8	1 1/4	1 1/4	3/4	1/2	1/4
TCWT-TCST-496	12.0	—	2 1/8	2 1/8	—	95 1/4	—	6 1/8	4 1/2	7 1/4	1 11/16	1 5/8	1 5/8	1 1/4	1 1/4	3/4	1/2	1/4
TCWT-TCST-612	3.3	—	2 3/8	2 3/8	—	9 3/8	—	6 1/8	6 5/8	10 1/2	2 5/16	1 7/8	1 7/8	2	2	1	1/2	1/2
TCWT-TCST-618	5.6	—	2 3/8	2 3/8	—	15 3/8	—	6 1/8	6 5/8	10 1/2	2 5/16	1 7/8	1 7/8	2	2	1	1/2	1/2
TCWT-TCST-TCYT-624	8.0	6.1	2 3/8	2 3/8	2 3/8	21 3/8	24	6 1/8	6 5/8	10 1/2	2 5/16	1 7/8	1 7/8	2	2	1	1/2	1/2
TCWT-TCST-TCYT-630	10.3	7.8	2 3/8	2 3/8	2 3/8	27 3/8	30	6 1/8	6 5/8	10 1/2	2 5/16	1 7/8	1 7/8	2	2	1	1/2	1/2
TCWT-TCST-TCYT-636	12.7	9.4	2 3/8	2 3/8	2 3/8	33 3/8	36	6 1/8	6 5/8	10 1/2	2 5/16	1 7/8	1 7/8	2	2	1	1/2	1/2
TCWT-TCST-TCYT-642	15.0	11.0	2 3/8	2 3/8	2 3/8	39 3/8	42	6 1/8	6 5/8	10 1/2	2 5/16	1 7/8	1 7/8	2	2	1	1/2	1/2
TCWT-TCST-TCYT-648	17.4	12.6	2 3/8	2 3/8	2 3/8	45 3/8	48	6 1/8	6 5/8	10 1/2	2 5/16	1 7/8	1 7/8	2	2	1	1/2	1/2
TCWT-TCST-TCYT-654	19.7	14.3	2 3/8	2 3/8	2 3/8	51 3/8	54	6 1/8	6 5/8	10 1/2	2 5/16	1 7/8	1 7/8	2	2	1	1/2	1/2
TCWT-TCST-TCYT-660	22.1	16.0	2 3/8	2 3/8	2 3/8	57 3/8	60	6 1/8	6 5/8	10 1/2	2 5/16	1 7/8	1 7/8	2	2	1	1/2	1/2
TCWT-TCST-TCYT-666	24.4	17.5	2 3/8	2 3/8	2 3/8	63 3/8	66	6 1/8	6 5/8	10 1/2	2 5/16	1 7/8	1 7/8	2	2	1	1/2	1/2
TCWT-TCST-TCYT-672	26.8	19.2	2 3/8	2 3/8	2 3/8	69 3/8	72	6 1/8	6 5/8	10 1/2	2 5/16	1 7/8	1 7/8	2	2	1	1/2	1/2
TCWT-TCST-TCYT-684	31.5	22.4	2 3/8	2 3/8	2 3/8	81 3/8	84	6 1/8	6 5/8	10 1/2	2 5/16	1 7/8	1 7/8	2	2	1	1/2	1/2
TCWT-TCST-TCYT-696	36.2	25.7	2 3/8	2 3/8	2 3/8	93 3/8	96	6 1/8	6 5/8	10 1/2	2 5/16	1 7/8	1 7/8	2	2	1	1/2	1/2
TCWT-TCST-818	11	—	3 3/8	3 3/8	—	16 1/4	—	8	8 5/8	12 1/2	3 3/8	2 1/4	2 1/2	3	3	1 1/4	1/2	1/2
TCWT-TCST-TCYT-824	15	11	3 3/8	3 3/8	3 3/8	22 1/4	24	8	8 5/8	12 1/2	3 3/8	2 1/4	2 1/2	3	3	1 1/4	1/2	1/2
TCWT-TCST-TCYT-830	19	14	3 3/8	3 3/8	3 3/8	28 1/4	30	8	8 5/8	12 1/2	3 3/8	2 1/4	2 1/2	3	3	1 1/4	1/2	1/2
TCWT-TCST-TCYT-836	23	17	3 3/8	3 3/8	3 3/8	34 1/4	36	8	8 5/8	12 1/2	3 3/8	2 1/4	2 1/2	3	3	1 1/4	1/2	1/2
TCWT-TCST-TCYT-842	27	20	3 3/8	3 3/8	3 3/8	40 1/4	42	8	8 5/8	12 1/2	3 3/8	2 1/4	2 1/2	3	3	1 1/4	1/2	1/2
TCWT-TCST-TCYT-848	32	23	3 3/8	3 3/8	3 3/8	46 1/4	48	8	8 5/8	12 1/2	3 3/8	2 1/4	2 1/2	3	3	1 1/4	1/2	1/2
TCWT-TCST-TCYT-854	36.5	26	3 3/8	3 3/8	3 3/8	52 1/4	54	8	8 5/8	12 1/2	3 3/8	2 1/4	2 1/2	3	3	1 1/4	1/2	1/2
TCWT-TCST-TCYT-860	41	29	3 3/8	3 3/8	3 3/8	58 1/4	60	8	8 5/8	12 1/2	3 3/8	2 1/4	2 1/2	3	3	1 1/4	1/2	1/2
TCWT-TCST-TCYT-866	45	32	3 3/8	3 3/8	3 3/8	64 1/4	66	8	8 5/8	12 1/2	3 3/8	2 1/4	2 1/2	3	3	1 1/4	1/2	1/2
TCWT-TCST-TCYT-872	49	35	3 3/8	3 3/8	3 3/8	70 1/4	72	8	8 5/8	12 1/2	3 3/8	2 1/4	2 1/2	3	3	1 1/4	1/2	1/2
TCWT-TCST-TCYT-884	58	40	3 3/8	3 3/8	3 3/8	82 1/4	84	8	8 5/8	12 1/2	3 3/8	2 1/4	2 1/2	3	3	1 1/4	1/2	1/2
TCWT-TCST-TCYT-896	67	46	3 3/8	3 3/8	3 3/8	94 1/4	96	8	8 5/8	12 1/2	3 3/8	2 1/4	2 1/2	3	3	1 1/4	1/2	1/2

Dimensions are subject to change. If exact dimensions are needed for layout, write for prints

Dimensions... (in inches) — continued

NOTE:

TCWT

Indicates $\frac{3}{4}$ " or $\frac{7}{8}$ " OD Copper Tubes

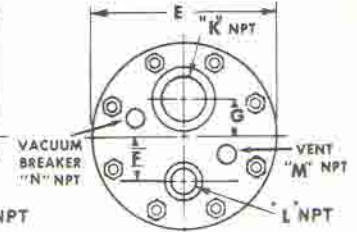
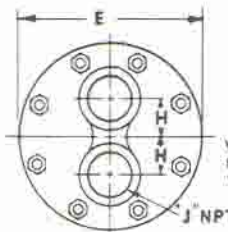
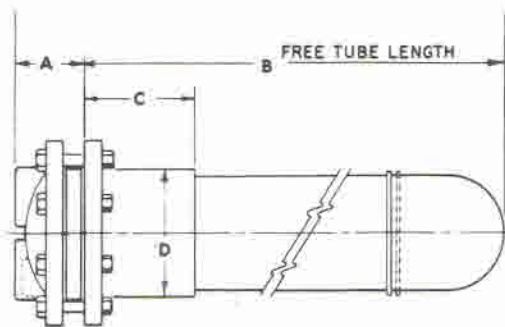
TCST

Indicates $\frac{3}{4}$ " or $\frac{7}{8}$ " OD Copper Tubes

TCYT

Indicates $1\frac{1}{4}$ " O.D. Copper Tubes

Please indicate head and tube style when ordering.



TCWT HEAD STYLE
FOR BOILER WATER
IN TUBES

TCST OR TCYT HEAD
STYLE FOR STEAM
IN TUBES

HEATING SURFACE SQ. FT.			A			B		D	D	E	F	G	H	J	K	L	M	N
HEATER NO.	TCWT TCST	TCYT	TCWT	TCST	TCYT	TCWT TCST	TCYT											
TCWT-TCST-1024	27	—	3%	3%	—	23%	—	8 1/4	10 3/4	14 5/8	4 1/8	2 13/16	2 13/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1030	34.5	21	3%	3%	3%	29%	30	8 1/4	10 3/4	14 5/8	4 1/8	2 13/16	2 15/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1036	42	26	3%	3%	3%	35%	36	8 1/4	10 3/4	14 5/8	4 1/8	2 13/16	2 15/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1042	49.5	30	3%	3%	3%	41%	42	8 1/4	10 3/4	14 5/8	4 1/8	2 13/16	2 15/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1048	56	34	3%	3%	3%	47%	48	8 1/4	10 3/4	14 5/8	4 1/8	2 13/16	2 15/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1054	63.5	38	3%	3%	3%	53%	54	8 1/4	10 3/4	14 5/8	4 1/8	2 13/16	2 15/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1060	71	43	3%	3%	3%	59%	60	8 1/4	10 3/4	14 5/8	4 1/8	2 13/16	2 15/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1066	78.5	47	3%	3%	3%	65%	66	8 1/4	10 3/4	14 5/8	4 1/8	2 13/16	2 15/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1072	86	51	3%	3%	3%	71%	72	8 1/4	10 3/4	14 5/8	4 1/8	2 13/16	2 15/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1084	101	60	3%	3%	3%	83%	84	8 1/4	10 3/4	14 5/8	4 1/8	2 13/16	2 15/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1096	116	68	3%	3%	3%	95%	96	8 1/4	10 3/4	14 5/8	4 1/8	2 13/16	2 15/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-10108	131	77	3%	3%	3%	107%	108	8 1/4	10 3/4	14 5/8	4 1/8	2 13/16	2 15/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1236	61	46	3%	5%	5%	36 1/4	36	10 1/4	12 3/4	16 5/8	5 1/8	3 11/16	3 11/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1242	72	54	3%	5%	5%	42 1/4	42	10 1/4	12 3/4	16 5/8	5 1/8	3 11/16	3 11/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1248	83	61	3%	5%	5%	48 1/4	48	10 1/4	12 3/4	16 5/8	5 1/8	3 11/16	3 11/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1254	94	69	3%	5%	5%	54 1/4	54	10 1/4	12 3/4	16 5/8	5 1/8	3 11/16	3 11/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1260	104	77	3%	5%	5%	60 1/4	60	10 1/4	12 3/4	16 5/8	5 1/8	3 11/16	3 11/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1266	115	85	3%	5%	5%	66 1/4	66	10 1/4	12 3/4	16 5/8	5 1/8	3 11/16	3 11/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1272	126	93	3%	5%	5%	72 1/4	72	10 1/4	12 3/4	16 5/8	5 1/8	3 11/16	3 11/16	4	4	2	3/4	3/4
TCWT-TCST-1278	137	—	3%	5%	—	78 1/4	—	10 1/4	12 3/4	16 5/8	5 1/8	3 11/16	3 11/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1284	147	108	3%	5%	5%	84 1/4	84	10 1/4	12 3/4	16 5/8	5 1/8	3 11/16	3 11/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-1296	169	124	3%	5%	5%	96 1/4	96	10 1/4	12 3/4	16 5/8	5 1/8	3 11/16	3 11/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-12108	191	140	3%	5%	5%	108 1/4	108	10 1/4	12 3/4	16 5/8	5 1/8	3 11/16	3 11/16	4	4	2	3/4	3/4
TCWT-TCST-TCYT-12120	212	156	3%	5%	5%	120 1/4	120	10 1/4	12 3/4	16 5/8	5 1/8	3 11/16	3 11/16	4	4	2	3/4	3/4
TCWT-TCST-1436	86	—	6%	6%	—	37 1/2	—	10 1/4	14	17 7/8	5 1/8	3 5/8	4	6	6	3	3/4	3/4
TCWT-TCST-1442	102	—	6%	6%	—	43 1/2	—	10 1/4	14	17 7/8	5 1/8	3 5/8	4	6	6	3	3/4	3/4
TCWT-TCST-1448	116	—	6%	6%	—	49 1/2	—	10 1/4	14	17 7/8	5 1/8	3 5/8	4	6	6	3	3/4	3/4
TCWT-TCST-1454	131	—	6%	6%	—	55 1/2	—	10 1/4	14	17 7/8	5 1/8	3 5/8	4	6	6	3	3/4	3/4
TCWT-TCST-1460	146	—	6%	6%	—	61 1/2	—	10 1/4	14	17 7/8	5 1/8	3 5/8	4	6	6	3	3/4	3/4
TCWT-TCST-1466	161	—	6%	6%	—	67 1/2	—	10 1/4	14	17 7/8	5 1/8	3 5/8	4	6	6	3	3/4	3/4
TCWT-TCST-1472	175	—	6%	6%	—	73 1/2	—	10 1/4	14	17 7/8	5 1/8	3 5/8	4	6	6	3	3/4	3/4
TCWT-TCST-1478	190	—	6%	6%	—	79 1/2	—	10 1/4	14	17 7/8	5 1/8	3 5/8	4	6	6	3	3/4	3/4
TCWT-TCST-1484	204	—	6%	6%	—	85 1/2	—	10 1/4	14	17 7/8	5 1/8	3 5/8	4	6	6	3	3/4	3/4
TCWT-TCST-1496	234	—	6%	6%	—	97 1/2	—	10 1/4	14	17 7/8	5 1/8	3 5/8	4	6	6	3	3/4	3/4
TCWT-TCST-14108	263	—	6%	6%	—	109 1/2	—	10 1/4	14	17 7/8	5 1/8	3 5/8	4	6	6	3	3/4	3/4
TCWT-TCST-14120	292	—	6%	6%	—	121 1/2	—	10 1/4	14	17 7/8	5 1/8	3 5/8	4	6	6	3	3/4	3/4

Dimensions are subject to change. If exact dimensions are needed for layout, write for prints.

HEAD AND PRESSURE EQUIVALENTS

FEET HEAD OF WATER AND EQUIVALENT PRESSURES

PRESSURES AND EQUIVALENT FEET HEAD OF WATER

Feet Head	Pounds per Sq. In.	Feet Head	Pounds per Sq. In.	Feet Head	Pounds per Sq. In.	Feet Head	Pounds per Sq. In.	Lbs. per Sq. In.	Feet Head	Lbs. per Sq. In.	Feet Head	Lbs. per Sq. In.	Feet Head	Lbs. per Sq. In.	Feet Head
1	.43	30	12.99	140	60.63	300	129.93	1	2.31	20	46.18	120	277.07	225	519.51
2	.87	40	17.32	150	64.96	325	140.75	2	4.62	25	57.72	125	288.62	250	577.24
3	1.30	50	21.65	160	69.29	350	151.58	3	6.93	30	69.27	130	300.16	275	643.03
4	1.73	60	25.99	170	73.63	400	173.24	4	9.24	40	92.36	140	323.25	300	692.69
5	2.17	70	30.32	180	77.96	500	216.55	5	11.54	50	115.45	150	346.34	325	750.41
6	2.60	80	34.65	190	82.29	600	259.85	6	13.85	60	138.54	160	369.43	350	808.13
7	3.03	90	38.98	200	86.62	700	303.16	7	16.16	70	161.63	170	392.52	375	865.89
8	3.46	100	43.31	225	97.45	800	346.47	8	18.47	80	184.72	180	415.61	400	922.58
9	3.90	110	47.64	250	108.27	900	389.78	9	20.78	90	207.81	190	438.90	500	1154.48
10	4.33	120	51.97	275	119.10	1000	433.09	10	23.09	100	230.90	200	461.78	1000	2309.00
20	8.66	130	56.30					15	34.63	110	253.98				

CONVERSION FACTORS

TO CONVERT FROM	TO	MULTIPLY BY	TO CONVERT FROM	TO	MULTIPLY BY
Pressure			Temperature		
Atmospheres	ft. of water	33.9	Centigrade degrees	Fahrenheit degrees	1.8 and add 32°
Atmospheres	mm. of mercury	760.0	Fahrenheit degrees	Centigrade degrees	Subtract 32° and multiply by
Atmospheres	pounds/sq. in.	14.696		Measure	0.5555
Feet of water (40°F)	pounds/sq. in.	0.4335	Centimeters	inches	0.3937
Inches of mercury (32°F)	feet of water (40°F)	1.133	Feet	meters	0.3048
Inches of mercury (32°F)	pounds/sq. in.	0.49116	Inches	centimeters	2.54
Inches of water (40°F)	pounds/sq. in.	0.03614	Kilometers	miles	0.6214
mm. of mercury (32°F)	pounds/sq. in.	0.01934	Meters	feet	3.2808
Pounds/sq. in.	feet of water (40°F)	2.3066	Microns	millimeters	0.001
Pounds/sq. in.	inches of mercury (32°F)	2.036	Sq. meters	sq. feet	10.764
Volume			Weight		
Barrels (oil)	gallons	42.0	Cubic ft. of water (60°F)	pounds	62.37
Barrels (breweries)	gallons	31.0	Gallons	pounds of water (60°F)	8.34
Cubic cm.	cubic inches	0.061023	Grains	pounds	1/7000
Cubic ft.	cubic inches	1728.0	Grains/gal.	parts per million	17.12
Cubic ft.	cubic meters	0.02832	Grams	grains	15.43
Cubic ft.	gallons	7.481	Kilograms	pounds	2.2046
Cubic meters	gallons	264.17	Pounds	grams	453.59
Gallons	cubic ft.	0.1337	Pounds	kilograms	0.4536
Gallons	cubic inches	231.0	Tons (long)	tons (short)	1.12
Gallons	gallons (British)	0.83268	Volumetric Rate		
Gallons	liters	3.7853	Cubic ft./sec.	gallons/min.	448.83
Liters	gallons	0.2642	Gallons/min.	cu. ft./sec.	0.00223
Liters	quarts	1.0567	Power		
Heat			Horsepower	ft. lbs./sec.	550.0
Boiler horsepower (BHP)	BTU/hr.	33479.0	Horsepower	K.W.	0.745
BTU	calories (gram)	252.0	Viscosity		
BTU	calories (kg.)	0.252	Centipoises	lbs./sec./ft.	0.000672
Calories (gram)/gram/°C	BTU/pound/°F	1.0	Poises	centipoises	0.01
Calories (gram) per gram	BTU/pound	1.8	Velocity		
Horsepower	BTU/hr.	2545.0	Ft./sec.	meters/sec.	0.3048
K. W. hours	BTU	3413.0	Meters/sec.	ft./sec.	3.2808