



**>>Entry Name: Tris(hydroxymethyl)phosphine**

**Synonym(s):** Phosphinidynetris(1-methanol), 9CI

**CAS Registry Number:** 2767-80-8

$\text{P}(\text{CH}_2\text{OH})_3$

**Molecular Formula:**  $\text{C}_3\text{H}_9\text{O}_3\text{P}$

**Molecular Weight:** 124.076

**Accurate Mass:** 124.028932

**Percentage Composition:** C 29.04%; H 7.31%; O 38.68%; P 24.96%

**Use/Importance:** Forms water-soluble metal complexes with potential for aq. catalysis. Fire-proofing agent for cellulose and other polymers. Co-monomer for fire-resistant polyurethanes

**Physical Description:** Viscous liq. or hygroscopic needles (butanol). Rel. air-stable

**Melting Point:** Mp 55°

**Boiling Point:** Bp<sub>2.5</sub> 111-114° dec.

**Solubility:** Sol.  $\text{H}_2\text{O}$

**Other Data:** Isomerises in AcOH or HCl at 180-90°

**Aldrich:** 17788-1

**>>Derivative:** Methiodide

**Synonym(s):** Methyltris(hydroxymethyl)phosphonium iodide

**Molecular Formula:**  $\text{C}_4\text{H}_{12}\text{IO}_3\text{P}$

**Molecular Weight:** 266.015

**Accurate Mass:** 265.95688

**Percentage Composition:** C 18.06%; H 4.55%; I 47.71%; O 18.04%; P 11.64%

**Physical Description:** Oil

**Solubility:** Insol.  $\text{Et}_2\text{O}$ ,  $\text{Me}_2\text{CO}$

**>>Derivative:** *P*-Me, tetraphenylborate

**Synonym(s):** Methyltris(hydroxymethyl)phosphonium tetraphenylborate

**Molecular Formula:**  $\text{C}_{28}\text{H}_{32}\text{BO}_3\text{P}$

**Molecular Weight:** 458.344

**Accurate Mass:** 458.218212

**Percentage Composition:** C 73.37%; H 7.04%; B 2.36%; O 10.47%; P 6.76%

**Physical Description:** Solid ( $\text{Me}_2\text{CO}/\text{C}_6\text{H}_6$ )

**Melting Point:** Mp 170-171 dec.°

**>>Derivative:** Tri-Ac

**Synonym(s):** Tris(acetoxymethyl)phosphine. Phosphinidynetris(methyl acetate)

**CAS Registry Number:** 18788-02-8

**Molecular Formula:**  $\text{C}_9\text{H}_{15}\text{O}_6\text{P}$

**Molecular Weight:** 250.188

**Accurate Mass:** 250.060627

**Percentage Composition:** C 43.21%; H 6.04%; O 38.37%; P 12.38%

**Other Data:** Forms water-sol. Rh, Pd, and Pt complexes. In AcOH at 180-90°, converted into  $\text{MeP}(\text{O})(\text{CH}_2\text{OAc})_2$

**>>Derivative:** Oxide

**Synonym(s):** Phosphinylidynetris(1-methanol)

**CAS Registry Number:** 1067-12-5

**Molecular Formula:**  $\text{C}_3\text{H}_9\text{O}_4\text{P}$

**Molecular Weight:** 140.075

**Accurate Mass:** 140.023847

**Percentage Composition:** C 25.72%; H 6.48%; O 45.69%; P 22.11%

**Physical Description:** Cryst. ( $\text{EtOH}$  or  $\text{MeOH}$ )

**Melting Point:** Mp 44-45°. Mp 50-52°, 69°, 70°

**Solubility:** Sol.  $\text{H}_2\text{O}$ ; insol.  $\text{Et}_2\text{O}$ ,  $\text{C}_6\text{H}_6$

**Other Data:** Complexes with Cd, Co, Cr, Cu, Fe, Mn, Ni, and Zn