



## BORON OXIDE - GLASSY

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GLASSY  
ETiMADEN

### Di-Boron Trioxide ( $B_2O_3$ )

CAS Number: 1303-86-2

Technical Grade: Granular

Packaging: 25 kg, 1000 kg

[with or without pallet]



#### General Information:

Boron oxide [diboron trioxide] is available in amorphous glassy form and in crystalline structure with two different forms. The amorphous form is a colorless, odorless, hard and glassy solid and is usually produced by the dehydration of boric acid. The most common crystalline state, hexagonal boron oxide, is stable under normal conditions. The other crystalline state of boron oxide is monoclinic boron oxide, which is less common, and it is not thermodynamically stable under normal conditions. These crystals are hard, white and odorless.

#### Usage and Benefits:

**Glass:** It is used as an agent to lower the fusing point and to increase the thermal expansion coefficient in glass production. Moreover, it improves the scratch resistance and acid resistance of glass and enhances its color and gloss properties.

**Ceramics:** Boron oxide is used in the production of ceramic and enamel glazes. Its functions are to regulate the coefficient of thermal expansion between the glaze and the material to be glazed; to ensure that the index of refraction of the glaze is high; to increase the mechanical properties and the scratch resistance of the glaze and to increase resistance against water and chemicals.

**Boron chemicals:** In the production of boron chemicals, it is used in the production of inorganic compounds such as boron hydrides, boron nitrides, and is used as a catalyst in the production of organic boron compounds such as boric acid esters.

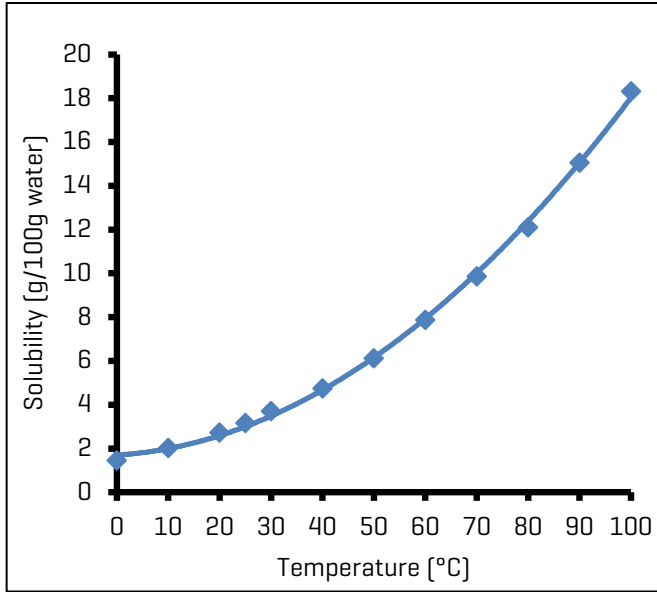
**Metallurgy:** It is used as flux in the metallurgy industry as it is a good solvent for metal oxides.

**Electric-Electronic:** It is used in the production of Ga-As (Gallium-Arsenic) semiconductors.

## Physical Properties:

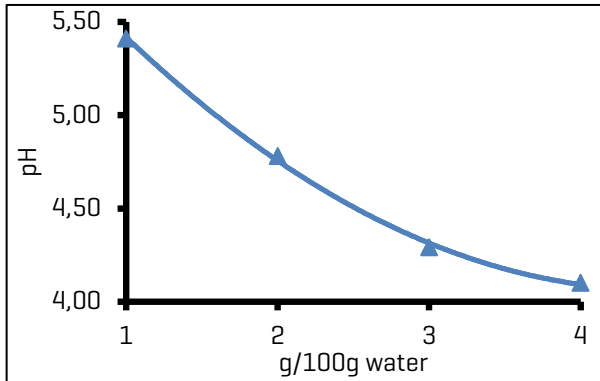
Specific weight	: 2.17 g/cm <sup>3</sup>
Pour (bulk) density <sup>a</sup>	: 1.10 g/cm <sup>3</sup>
Molecular weight	: 69.62 g/mol
Melting point	: 450°C
Boiling point	: 1860°C
Heat capacity	: 16.2 J/g°C
Thermal conductivity	: 0.345 W/mK
Specific surface area	: <1 m <sup>2</sup> /g
Diffusion coefficient	: 1.1x10 <sup>-5</sup> cm <sup>2</sup> /s
Surface tension	: 68.17 mN/m [1.0% aqueous solution by weight]
Colorimetry test	: 96.43 [average L value]

<sup>a</sup> Applies to a representative sample.

Solubility <sup>b,c</sup>:

Temperature [°C]	Solubility [g/100g water]
0	1.44
10	2.01
20	2.72
25	3.15
30	3.70
40	4.73
50	6.11
60	7.87
70	9.86
80	12.09
90	15.04
100	18.30

## Solution pH Values :



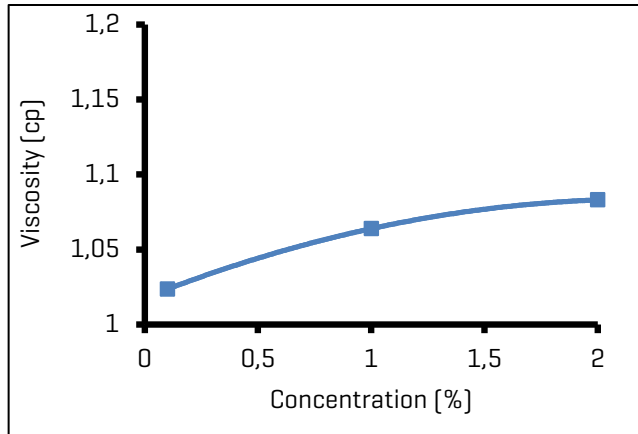
Solution [g/100g water]	pH <sup>a</sup> [±0.1 / 25°C]
1	5.41
2	4.78
3	4.29
4	4.10

<sup>a</sup> Applies to a representative sample.

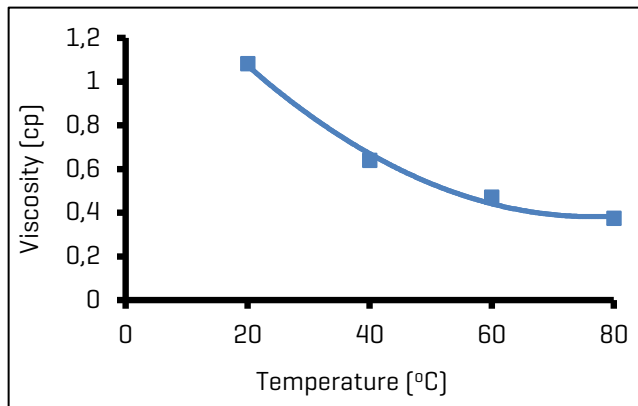
<sup>b</sup> Factors affecting the dissolution rate, such as the particle size of material to be dissolved, the mixing speed of the solution are effective on the time to reach the saturation point. The values on the table should be evaluated by taking this into account.

<sup>c</sup> Saturation value of Boron oxide-glassy at 25°C in 100g water is 3.15g.

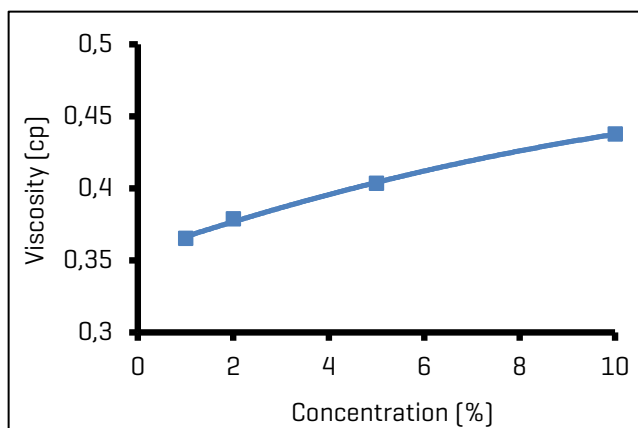
## Solution viscosity values:



Temp. [°C]	Conc. [%]	Viscosity [cp]
20	0.1	1.02
20	1	1.06
20	2	1.08



Temp. [°C]	Conc. [%]	Viscosity [cp]
20	2	1.08
40	2	0.64
60	2	0.47
80	2	0.37



Temp. [°C]	Conc. [%]	Viscosity [cp]
80	1	0.37
80	2	0.38
80	5	0.40
80	10	0.44

**Chemical Content:**

Component	Content
B <sub>2</sub> O <sub>3</sub>	98% min
SO <sub>4</sub>	500 ppm max
Cl	10 ppm max
Fe	35 ppm max

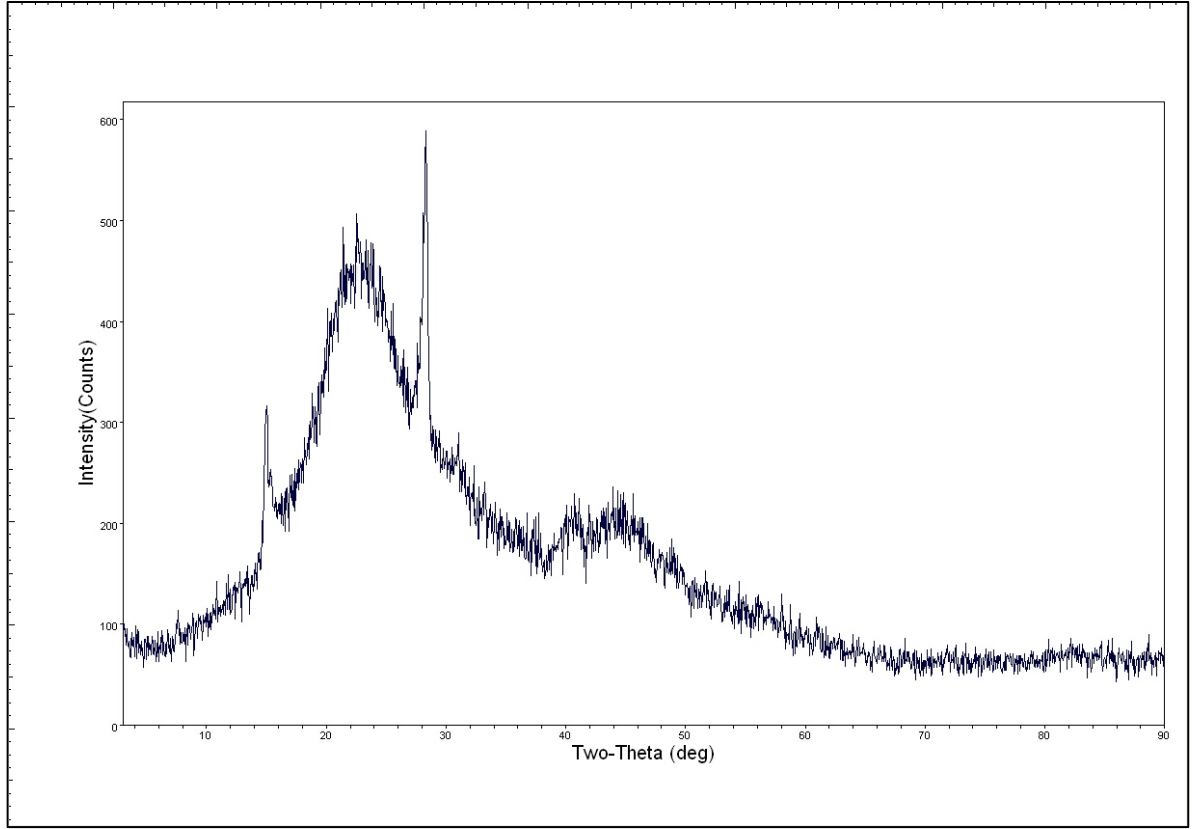
**Heavy metal content:**

Component	Concentration [mg/kg]
As	0.600 max
Cd	<0.005
Pb	<0.010
Cr	<0.005
Hg	<0.010

**Particle size:**

Size	Content
+0.250mm	35% max

## X-Ray Diffraction Analysis:



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