

UltraPur™ TMP

Trimethylphosphite

Trimethylphosphite (TMP) is an organic phosphorous ester compound used as a phosphorous source in depositing doped silicate glass. Phosphorous and boron act as glass flow temperature modifiers and gettering agents. The softening temperature of BPSG films is modulated by varying concentrations of doping constituents. The phosphorous source of doped glass has traditionally been phosphine and more recently TMP.

TMP has gained significant acceptance in these applications because of ease of handling a liquid source, reduced health hazards, improved purity levels and improved performance. Phosphine is a highly dangerous compound to handle and ship. In addition, the typical hydrid-based films that use phosphine have step coverage drawbacks. TMP 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.

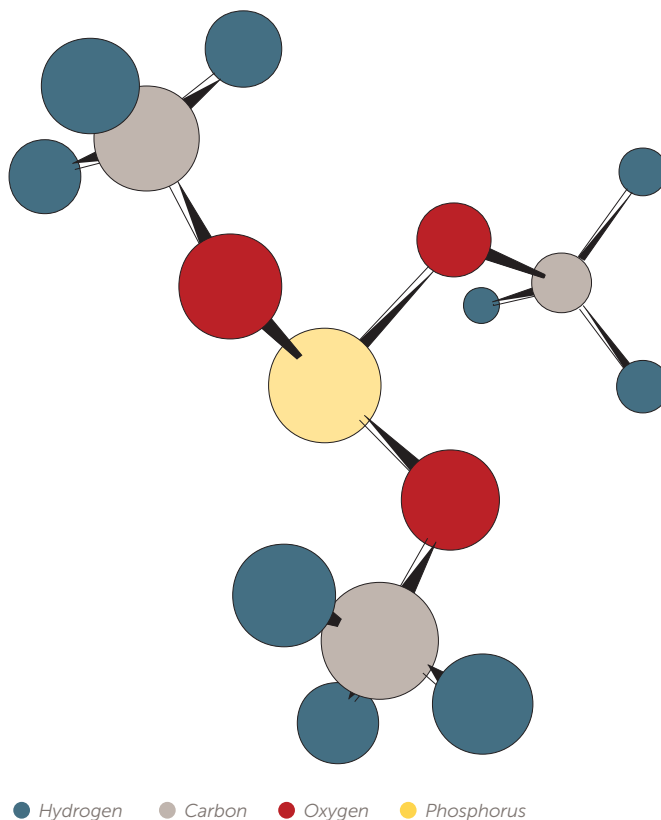
Entegris offers TMP in an ultrapure grade which is purified using proprietary techniques allowing us to supply the most consistent, high-purity chemical available.

Canisters and delivery systems

UltraPur™ TMP 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 & BENEFITS

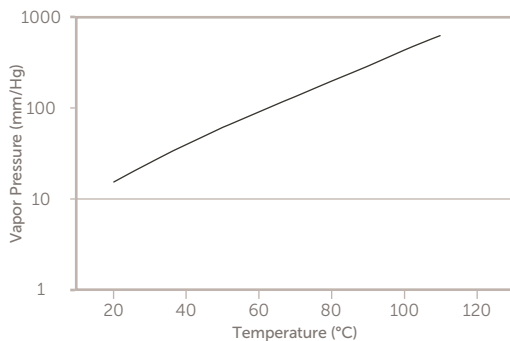
- Ease of handling
- Reduced health hazards
- Improved purity levels
- Improved performance
- Standard shelf life of 24 months

APPLICATIONS

- As a phosphorus source in the deposition of doped silicate glass
- BPSG films

PERFORMANCE DATA

Vapor Pressure Curve



SPECIFICATIONS

Physical properties

Chemical formula	C ₃ H ₉ O ₃ P
Molecular weight	124.08
Density	1.052 gm/mL
Boiling point	111.5°C (232.7°F) @ 0.1 mm Hg
Melting point	-78°C (-108.4°F)
Flash point (closed cup)	27°C (82.4°F)

Purity analysis

Element	Detection limit	Specification	Analytical method
Aluminum	0.012 ppb	0.700 ppb	ICP-MS
Antimony	0.018 ppb	0.050 ppb	ICP-MS
Arsenic	0.018 ppb	0.500 ppb	ICP-MS
Barium	0.003 ppb	0.050 ppb	ICP-MS
Beryllium	0.005 ppb	0.100 ppb	ICP-MS
Bismuth	0.004 ppb	0.050 ppb	ICP-MS
Boron	0.334 ppb	50.000 ppb	ICP-MS
Cadmium	0.005 ppb	0.100 ppb	ICP-MS
Calcium	0.043 ppb	1.000 ppb	ICP-MS
Cerium	0.003 ppb	0.050 ppb	ICP-MS

Purity analysis (continued)

Element	Detection limit	Specification	Analytical method
Chromium	0.007 ppb	0.100 ppb	ICP-MS
Cobalt	0.005 ppb	0.100 ppb	ICP-MS
Copper	0.008 ppb	0.500 ppb	ICP-MS
Gallium	0.004 ppb	0.050 ppb	ICP-MS
Germanium	0.010 ppb	0.050 ppb	ICP-MS
Gold	0.006 ppb	0.100 ppb	ICP-MS
Hafnium	0.005 ppb	0.200 ppb	ICP-MS
Indium	0.004 ppb	0.050 ppb	ICP-MS
Iridium	0.004 ppb	0.050 ppb	ICP-MS
Iron	0.014 ppb	0.500 ppb	ICP-MS
Lead	0.004 ppb	0.500 ppb	ICP-MS
Lithium	0.006 ppb	0.100 ppb	ICP-MS
Magnesium	0.005 ppb	0.200 ppb	ICP-MS
Manganese	0.038 ppb	0.100 ppb	ICP-MS
Mercury	0.032 ppb	0.200 ppb	ICP-MS
Molybdenum	0.008 ppb	0.100 ppb	ICP-MS
Nickel	0.007 ppb	0.500 ppb	ICP-MS
Niobium	0.003 ppb	0.050 ppb	ICP-MS
Palladium	0.010 ppb	0.050 ppb	ICP-MS
Platinum	0.012 ppb	0.050 ppb	ICP-MS
Potassium	0.072 ppb	0.300 ppb	ICP-MS
Rhenium	0.003 ppb	0.050 ppb	ICP-MS
Rhodium	0.002 ppb	0.050 ppb	ICP-MS
Rubidium	0.003 ppb	0.050 ppb	ICP-MS
Silver	0.013 ppb	0.300 ppb	ICP-MS
Sodium	0.032 ppb	1.000 ppb	ICP-MS

Purity analysis (continued)

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

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	Specification	Analytical method
Assay	99.99%	GC
Chloride	50 ppb	Typical
Color	5	Typical
Purity	99.9999995%	ICP-MS

Maximum TMP 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 entegris.com and select the Contact Us link to find the customer service center nearest you.

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