

 Borax Decahydrate +  Optibor® mixtures

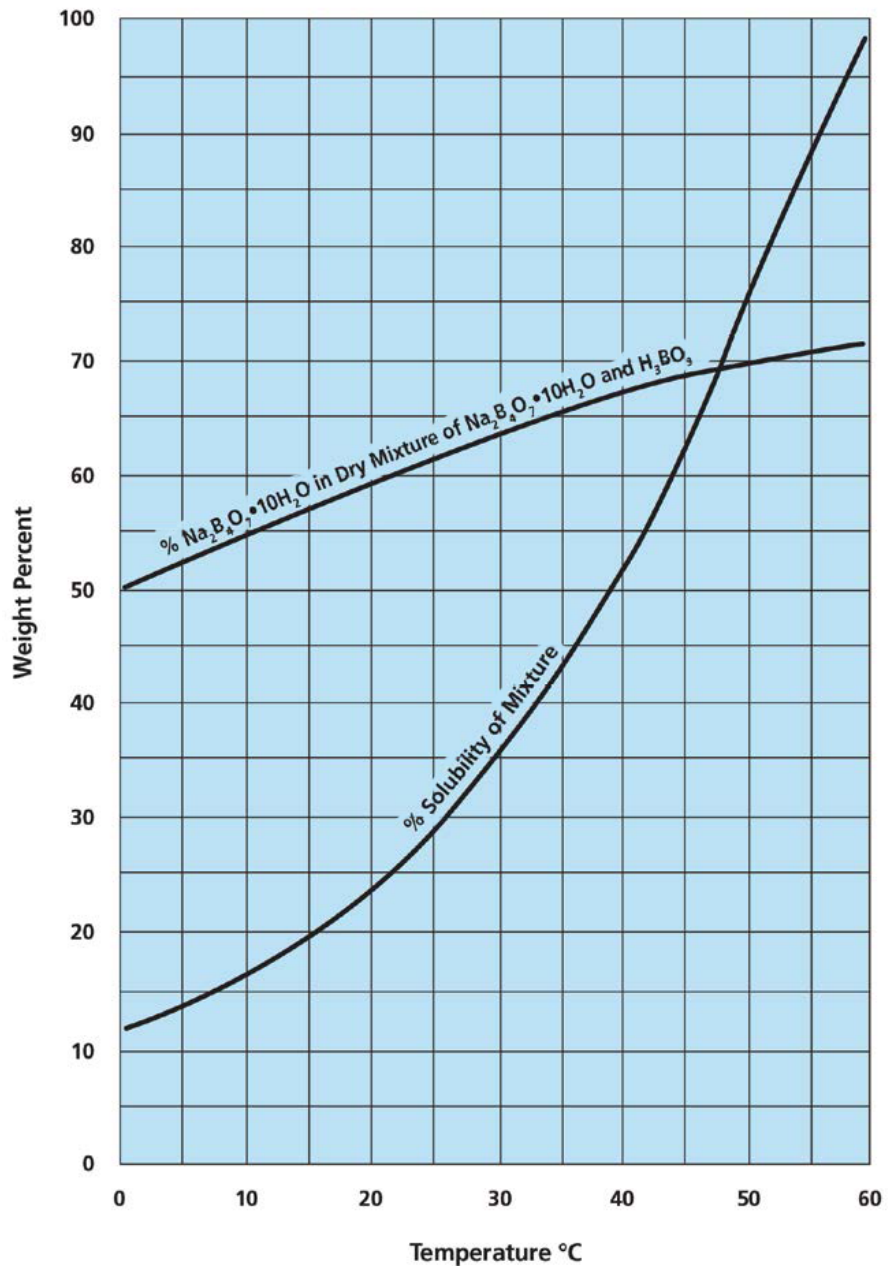
Maximum solubility based on typical analysis

Example explanation

To determine the solubility and composition of a mixture of borax decahydrate (borax 10 mol) and *Optibor*® (boric acid) at 30°C.

Proceed along the horizontal ordinate to 30°C. Read upward to the lower line labeled “% Solubility of Mixture,” and then across to where the vertical ordinate reads 36% by weight is given as the maximum solubility.

To determine the ratio of the two components at this temperature and at this solubility, proceed along the horizontal ordinate to the 30°C temperature as above and read upward to the top line which gives the composition of the mixture and then across. In this example, it reads that this mixture contains 62.5% borax decahydrate and 37.5% *Optibor*.



TECHNICAL BULLETIN

Borax decahydrate and *Optibor* mixtures

Solid mixtures based on typical analysis of technical grade products

Wt %		Mole ratios		Boric oxide content
Borax decahydrate	<i>Optibor</i>	$\text{Na}_2\text{O}/\text{B}_2\text{O}_3$	$\text{B}_2\text{O}_3/\text{Na}_2\text{O}$	Wt % B_2O_3
100	0	0.5000	2.000	36.515
95	5	0.4625	2.1623	37.504
90	10	0.4269	2.3427	38.494
85	15	0.3931	2.5442	39.483
80	20	0.3609	2.7710	40.472
75.52	24.48	0.3333	3.0000	41.359
75	25	0.3302	3.0280	41.462
70	30	0.3010	3.3217	42.451
66.66	33.34	0.2823	3.5425	43.112
65	35	0.2732	3.6607	43.440
60.66	39.34	0.2500	4.0000	44.299
60	40	0.2465	4.0561	44.430
55	45	0.2211	4.5233	45.419
50.69	49.31	0.2000	5.0000	46.272
50	50	0.1967	5.0841	46.409
46	54	0.1779	5.6204	47.200
45	55	0.1733	5.7694	47.398
43.54	56.46	0.1667	6.0000	47.687
40	60	0.1509	6.6261	48.387
35	65	0.1294	7.7276	49.377
33.34	66.66	0.1225	8.1663	49.705
30	70	0.1087	9.1962	50.366
25	75	0.08887	11.252	51.355
20	80	0.06975	14.336	52.345
15	85	0.05135	19.476	53.334
10	90	0.03361	29.757	54.323
5	95	0.01665	60.598	55.313
0	100	0.00000	Infinity	56.302

About U.S. Borax

U.S. Borax, part of Rio Tinto, is a global leader in the supply and science of borates—naturally-occurring minerals containing boron and other elements. We are 1,000 people serving 650 customers with more than 1,800 delivery locations globally. We supply around 30% of the world's need for refined borates from our world-class mine in Boron, California, about 100 miles northeast of Los Angeles.

About 20 Mule Team products

U.S. Borax produces the *20 Mule Team*® borates family of products from naturally occurring minerals and have an excellent reputation for purity and safety when used as directed. Borates are key ingredients in a number of industrial applications including fiberglass, glass, ceramics, batteries and capacitors, wood preservatives, and flame retardants.

High quality, high reliability, high performance borate products.
It's what we're known for.



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