

## Metalworking Additives Technical Data Sheet – Phosphate Esters (1 of 2)

PHOSPHETAL products are available as phosphoric alkyl acid esters, ethoxylated alkyl acid esters, or triethanolamine salts.

Phosphate esters formed from ethoxylated alcohols are used as surfactants, wetting agents and dispersants in metalworking, metal cleaning, oilfield, cosmetics and personal care applications. These products also provide corrosion inhibition and excellent EP/AW protection in water based metalworking formulations, and are typically neutralized with an organic amine or alkali base. Acid and salt forms are available.

Product Name	Chemistry	Fatty Alcohol Composition	Phosphorus Content, %	State @ Room Temperature	pH*	Specific Gravity
<b>Ethoxylated Phosphate Esters</b>						
PHOSPHETAL 1060 K	K Salt	POE(6) • iC10	4.0	Liquid	7	1.10
PHOSPHETAL 1360 K	K Salt	POE(6) • iC13	3.6	Liquid	7	1.09
PHOSPHETAL 2280 K	K Salt	POE(2) • 2-EH	5.3	Liquid	7	1.12
PHOSPHETAL 2535	Acid	POE(3) • C12-C15	5.8	Liquid	2	1.01
PHOSPHETAL 2-EH-2	Acid	POE(2) • 2-EH	7.1	Liquid	2	1.05
PHOSPHETAL 8147 K	K Salt	POE(4) • C8-C10	4.1	Liquid	7	1.11
PHOSPHETAL 91-6	Acid	POE(2) • C9-C11	10.3	Liquid	2.5	1.06
PHOSPHETAL C810-4	Acid	POE(4) • C8-C10	6.4	Liquid	2	1.07
PHOSPHETAL DA 3	Acid	POE(6) • iC10	11.2	Liquid	2.5	1.04
PHOSPHETAL DA-4115	Acid	POE(6) • iC10	9.7	Liquid	2.5	1.04
PHOSPHETAL DA 6	Acid	POE(6) • iC10	5.0	Liquid	2.5	1.04
PHOSPHETAL DNP-8	Acid	POE(8) • DiNP	2.8	Liquid	2	1.06
PHOSPHETAL LA-4	Acid	POE(4) • C12	6.2	Liquid	2.5	1.04
PHOSPHETAL LA-7	Acid	POE(7) • C12	4.6	Liquid	2	1.06
PHOSPHETAL L12-6	Acid	POE(6) • C12	4.1	Liquid	2	1.05
PHOSPHETAL NP-6-T	Acid	POE(6) • NP	3.0	Liquid	2	1.03
PHOSPHETAL NP-9	Acid	POE(9) • NP	3.7	Liquid	2	1.10
PHOSPHETAL NP-9C	Acid	POE(9) • NP	3.0	Liquid	2	1.10
PHOSPHETAL OAX	Acid	POE(4) • C18:1	5.0	Liquid	2	1.03
PHOSPHETAL P6-115	Acid	POE(6) • Phenol	5.1	Liquid	2	1.20
PHOSPHETAL P-615 K	K Salt	POE(6) • Phenol	2.3	Liquid	8.5	1.16
PHOSPHETAL P6-N	Na Salt	POE(6) • Phenol	2.5	Liquid	8.5	1.16
PHOSPHETAL PP-6	Acid	POE(6) • Phenol	5.5	Liquid	2	1.21
PHOSPHETAL T6-F	Acid	POE(9) • iC13	4.4	Liquid	2.5	1.06
PHOSPHETAL TDA-3	Acid	POE(9) • iC13	5.5	Liquid	2.5	1.02
PHOSPHETAL TDA-6	Acid	POE(9) • iC13	4.4	Liquid	2.5	1.06
PHOSPHETAL TDA-9	Acid	POE(9) • iC13	3.8	Liquid	2.5	1.06

\*pH measured as 5% product in distilled water.

## Metalworking Additives Technical Data Sheet – Phosphate Esters (2 of 2)

Monophosphoric esters of C8 to C18 fatty alcohols are multifunctional additives that offer excellent EP/AW protection, corrosion inhibition and metal surface wetting properties. These products are typically neutralized with an organic amine or alkali base for optimum emulsification performance as co-surfactants, and are available as acids or salts.

Synthetic Ester	Chemistry	Fatty Alcohol Composition	Phosphorus Content	State @ Room Temperature	pH*	Specific Gravity
<b>Alkyl Phosphate Esters</b>						
PHOSPHETAL 1362	Acid	iC10	7.1	Liquid	2.5	1.04
PHOSPHETAL 1618	K Salt	C16-C18	8.0	Solid	2	1.02
PHOSPHETAL 2-EH	Acid	2-EH	11.6	Liquid	2	1.02
PHOSPHETAL C-12	Acid	C12	9.9	Solid	2	1.01
PHOSPHETAL C8-C10	Acid	C8-C10	11.6	Liquid	2	1.02
PHOSPHETAL TDA	Acid	iC13	5.5	Liquid	2.5	1.06

\*pH measured as 5% product in distilled water.

Phosphoric acid or polyphosphoric acids reacted with triethanolamine are useful as surfactants, wetting agents, corrosion inhibitors and EP/AW additives in water based metalworking formulations. They also find use as oilfield scale inhibitors. Products are available in several concentrations and as acids or sodium salts.

Synthetic Ester	Chemistry	Composition	Phosphorus Content	State @ Room Temperature	pH*	Specific Gravity
<b>Triethanolamine Phosphates</b>						
PHOSPHETAL TEA	Amine Salt	100% TEA Phosphate	2.2	Liquid	9	1.20
PHOSPHETAL TEA 70/1	Acid	70% TEA Polyphosphate	15	Liquid	2	1.43
PHOSPHETAL TEA 70/1 NA	Na Salt	70% TEA Polyphosphate	12	Liquid	4.5	1.46
PHOSPHETAL TEA 80	Acid	80% TEA Polyphosphate	18	Liquid	2	1.48
PHOSPHETAL TEA 80 NA	Na Salt	80% TEA Polyphosphate	15	Liquid	5	1.58

\*pH measured as 5% product in distilled water.

Please inquire about additional tailor-made products that can be made to fit your exact performance requirements.

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