Phosphate Esters

Cola®Fax Products

Effective March 2019

Colonial Chemical

Cola®Fax phosphate esters for use as surfactants are the mono and diesters of phosphoric acid and are supplied as the free acid or their salts. Any starting compound with a hydroxyl group (-OH) can be reacted with polyphosphoric acid (PPA)or phosphorus pentoxide (P_2O_5). In general, diesters are more lipophilic than the monoesters although the starting alcohol has a significant effect.

Phosphate esters are usually characterized by their titration curves, which yield acid values giving valuable information on the ratio of monoester/diester, free acid, and unreacted alcohol.

Product Name	Alcohol / EO	Monoester/ Diester	Actives	Foam	Color	Moisture	% Free Phosphoric Acid	Caustic Solubility in NaOH, 1%
Cola®Fax 3373	Butyl Diethylene Glycol	Monoester	99	Low	4 Max.	1 Max.	12.65	30 – 35%
Cola®Fax 3374	Phenol-6	Monoester	99	Mid flash	2 Max.	1 Max.	6.91	20 – 25%
Cola®Fax 3375	Phenol-6	Monoester	92	Mid flash	7 Max.	8 – 10	9.44	20 – 25%
Cola®Fax 3376	Nonylphenol-9	Mono and Diesters	99	Mid	4 Max.	1 Max.	1.72	5 – 10%
Cola®Fax 3378	Butyl Ethylene Glycol	Monoester	99	Low	4 Max.	1 Max.	11.86	30 – 35%
Cola®Fax 3383	Phenoxyethanol	Monoester (KOH)	50	Low	2 Max.	49 – 51	(neutral-ized)	3 – 5%
Cola®Fax 3384	2-Ethylhexanol	Mono and Diesters	99	Low	2 Max.	1 Max.	0.8	0 – 5%
Cola®Fax 3386	Phenol-6	Mono and Diesters	99	Mid flash	3 Max.	1 Max.	1.25	5 – 10%
Cola®Fax 3396	Phenol-6	Monoester	50	Mid flash	3 Max.	49 – 51	(neutral-ized)	30 – 35%
Cola®Fax 3397	Oleyl-4	Mono and Diesters	97	Low flash	5 Max.	3 Max.	2.01	2.5-5%
Cola®Fax 3611	Phenol-4	Monoester	99	Low flash	7 Max.	1 Max.	7.5	30-35%
Cola®Fax 3660	C9-11 alcohol 6EO	Mono and Diesters	98.5	Mid	5 Max.	1.5 Max.	5.17	5-10%

Reactions with P_2O_5 are calculated to give a 1/1 mole ratio of monester/diester, but steric hindrance and reaction kinetics will produce product with varying ratios together with some unreacted alcohol (5% – 15%), phosphoric acid (4% - 8%), and some polyphosphates. These phosphate esters are typically higher in diester content and are used as oil-soluble emulsifiers or alkaline detergents in high pH systems designed to ensure their solubility in water.

Reactions with PPA yield a much higher ratio of monoester-to-diester with higher levels of free acid (10% - 20%), but lower amounts of residual alcohol (3% - 10%). Many of these phosphate esters are used as hydrotropes to couple other less soluble ingredients or lower the overall Kraft point. These esters also tend to be more hypochlorite tolerant due to the smaller amount of free alcohol.

Product Name	Performance	Application
Cola®Fax 3373	Aliphatic-based phosphate ester hydrotrope, with very low foaming, water soluble, good solubility in high pH formulation, excellent compatibility in sodium hypochlorite formulations	Hydrotrope recommended for use in spray, soak tank, and CIP, bottle, carpet, rinse aid in automatic dishwashing and disinfecting cleaning.
Cola®Fax 3374	Nearly 100% active aromatic alcohol phosphate ester with medium foam, excellent hydrotrope for nonionic surfactant in high alkaline based formulations	Hydrotrope for nonionic surfactants in high alkaline applications, food processing and metal soak tank.
Cola®Fax 3375	92% active hydrotrope with fast breaking foam, active aromatic alcohol phosphate ester, excellent hydrotrope for nonionic surfactant in high alkaline based formulations	Hydrotrope for nonionic surfactants in high alkaline applications, vehicle, machine shop, food processing and plant cleaning.
Cola®Fax 3376	Nearly 100% active mid foaming wetting agent and emulsifier with good stability in alkaline and acidic environments	Effective for detergency in high alkaline applications, emulsion polymerization, corrosion inhibition for metal & oilfield equipment against acidic gas, emulsifier for pesticides in agriculture.
Cola®Fax 3378	Nearly 100% active aliphatic low foam wetting agent and cleaner with good stability in alkaline solution	Great low foam hydrotrope for wetting and cleaning applications in high alkaline formulations such as brewery, smokehouse, machine shop, CIP and metals.
Cola®Fax 3383	Organic phosphate ester with ultra low foam. With 50% active potassium salt, it's designed for use as a hydrotrope and/or solubilizer for conventional and low-foam nonionics in alkaline systems	Conventional and low-foam nonionics in alkaline systems. Used in place of sodium xylene sulfonate to solubilize LAS and alkanolamide formulas such as liquid hand dishwashes, rinse aid in auto dishwashing, bottle wash, CIP cleaning.
Cola®Fax 3384	Nearly 100% active, flash low foam branched alcohol phosphate ester in the acid form, with good wetting and defoaming capabilities	Metal working lubricants and synthetic cutting fluids. Uses in spray applications for hard surface cleaners and as a hydrotrope in built alkaline systems
Cola®Fax 3386	Nearly 100% active, low foaming, aromatic based, phosphate ester with characteristics of low coefficient of friction, corrosion inhibition, high electrolyte compatibility, hydrotrope, and low toxicity	Metal cleaning, chain lubricating, hydrotroping, for low foam nonionic surfactant emulsifier.
Cola®Fax 3396	50% active, low foaming, aromatic based, phosphate ester with characteristics of low coefficient of friction, corrosion inhibition, high electrolyte compatibility, hydrotrope, and low toxicity	Great mid foam hydrotrope for metal cleaning, chain lubricating, and corrosion inhibition.
Cola®Fax 3397	Long chain aliphatic phosphate ester with low-flash foam, good wetting agent, corrosion inhibitor, emulsifier, detergent, and dispersant. Biodegradable and non-ecotoxic surfactant	Oil and water soluble lubricity additive, emulsifier, wetting, degreasing in household and industrial cleaning, corrosion inhibition, oilfield applications, hydraulic and water-based cutting fluids.
Cola®Fax 3611	Nearly 100% active low flash foam aromatic alcohol phosphate ester with good stability in alkaline formulation	Excellent hydrotrope for metal and CIP cleaning where very low foam is essential, carpet, food processing cleaning.
Cola®Fax 3660	Anionic surfactant for industrial applications that provides good wetting, detergency, hydrotroping, and electrolyte stability. It is fully biodegradable	Hard surface cleaning, emulsion polymer emulsifier, vehicle cleaners, corrosion inhibitors, lubricant anti-wear properties, textile wetting.

Cola®Fax Phosphate Esters include a growing line of anionic surfactants for applications including:

- Efficient hydrotropes for highly built alkaline cleaners
- Corrosion inhibition for different metals
- Lubrication in oil or/and water based lubricant systems
- Emulsion polymerization as emulsifiers and dispersants
- Oilfield and drilling equipment protection and lubrication
- Emulsifiers for pesticides in agriculture applications
- Flame retardants in coating
- Plasticizers in coating and engineering polymers

Advantages of Cola®Fax Phosphate Esters

- Mono and Di-phosphate esters
- Derived from wide variety of alcohol and /or phenol ether based backbonds
- Various chain lengths to provide from low to high foam
- Neutralized and un-neutralized forms
- Higher percent active as compared with amphoteric when being used as hydrotropes

Contact us today.

One of our customer service representatives or technical advisors will be happy to help you locate the right product you need with specifications, formulations and product samples upon request.

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