

# Decahydrate Borax

## Extra Coarse Grade

Technical Information  
Bulletin 2601

<b>Brand Name:</b>	THREE ELEPHANT® Borax
<b>Chemical Name:</b>	Sodium tetraborate decahydrate
<b>Also known as:</b>	Borax decahydrate, sodium biborate decahydrate
<b>Formula:</b>	$\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$
<b>Molecular Weight:</b>	381.37
<b>CAS / TSCA No.:</b>	1303-96-4 <b>REACH:</b> 01-2119490790-32-0001
<b>Description:</b>	White, crystalline solid. The surface of the crystal is usually chalk white as a result of partial loss of water hydration.
<b>Grades:</b>	Technical Extra Coarse

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

### Properties

Chemical Analysis	Specification	Physical Analysis	Specification
Decahydrate Borax ( $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$ )	100.0 % min	<i>U.S. Standard Sieve No. (% cum. retained)</i>	
Anhydrous Borax ( $\text{Na}_2\text{B}_4\text{O}_7$ )	52.8 % min	+10	1 % max
Boric Oxide ( $\text{B}_2\text{O}_3$ )	36.5 % min	+40	90 % min
Sodium Oxide ( $\text{Na}_2\text{O}$ )	16.3 % min		
Water of Crystallization ( $\text{H}_2\text{O}$ )	47.2 % max		
Chloride (Cl)	200 ppm max		

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

#### Packaging

<b>Multi-wall Paper Bags:</b>	25 kg
<b>Poly Bags:</b>	25 kg
<b>Semi-bulk Bags:</b>	2,000 lb and 1,000 kg

#### 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.



ISO 9001

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 <sub>2</sub> O)	16.25 %
Boric oxide	(B <sub>2</sub> O <sub>3</sub> )	36.51 %
Water of crystallization	(H <sub>2</sub> O)	47.24 %
Anhydrous borax	(Na <sub>2</sub> B <sub>4</sub> O <sub>7</sub> )	52.76 %

## Melting Point

Borax has no definite melting point. It begins to melt in its own water of crystallization at 60.8°C (141°F) and is completely fluid at 140°C. On continued heating, it loses water. It becomes anhydrous at 742.5°C (1367°F), fusing to a clear glass.

## Specific Gravity @ 25°C

1.73

## Specific Heat @ 25°C

147 cal/deg-mol

## Heat of Solution (absorbed) @ 18°C

-2.589 Kcal/g-mol or -102.59 Btu

## Heat of Formation @ 25°C

-1503.0 Kcal/g-mol or -5964.7 Btu

## Heat of Hydration

Na<sub>2</sub>B<sub>4</sub>O<sub>7</sub> to Na<sub>2</sub>B<sub>4</sub>O<sub>7</sub>·10H<sub>2</sub>O:  
-335.3 Kcal/g-mol or -1330.5 Btu

Na<sub>2</sub>B<sub>4</sub>O<sub>7</sub>·5H<sub>2</sub>O to Na<sub>2</sub>B<sub>4</sub>O<sub>7</sub>·10H<sub>2</sub>O:  
-21.4 Kcal/g-mol or -84.9 Btu

## Solubility in Water as Na<sub>2</sub>B<sub>4</sub>O<sub>7</sub>·10H<sub>2</sub>O (Borax)

Temperature °C	°F	Parts per 100 parts water	Percent by weight of saturated solution	Pounds per U.S. gallon of water	Grams per liter of water
0	32	2.22	2.17	0.185	22.2
10	50	3.14	3.04	0.262	31.4
15	59	3.94	3.79	0.329	39.4
20	68	5.02	4.78	0.419	50.2
25	77	6.24	5.87	0.521	62.2
30	86	7.76	7.20	0.645	77.3
40	104	12.6	11.2	1.04	125
50	122	22.0	18.0	1.82	218
60	140	45.6	31.3	3.74	448
70	158	59.2	37.2	4.83	579
80	176	82.0	45.1	6.65	797
100	212	189.0	65.4	15.1	1810

## Solubility in other Solvents

	°C	°F	Percent by weight
Ethylene glycol	25	77	43.02
Diethylene glycol	25	77	18.65
Glycerol, C.P.	25	77	50.26
Glycerol, 99%	20	68	51.66
Ethyl alcohol, abs	15.5	59.9	0.38

## pH in Water @ 20°C (68°F)

Percent by Weight	pH
0.1	9.24
0.5	9.23
1.0	9.23
2.0	9.24
3.0	9.27
4.78 (saturation)	9.32

## Angle of Repose, horizontal

33 degrees

## Stability

Borax is relatively stable under ordinary conditions, but gradually loses water of crystallization in dry air or at elevated temperatures.