

V-BOR[®] Refined Pentahydrate Borax

Technical Information Bulletin 5500

Brand Name: THREE ELEPHANT[®] V-BOR[®] Refined Pentahydrate Borax
Chemical Name: Sodium tetraborate pentahydrate
Also known as: Borax pentahydrate, sodium baborate pentahydrate
Formula: Na₂B₄O₇·5H₂O
Molecular Weight: 291.29
CAS / TSCA No.: 12179-04-3 / 1330-43-4 **REACH:** 01-2119490790-32-0001
Description: White, granular, crystalline solid.
Grades: Technical (Standard)

If you require guidance in developing product specifications, please contact Quality Assurance at (760) 372-2243

Properties

Chemical Analysis	Specification		Physical Analysis	Specification
	Minimum	Maximum		
Pentahydrate Borax (Na ₂ B ₄ O ₇ ·5H ₂ O)	101.5 %	103.5 %	U.S. Standard Sieve No. (% cum. retained) +12	2 % max
Anhydrous Borax (Na ₂ B ₄ O ₇)	70.1 %	71.5 %		
Boric Oxide (B ₂ O ₃)	48.5 %	49.5 %		
Sodium Oxide (Na ₂ O)	21.6 %	22.0 %		
Water of Crystallization (H ₂ O)	28.5 %	29.9 %		
Chloride (Cl)	---	600 ppm		
Sulfate (as Na ₂ SO ₄)	---	300 ppm		
Iron (Fe)	---	15 ppm		

Note: All data in the above specification are determined by Searles Valley Minerals analytical methods.

Packaging

Multi-wall Paper Bags: 25 kg
Poly bags: 25 kg
Semi-bulk Bags: 2,000 lb and 1,000 kg
Bulk: Truck and hopper cars

Handling

Information concerning the handling and use of this product is provided in a safety data sheet (SDS). The SDS must be fully read and understood prior to any exposure, handling, or use of the product.

The information herein is believed to be reliable. However, no warranty, expressed or implied, is made as to its accuracy or completeness and none is made as to **MERCHANTABILITY** of the material or its **FITNESS FOR ANY PURPOSE**. The manufacturer shall not be liable for consequential damages or for damage to persons or property resulting from its use. Nothing herein shall be construed as a recommendation for use in violation of any patent.



SVM's QMS is Certified to ISO 9001:2015

Theoretical Properties

The following properties are textbook theoretical data and are provided for convenience and reference only. These properties are not normally tested for the commercial product and no representation is made relative to the commercial product.

Theoretical Composition

Sodium oxide	(Na ₂ O)	21.28 %
Boric oxide	(B ₂ O ₃)	47.80 %
Water of crystallization	(H ₂ O)	30.92 %
Anhydrous borax	(Na ₂ B ₄ O ₇)	69.08 %

Melting Point

When heated in a closed tube, V-BOR® begins to melt in its own water of crystallization at 128°C (262°F) and is completely fluid at 140°C. Heated in the open, V-BOR® loses its water of crystallization to complete hydration and fusion at 742.5°C (1367°F).

Specific Gravity @ 25°C

1.815

Specific Heat @ 25°C

96.3 cal/deg-mol

Heat of Solution (absorbed) @ 25°C

-13.03 Kcal/g-mol or -51.71 Btu

Heat of Formation @ 25°C

-1147.8 Kcal/g-mol or -4555.0 Btu

Heat of Hydration

-21.4 Kcal/g-mol or -84.9 Btu

Other Information

V-BOR® contains only one-half the water content of decahydrate borax. Except for the difference in water of hydration, V-BOR® is chemically identical to decahydrate borax and can be directly substituted for borax in fusion or solution applications. One weight unit of borax is equivalent to 0.764 weight units of V-BOR®. At equivalent concentrations of the active ingredient, sodium tetraborate, the properties of solutions or fusion products are chemically and physically identical.

V-BOR®, a more concentrated form of borax can result in savings in transportation, handling and storage. Because 100 units of decahydrate borax can be replaced by 76.4 units of V-BOR®, freight and other costs can be reduced approximately 25 percent.

Where V-BOR®, is substituted for decahydrate borax in dry mixtures, allowance should be made for differences in volumes and weight.

Solubility in Water as Na₂B₄O₇·5H₂O (V-BOR®)

Temperature		Parts per 100 parts water	Percent by weight of saturated solution	Pounds per U.S. gallon of water	Grams per liter of water
°C	°F				
0	32	1.73	1.71	0.144	17.3
10	50	2.61	2.55	0.218	26.1
15	59	3.17	3.07	0.264	31.7
20	68	3.89	3.74	0.324	38.8
25	77	4.75	4.53	0.375	47.7
30	86	5.90	5.57	0.490	58.7
40	104	9.51	8.69	0.787	94.4
50	122	61.05	13.83	1.322	158.6
60	140	31.76	24.10	2.598	312.3
70	158	39.31	28.22	3.204	384.4
80	176	51.16	33.85	4.145	497.2
100	212	100.6	50.13	8.037	964.2
102.7*	217	113.6	50.17	9.076	1086

* boiling point

Solubility in other Solvents

	°C	°F	Percent by weight
Ethylene glycol	25	77	36.58
Diethylene glycol	25	77	14.91
Glycerol, C.P.	25	77	43.58
Glycerol, 99%	20	68	44.97
Ethyl alcohol, 50 Vol%	15.5	59.9	0.29

pH in Water @ 20° C (68° F)

Percent by Weight	pH
0.1	9.25
0.5	9.24
1.0	9.24
2.0	9.25
3.0	9.29
3.74 (saturation)	9.30

Angle of Repose, horizontal

33 degrees

Stability

V-BOR® is the most stable of the hydrates of sodium tetraborate; however, at temperatures above 110°C (230°F), it gradually loses water of crystallization.