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Specific gravity and density of caustic soda solutions

Scope

This Technical Information Paper presents the specific gravity and density of solutions of sodium hydroxide (caustic soda) as a function of the strength of solution.

Safety precautions

Caustic soda is a highly corrosive material, which can cause severe burns to the eyes and skin. Eye contact of only a few seconds can cause permanent damage, even blindness. In all cases of bodily contact with caustic soda, begin washing the exposed area **immediately** with large quantities of flowing water. Personnel engaged in the use or handling of caustic soda should wear close fitting chemical workers goggles, rubber gloves, rubber apron or suit, and a face shield. The addition of caustic soda to liquid will cause a rise in temperature. If caustic soda becomes concentrated in one area, or is added too rapidly, or is added to hot or cold liquid, a rapid temperature increase can result in dangerous mists or boiling and spattering, which may cause an immediate **violent eruption**.

Statement of accuracy

These data were developed for a standard grade of caustic soda and will be satisfactory for nearly all applications. There are several grades of caustic soda available commercially. If the application of this data is intended for highly accurate calculations, the user should obtain specific data from the supplier of the product being used.

Keywords

Specific gravity, Density, Sodium hydroxide, Caustic soda, Physical properties, Chemical preparation, Bleaching

Additional information

NOTE: Specific gravity is the ratio of the density (weight per unit volume) of a substance to that of a reference material, usually water. For this case, the specific gravity of a caustic soda solution is numerically equal to its density.

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TIP Category: Data and Calculations



Documents

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At 15.5°C.

% NaOH	% Na ₂ O	Specific gravity 15.5/15.5°C	Degrees Baume, Am. Std.	Degrees Twaddell, 15.5/15.5°C	NaOH g/L	NaOH, lb		Pounds of solution	
						Per gal	Per ft ³	Per gal	Per ft ³
1	0.78	1.012	1.72	2.4	10.11	0.08	0.63	8.44	63.14
2	1.55	1.023	3.26	4.6	20.46	0.17	1.28	8.53	63.83
3	2.32	1.034	4.77	6.8	31.02	0.26	1.94	8.62	64.52
4	3.10	1.045	6.24	9.0	41.80	0.35	2.61	8.71	65.20
5	3.87	1.056	7.69	11.2	52.80	0.44	3.30	8.80	65.89
6	4.65	1.067	9.10	13.4	64.02	0.53	4.00	8.90	66.58
7	5.42	1.079	10.62	15.8	75.53	0.63	4.72	9.00	67.33
8	6.20	1.090	11.97	18.0	87.20	0.73	5.44	9.09	68.01
9	6.98	1.101	13.30	20.2	99.09	0.83	6.19	9.18	68.70
10	7.75	1.112	14.60	22.4	111.20	0.93	6.94	9.27	69.38
11	8.52	1.123	15.88	24.6	123.53	1.03	7.71	9.36	70.07
12	9.30	1.134	17.13	26.8	136.08	1.14	8.50	9.45	70.76
13	10.08	1.145	18.36	29.0	148.85	1.24	9.29	9.55	71.44
14	10.85	1.156	19.57	31.2	161.84	1.35	10.10	9.64	72.13
15	11.62	1.167	20.75	33.4	175.05	1.46	10.93	9.73	72.82
16	12.40	1.178	21.91	35.6	188.48	1.57	11.77	9.82	73.50
17	13.17	1.190	23.15	38.0	202.30	1.69	12.63	9.92	74.25
18	13.95	1.201	24.27	40.2	216.18	1.80	13.50	10.01	74.94
19	14.73	1.212	25.36	42.4	230.28	1.92	14.38	10.10	75.62
20	15.50	1.223	26.44	44.6	244.60	2.04	15.27	10.20	76.31
21	16.28	1.234	27.50	46.8	259.14	2.16	16.18	10.29	77.00
22	17.05	1.245	28.53	49.0	273.90	2.29	17.10	10.38	77.68
23	17.83	1.256	29.55	51.2	288.88	2.41	18.03	10.47	78.37
24	18.60	1.267	30.56	53.4	304.08	2.54	18.98	10.56	79.06
25	19.38	1.278	31.54	55.6	319.50	2.67	19.95	10.65	79.74
26	20.15	1.289	32.51	57.8	335.14	2.80	20.92	10.75	80.43
27	20.92	1.300	33.46	60.0	351.00	2.93	21.91	10.84	81.11
28	21.70	1.310	34.31	62.0	366.80	3.06	22.90	10.92	81.74
29	22.48	1.321	35.23	64.2	383.09	3.20	23.92	11.01	82.43
30	23.25	1.332	36.14	66.4	399.60	3.33	24.95	11.10	83.11
31	24.02	1.343	37.03	68.6	416.33	3.47	25.99	11.20	83.80
32	24.80	1.353	37.83	70.6	432.96	3.61	27.03	11.28	84.41
33	25.58	1.363	38.62	72.6	449.79	3.75	28.08	11.36	85.05
34	26.35	1.374	39.47	74.8	467.16	3.90	29.16	11.46	85.73
35	27.12	1.384	40.23	76.8	484.40	4.04	30.24	11.54	86.36
36	27.90	1.394	40.98	78.8	501.84	4.19	31.33	11.62	86.98
37	28.68	1.404	41.72	80.8	519.48	4.34	32.43	11.71	87.60
38	29.45	1.414	42.45	82.8	537.32	4.48	33.54	11.79	88.23
39	30.22	1.424	43.17	84.8	555.36	4.63	34.67	11.87	88.85
40	31.00	1.434	43.88	86.8	573.60	4.79	35.81	11.96	89.48
41	31.78	1.444	44.58	88.8	592.04	4.94	36.96	12.04	90.10
42	32.55	1.454	45.28	90.8	610.68	5.10	38.12	12.12	90.72
43	33.32	1.463	45.89	92.6	629.09	5.25	39.27	12.20	91.29
44	34.10	1.473	46.56	94.6	648.12	5.41	40.46	12.28	91.91
45	34.88	1.483	47.22	96.6	667.35	5.57	41.66	12.36	92.53
46	35.65	1.492	47.82	98.4	686.32	5.73	42.85	12.44	93.09
47	36.42	1.502	48.46	100.4	705.94	5.89	44.07	12.52	93.72
48	37.20	1.511	49.04	102.2	725.28	6.05	45.28	12.60	94.28
49	37.98	1.521	49.67	104.2	745.29	6.22	46.53	12.68	94.90
50	38.75	1.530	50.23	106.0	765.00	6.38	47.76	12.76	95.47
51	39.52	1.540	50.84	108.0	785.40	6.55	49.03	12.84	96.09
52	40.30	1.549	51.39	109.8	805.48	6.72	50.29	12.91	96.65