TEMPERATURE, T (K)	PRESSURE, P (bars)*	SPECIFIC VOLUME (m^3/kg) $v_f \cdot 10^3$	v_g	HEAT OF VAPORIZATION, h_{fg} (kJ/kg)	SPECIFIC HEAT (kJ/kg · K) $c_{p,f}$	$c_{p,g}$	VISCOSITY ($N \cdot s/m^2$) $\mu_f \cdot 10^6$	$\mu_g \cdot 10^6$	THERMAL CONDUCTIVITY (W/m · K) $k_f \cdot 10^3$	$k_g \cdot 10^3$	PRANDTL NUMBER Pr_f	Pr_g	SURFACE TENSION, $\sigma_f \cdot 10^3$ (N/m)	EXPANSION COEFFICIENT, $\beta_f \cdot 10^6$ (K^{-1})	TEMPERATURE, T (K)
273.15	0.00611	1.000	206.3	2502	4.217	1.854	1750	8.02	569	18.2	12.99	0.815	75.5	−68.05	273.15
275	0.00697	1.000	181.7	2497	4.211	1.855	1652	8.09	574	18.3	12.22	0.817	75.3	−32.74	275
280	0.00990	1.000	130.4	2485	4.198	1.858	1422	8.29	582	18.6	10.26	0.825	74.8	46.04	280
285	0.01387	1.000	99.4	2473	4.189	1.861	1225	8.49	590	18.9	8.81	0.833	74.3	114.1	285
290	0.01917	1.001	69.7	2461	4.184	1.864	1080	8.69	598	19.3	7.56	0.841	73.7	174.0	290
295	0.02617	1.002	51.94	2449	4.181	1.868	959	8.89	606	19.5	6.62	0.849	72.7	227.5	295
300	0.03531	1.003	39.13	2438	4.179	1.872	855	9.09	613	19.6	5.83	0.857	71.7	276.1	300
305	0.04712	1.005	27.90	2426	4.178	1.877	769	9.29	620	20.1	5.20	0.865	70.9	320.6	305
310	0.06221	1.007	22.93	2414	4.178	1.882	695	9.49	628	20.4	4.62	0.873	70.0	361.9	310
315	0.08132	1.009	17.82	2402	4.179	1.888	631	9.69	634	20.7	4.16	0.883	69.2	400.4	315
320	0.1053	1.011	13.98	2390	4.180	1.895	577	9.89	640	21.0	3.77	0.894	68.3	436.7	320
325	0.1351	1.013	11.06	2378	4.182	1.903	528	10.09	645	21.3	3.42	0.901	67.5	471.2	325
330	0.1719	1.016	8.82	2366	4.184	1.911	489	10.29	650	21.7	3.15	0.908	66.6	504.0	330
335	0.2167	1.018	7.09	2354	4.186	1.920	453	10.49	656	22.0	2.88	0.916	65.8	535.5	335
340	0.2713	1.021	5.74	2342	4.188	1.930	420	10.69	660	22.3	2.66	0.925	64.9	566.0	340
345	0.3372	1.024	4.683	2329	4.191	1.941	389	10.89	668	22.6	2.45	0.933	64.1	595.4	345
350	0.4163	1.027	3.846	2317	4.195	1.954	365	11.09	668	23.0	2.29	0.942	63.2	624.2	350
355	0.5100	1.030	3.180	2304	4.199	1.968	343	11.29	671	23.3	2.14	0.951	62.3	652.3	355
360	0.6209	1.034	2.645	2291	4.203	1.983	324	11.49	674	23.7	2.02	0.960	61.4	697.9	360
365	0.7514	1.038	2.212	2278	4.209	1.999	306	11.69	677	24.1	1.91	0.969	60.5	707.1	365
370	0.9040	1.041	1.861	2265	4.214	2.017	289	11.89	679	24.5	1.80	0.978	59.5	728.7	370
373.15	1.0133	1.044	1.679	2257	4.217	2.029	279	12.02	680	24.8	1.76	0.984	58.9	750.1	373.15
375	1.0615	1.045	1.574	2252	4.220	2.036	274	12.09	681	24.9	1.70	0.987	58.6	761	375
380	1.2869	1.049	1.337	2239	4.226	2.057	260	12.29	683	25.4	1.61	0.999	57.6	788	380
385	1.5233	1.053	1.142	2225	4.232	2.080	248	12.49	685	25.8	1.53	1.004	56.6	814	385
390	1.794	1.058	0.980	2212	4.239	2.104	237	12.69	686	26.3	1.47	1.013	55.6	841	390
400	2.455	1.067	0.731	2183	4.256	2.158	217	13.05	688	27.2	1.34	1.033	53.6	896	400
410	3.302	1.077	0.553	2153	4.278	2.221	200	13.42	688	28.2	1.24	1.054	51.5	952	410
420	4.370	1.088	0.425	2123	4.302	2.291	185	13.79	688	29.8	1.16	1.075	49.4	1010	420
430	5.699	1.099	0.331	2091	4.331	2.369	173	14.14	685	30.4	1.09	1.10	47.2		430
440	7.333	1.110	0.261	2059	4.36	2.46	162	14.50	682	31.7	1.04	1.12	45.1		440
450	9.319	1.123	0.208	2024	4.40	2.56	152	14.85	678	33.1	0.99	1.14	42.9		450
460	11.71	1.137	0.167	1989	4.44	2.68	143	15.19	673	34.6	0.95	1.17	40.7		460
470	14.55	1.152	0.136	1951	4.48	2.79	136	15.54	667	36.3	0.92	1.20	38.5		470
480	17.90	1.167	0.111	1912	4.53	2.94	129	15.88	660	38.1	0.89	1.23	36.2		480

490	21.83	1.184	0.0922	1870	4.59	3.10	124	16.23	651	40.1	0.87	1.25	33.9	490
500	26.40	1.203	0.0766	1825	4.66	3.27	118	16.59	642	42.3	0.86	1.28	31.6	500
510	31.66	1.222	0.0631	1779	4.74	3.47	113	16.95	631	44.7	0.85	1.31	29.3	510
520	37.70	1.244	0.0525	1730	4.84	3.70	108	17.33	621	47.5	0.84	1.35	26.9	520
530	44.58	1.268	0.0445	1679	4.95	3.96	104	17.72	608	50.6	0.85	1.39	24.5	530
540	52.38	1.294	0.0375	1622	5.08	4.27	101	18.1	594	54.0	0.86	1.43	22.1	540
550	61.19	1.323	0.0317	1564	5.24	4.64	97	18.6	580	58.3	0.87	1.47	19.7	550
560	71.08	1.355	0.0269	1499	5.43	5.09	94	19.1	563	63.7	0.90	1.52	17.3	560
570	82.16	1.392	0.0228	1429	5.68	5.67	91	19.7	548	76.7	0.94	1.59	15.0	570
580	94.51	1.433	0.0193	1353	6.00	6.40	88	20.4	528	76.7	0.99	1.68	12.8	580
590	108.3	1.482	0.0163	1274	6.41	7.35	84	21.5	513	84.1	1.05	1.84	10.5	590
600	123.5	1.541	0.0137	1176	7.00	8.75	81	22.7	497	92.9	1.14	2.15	8.4	600
610	137.3	1.612	0.0115	1068	7.85	11.1	77	24.1	467	103	1.30	2.60	6.3	610
620	159.1	1.705	0.0094	941	9.35	15.4	72	25.9	444	114	1.52	3.46	4.5	620
625	169.1	1.778	0.0085	858	10.6	18.3	70	27.0	430	121	1.65	4.20	3.5	625
630	179.7	1.856	0.0075	781	12.6	22.1	67	28.0	412	130	2.0	4.8	2.6	630
635	190.9	1.935	0.0066	683	16.4	27.6	64	30.0	392	141	2.7	6.0	1.5	635
640	202.7	2.075	0.0057	560	26	42	59	32.0	367	155	4.2	9.6	0.8	640
645	215.2	2.351	0.0045	361	90		54	37.0	331	178	12	26	0.1	645
647.3	221.2	3.170	0.0032	0	∞	∞	45	45.0	238	238	∞	∞	0.0	647.3

[a] Adapted from Reference 19.
[b] 1 bar = 10^5 N/m^2.
[c] Critical temperature.

TABEL 2. REYNOLDS NUMBER

CONFIGURATION	$Re_{D,max}$	C	m
Aligned	$10^3 - 2 \times 10^5$	0.27	0.63
Staggered ($S_T/S_L < 2$)	$10^3 - 2 \times 10^5$	$0.35(S_T/S_L)^{1/5}$	0.60
Staggered ($S_T/S_L > 2$)	$10^3 - 2 \times 10^5$	0.40	0.60
Aligned	$2 \times 10^5 - 2 \times 10^6$	0.021	0.84
Staggered	$2 \times 10^5 - 2 \times 10^6$	0.022	0.84

TABEL 3. HUBUNGAN BRIX - SPECIFIC GRAVITY

Brix	Specific Gravity
0.0	1.00000
.2	1.00078
.4	1.00155
.6	1.00233
.8	1.00311
1.0	1.00389
.2	1.00466
.4	1.00544
.6	1.00622
.8	1.00700
2.0	1.00778
.2	1.00856
.4	1.00934
.6	1.01013
.8	1.01091
3.0	1.01169
.2	1.01248
.4	1.01327
.6	1.01406
.8	1.01485
4.0	1.01564
.2	1.01643
.4	1.01722
.6	1.01802
.8	1.01881
5.0	1.01960
.2	1.02040
.4	1.02120
.6	1.02200
.8	1.02280
6.0	1.02360
.2	1.02440
.4	1.02521
.6	1.02601
.8	1.02682
7.0	1.02762
.2	1.02843
.4	1.02924
.6	1.03005
.8	1.03086
8.0	1.03167
.2	1.03248
.4	1.03330
.6	1.03411
.8	1.03493
9.0	1.03574
.2	1.03656
.4	1.03738
.6	1.03820
.8	1.03902
10.0	1.03984
.2	1.04067
.4	1.04149
.6	1.04232
.8	1.04314
11.0	1.04397
.2	1.04480
.4	1.04564
.6	1.04647
.8	1.04730
12.0	1.04813
.2	1.04897
.4	1.04981
.6	1.05065
.8	1.05148
13.0	1.05232
.2	1.05317
.4	1.05401
.6	1.05485
.8	1.05570
14.0	1.05654
.2	1.05739
.4	1.05824
.6	1.05909
.8	1.05994
15.0	1.06080
.2	1.06165
.4	1.06251
.6	1.06336
.8	1.06422
16.0	1.06508
.2	1.06594
.4	1.06680
.6	1.06767
.8	1.06853
17.0	1.06940
.2	1.07026
.4	1.07113
.6	1.07200
.8	1.07287
18.0	1.07374
.2	1.07461
.4	1.07549
.6	1.07636
.8	1.07724
19.0	1.07812
.2	1.07900
.4	1.07988
.6	1.08076
.8	1.08164
20.0	1.08253
.2	1.08341
.4	1.08430
.6	1.08519
.8	1.08608
21.0	1.08697
.2	1.08786
.4	1.08876
.6	1.08965
.8	1.09055
22.0	1.09144
.2	1.09234
.4	1.09324
.6	1.09414
.8	1.09504
23.0	1.09595
.2	1.09685
.4	1.09776
.6	1.09867
.8	1.09957
24.0	1.10048
.2	1.10140
.4	1.10231
.6	1.10322
.8	1.10414
25.0	1.10551
.2	1.10597
.4	1.10689
.6	1.10781
.8	1.10873
26.0	1.10965
.2	1.11058
.4	1.11151
.6	1.11244
.8	1.11336
27.0	1.11429
.2	1.11522
.4	1.11616
.6	1.11709
.8	1.11802
28.0	1.11896
.2	1.11989
.4	1.12083
.6	1.12177
.8	1.12271
29.0	1.12365
.2	1.12460
.4	1.12555
.6	1.12649
.8	1.12744

Brix	Specific Gravity
30.0	1.12829
.2	1.12931
.4	1.13030
.6	1.13125
.8	1.13221
31.0	1.13316
.2	1.13412
.4	1.13508
.6	1.13604
.8	1.13700
32.0	1.13797
.2	1.13893
.4	1.13990
.6	1.14087
.8	1.14184
33.0	1.14281
.2	1.14378
.4	1.14476
.6	1.14573
.8	1.14671
34.0	1.14768
.2	1.14866
.4	1.14965
.6	1.15063
.8	1.15161
35.0	1.15259
.2	1.15358
.4	1.15457
.6	1.15556
.8	1.15655
36.0	1.15753
.2	1.15853
.4	1.15952
.6	1.16052
.8	1.16152
37.0	1.16251
.2	1.16351
.4	1.16454
.6	1.16552
.8	1.16652
38.0	1.16753
.2	1.16854
.4	1.16955
.6	1.17056
.8	1.17157
39.0	1.17258
.2	1.17360
.4	1.17462
.6	1.17564
.8	1.17666

Brix	Specific Gravity
40.0	1.17768
.2	1.17870
.4	1.17973
.6	1.18076
.8	1.18178
41.0	1.18281
.2	1.18384
.4	1.18488
.6	1.18592
.8	1.18695
42.0	1.18799
.2	1.18903
.4	1.19007
.6	1.19112
.8	1.19216
43.0	1.19320
.2	1.19425
.4	1.19530
.6	1.19635
.8	1.19740
44.0	1.19845
.2	1.19951
.4	1.20057
.6	1.20163
.8	1.20269
45.0	1.20375
.2	1.20481
.4	1.20588
.6	1.20695
.8	1.20801
46.0	1.20908
.2	1.21015
.4	1.21122
.6	1.21230
.8	1.21337
47.0	1.21445
.2	1.21553
.4	1.21661
.6	1.21769
.8	1.21877
48.0	1.21985
.2	1.22094
.4	1.22203
.6	1.22311
.8	1.22420
49.0	1.22529
.2	1.22639
.4	1.22748
.6	1.22858
.8	1.22968

Brix	Specific Gravity
50.0	1.23077
.2	1.23187
.4	1.23298
.6	1.23408
.8	1.23518
51.0	1.23629
.2	1.23740
.4	1.23851
.6	1.23962
.8	1.24073
52.0	1.24184
.2	1.24295
.4	1.24407
.6	1.24519
.8	1.24631
53.0	1.24743
.2	1.24855
.4	1.24968
.6	1.25080
.8	1.25193
54.0	1.25305
.2	1.25419
.4	1.25532
.6	1.25645
.8	1.25758
55.0	1.25872
.2	1.25986
.4	1.26100
.6	1.26214
.8	1.26328
56.0	1.26443
.2	1.26557
.4	1.26672
.6	1.26787
.8	1.26902
57.0	1.27017
.2	1.27133
.4	1.27249
.6	1.27364
.8	1.27480
58.0	1.27596
.2	1.27712
.4	1.27829
.6	1.27945
.8	1.28061
59.0	1.28178
.2	1.28295
.4	1.28412
.6	1.28530
.8	1.28647

Brix	Specific Gravity
60.0	1.27864
.2	1.28882
.4	1.29000
.6	1.29118
.8	1.29236
61.0	1.29354
.2	1.29473
.4	1.29592
.6	1.29710
.8	1.29829
62.0	1.29948
.2	1.30067
.4	1.30187
.6	1.30307
.8	1.30426
63.0	1.30546
.2	1.30666
.4	1.30786
.6	1.30907
.8	1.31027
64.0	1.31147
.2	1.31269
.4	1.31390
.6	1.31511
.8	1.31632
65.0	1.31753
.2	1.31875
.4	1.31997
.6	1.32119
.8	1.32240
66.0	1.32362
.2	1.32485
.4	1.32608
.6	1.32730
.8	1.32853
67.0	1.32975
.2	1.33099
.4	1.33222
.6	1.33346
.8	1.33469
68.0	1.33593
.2	1.33717
.4	1.33841
.6	1.33965
.8	1.34089
69.0	1.34213
.2	1.34338
.4	1.34463
.6	1.34588
.8	1.34713