

UltraPur™ TEPO

Triethylphosphate

Triethylphosphate (TEPO) is an organic phosphorus ester compound used as a phosphorus source in the deposition of doped silicate glass. Phosphorus and boron 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 phosphorus source of doped glass has traditionally been phosphine.

TEPO is considered a replacement for phosphine, TMP and TEP. Benefits of TEPO include ease of handling a liquid source, reduced health hazards, improved purity levels and improved performance characteristics. Phosphine is a highly dangerous compound to handle and ship. In addition, the typical hydride-based films that use phosphine have step coverage drawbacks. TEPO is a liquid with high vapor pressure that allows for bubbling with a carrier gas, vacuum processing or direct liquid injection.

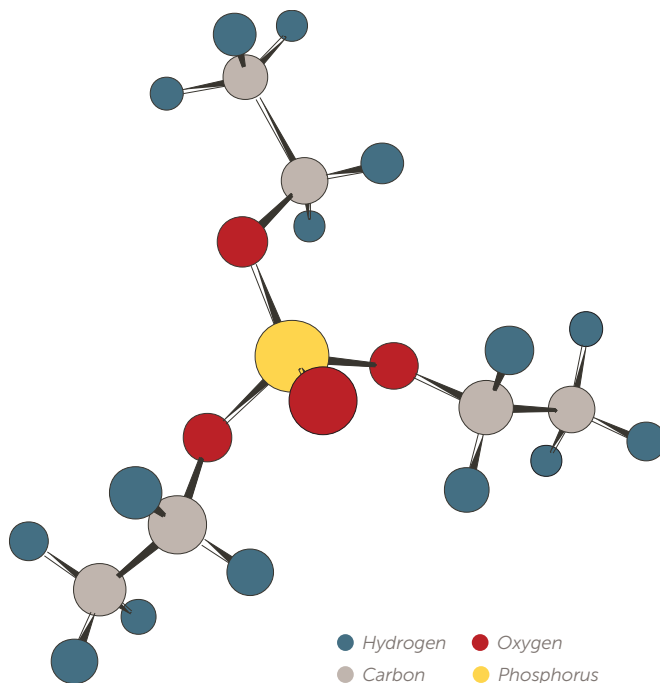
Entegris offers TEPO in an ultrapure grade which is purified using techniques developed by Entegris. By using these techniques, Entegris has developed the industry's most consistent, high-purity chemicals available.

Canisters and Delivery Systems

Entegris UltraPur™ TEPO is available in a wide variety of stainless steel canisters and ampoules to fit 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 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. The result is higher productivity, greater tool up-time and improved yields.



APPLICATIONS

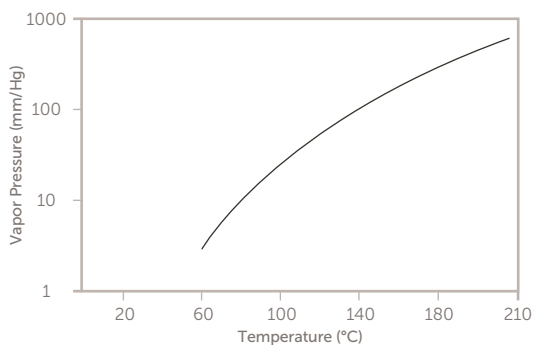
- Deposition of doped silicate glass
- Custom blends of TEPO and/or TEB with TEOS are available for high-volume applications

FEATURES & BENEFITS

- Replaces phosphine, TMP and TEP
- Reduces health hazards
- Easy to handle
- Improves purity levels
- Improves performance characteristics
- Compatible with Entegris' and other chemical delivery systems
- Standard shelf life of 24 months

PERFORMANCE DATA

Vapor Pressure Curve



SPECIFICATIONS

Physical properties

Chemical formula	C ₆ H ₁₅ O ₄ P
Molecular weight	182.16
Density	1.0725 gm/mL
Boiling point	214.5°C (418.1°F) @ 0.1 mm Hg
Melting point	-56°C (132.8°F)
Flash point (closed cup)	115°C (239°F)

Purity analysis

Element	Specification	Analytical method
Aluminum	0.500 ppb	ICP-MS
Antimony	0.100 ppb	ICP-MS
Arsenic	1.000 ppb	ICP-MS
Barium	0.050 ppb	ICP-MS
Beryllium	0.050 ppb	ICP-MS
Bismuth	0.050 ppb	ICP-MS
Boron	10.000 ppb	ICP-MS
Cadmium	0.050 ppb	ICP-MS
Calcium	1.000 ppb	ICP-MS
Cerium	0.050 ppb	ICP-MS
Chromium	0.050 ppb	ICP-MS
Cobalt	0.150 ppb	ICP-MS

Purity analysis (continued)

Element	Specification	Analytical method
Copper	0.500 ppb	ICP-MS
Gallium	0.100 ppb	ICP-MS
Germanium	0.050 ppb	ICP-MS
Gold	0.100 ppb	ICP-MS
Hafnium	0.200 ppb	ICP-MS
Indium	0.050 ppb	ICP-MS
Iridium	0.050 ppb	ICP-MS
Iron	0.800 ppb	ICP-MS
Lead	0.100 ppb	ICP-MS
Lithium	0.100 ppb	ICP-MS
Magnesium	0.300 ppb	ICP-MS
Manganese	0.100 ppb	ICP-MS
Mercury	0.100 ppb	ICP-MS
Molybdenum	0.100 ppb	ICP-MS
Nickel	0.500 ppb	ICP-MS
Niobium	0.050 ppb	ICP-MS
Palladium	0.050 ppb	ICP-MS
Platinum	0.050 ppb	ICP-MS
Potassium	0.200 ppb	ICP-MS
Rhenium	0.050 ppb	ICP-MS
Rhodium	0.050 ppb	ICP-MS
Rubidium	0.050 ppb	ICP-MS
Silver	0.300 ppb	ICP-MS
Sodium	1.000 ppb	ICP-MS
Strontium	0.050 ppb	ICP-MS
Tantalum	0.050 ppb	ICP-MS
Thallium	0.050 ppb	CP-MS
Thorium	0.050 ppb	ICP-MS
Tin	0.100 ppb	ICP-MS
Titanium	0.200 ppb	ICP-MS
Tungsten	0.050 ppb	ICP-MS
Uranium	0.050 ppb	ICP-MS
Vanadium	0.050 ppb	ICP-MS
Zinc	1.000 ppb	ICP-MS
Zirconium	0.200 ppb	ICP-MS

Purity analysis (continued)

Particle size	Specification	Analytical method
>0.2 µm	10 mL	PMS
>0.3 µm	7 mL	PMS
>0.5 µm	5 mL	PMS
>1.0 µm	1 mL	PMS

Parameter	Detection limit	Specification	Analytical method
Assay	—	99.99%	GC
Chloride	—	50 ppb	Typical
Color	—	5	Typical
Purity	—	99.9999995%	ICP-MS
Water	1.3 ppm	20 ppm	KF Titrator

Maximum TEPO fill weights for Entegris canisters

2-gallon	7,700 grams
5-gallon	19,500 grams
10-gallon	37,000 grams

FOR MORE INFORMATION

Please call your Regional Customer Service Center today to learn what Entegris can do for you. Visit entegris.com and select the Contact Us link to find the customer service center nearest you.

TERMS AND CONDITIONS OF SALE

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