



## ULTRAPUR™ TMB

*Trimethylborate*

## Overview

Trimethylborate (TMB) is an organic boron ester compound widely used as a boron source in the deposition of doped silicate glass in low pressure, plasma-enhanced CVD. Boron and phosphorus act as glass flow temperature modifiers and gettering agents. The softening temperature of the silicate glass is modified with varying concentrations of doping constituents. The boron source of doped glass has traditionally been diborane.

TMB has gained significant acceptance in these applications because of the ease of handling a liquid source, reduced health hazards, improved purity levels and improved performance characteristics. TMB is a liquid at room temperature and has a relatively high vapor pressure that allows for bubbling with a carrier gas, vacuum processing or direct liquid injection.

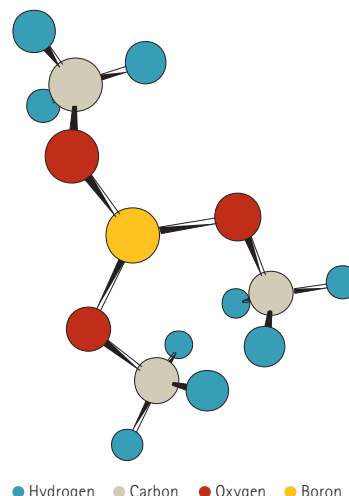
Entegris offers TEB in an ultrapure grade which is purified using proprietary techniques allowing us to supply the most consistent, high-purity chemical available.

### Canisters and Delivery Systems

Entegris UltraPur™ TMB is provided in a variety of stainless steel ampoules and canisters for compatibility with all tools and delivery systems. Standard sizes include 2-, 5- and 10-gallon. Options include manual or air-operated valves, level sensors and keyed configurations. Entegris also provides cleaning and maintenance services for customer owned ampoules.

Entegris offers the Unichem™ 3100 and Unichem 3200 dual-canister chemical delivery systems for BPSG applications.

Entegris is a leading industry supplier that provides a complete line of advanced materials, delivery systems and control/monitoring systems which enable comprehensive material lifecycle management solutions for OEMs and end users.



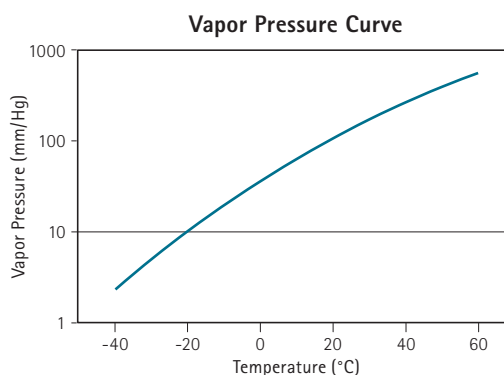
## Features and Benefits

- Ease of handling
- Reduced health hazards
- Improved purity levels
- Improved performance characteristics
- Standard shelf life 24 months

## Application

- Deposition of doped silicate glass in low pressure, plasma-enhanced CVD

## Performance Data



# Specifications

## PHYSICAL PROPERTIES

Chemical formula:	C <sub>3</sub> H <sub>9</sub> O <sub>3</sub> B
Molecular weight:	103.91
Density:	0.915 gm/mL
Boiling point:	68°C (154.4°F) @ 0.1 mm Hg
Melting point:	-34°C (-29.2°F)
Flash point (closed cup):	-8°C (17.6°F)

## PURITY ANALYSIS

Element	Detection Limit (ppb)	Specification (ppb)	Analytical Method
Aluminum	0.012	0.700	ICP-MS
Antimony	0.018	0.050	ICP-MS
Arsenic	0.018	0.500	ICP-MS
Barium	0.003	0.100	ICP-MS
Beryllium	0.005	0.100	ICP-MS
Bismuth	0.004	0.100	ICP-MS
Cadmium	0.005	0.100	ICP-MS
Calcium	0.043	0.700	ICP-MS
Cerium	0.003	0.050	ICP-MS
Chromium	0.007	0.100	ICP-MS
Cobalt	0.005	0.100	ICP-MS
Copper	0.008	0.200	ICP-MS
Gallium	0.004	0.050	ICP-MS
Germanium	0.010	0.050	ICP-MS
Gold	0.006	0.100	ICP-MS
Hafnium	0.005	0.050	ICP-MS
Indium	0.004	0.050	ICP-MS
Iridium	0.004	0.050	ICP-MS
Iron	0.014	0.500	ICP-MS
Lead	0.004	0.100	ICP-MS
Lithium	0.006	0.050	ICP-MS
Magnesium	0.005	0.300	ICP-MS
Manganese	0.038	0.100	ICP-MS
Mercury	0.032	0.100	ICP-MS
Molybdenum	0.008	0.100	ICP-MS
Nickel	0.007	0.400	ICP-MS
Niobium	0.003	0.050	ICP-MS
Palladium	0.010	0.050	ICP-MS
Platinum	0.012	0.050	ICP-MS
Potassium	0.072	0.200	ICP-MS
Rhenium	0.003	0.050	ICP-MS
Rhodium	0.002	0.050	ICP-MS
Rubidium	0.003	0.050	ICP-MS
Silver	0.013	0.050	ICP-MS
Sodium	0.032	0.500	ICP-MS
Strontium	0.004	0.100	ICP-MS

## Specifications (continued)

### PURITY ANALYSIS (CONTINUED)

Element	Detection Limit (ppb)	Specification (ppb)	Analytical Method
Tantalum	0.003	0.050	ICP-MS
Thallium	0.003	0.050	ICP-MS
Thorium	0.004	0.100	ICP-MS
Tin	0.033	0.100	ICP-MS
Titanium	0.015	0.100	ICP-MS
Tungsten	0.006	0.050	ICP-MS
Uranium	0.004	0.100	ICP-MS
Vanadium	0.010	0.300	ICP-MS
Zinc	0.028	0.500	ICP-MS
Zirconium	0.004	0.100	ICP-MS

Particle Size	Specification (mL)	Analytical Method
>0.2 µm	10	PMS
>0.3 µm	7	PMS
>0.5 µm	5	PMS
>1.0 µm	1	PMS

Parameter	Detection Limit	Specification	Analytical Method
Assay	—	99.99%	GC
Chloride	—	50 ppb	Typical
Color	—	10	Typical
Purity	—	99.9999995%	ICP-MS
Water	1.3 ppm	20 ppm	KF Titrator

### MAXIMUM TMB FILL WEIGHTS FOR STANDARD ENTEGRIS CANISTERS

2-gallon	7,000 grams
5-gallon	17,000 grams
10-gallon	34,000 grams

## For More Information

Please call your Regional Customer Service Center today to learn what Entegris can do for you. Visit [www.entegris.com](http://www.entegris.com) and select the Customer Service link for the center nearest you.

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