Surfactants for Emulsion Polymerization

Specialty Products

Effective October 2023

Colonial Chemical

Colonial Chemical Surfactants for Emulsion Polymerization

Colonial Chemical is ready to provide you with surfactants and formulation expertise to meet your current and changing needs in the emulsion polymerization market. Our broad and diverse portfolio of surfactants for emulsion polymerization includes **Cola®Tex** vegetable-derived surfactant blends, all-natural **Suga®** surfactant products, and other specialty and general purpose nonionic surfactants.

These products from Colonial Chemical improve the performance of styrene-butadiene latex, vinyl, acrylic and other copolymer resin systems. Manufacturers of latex products can also rely on these surfactants to help achieve the desired mechanical properties and storage stability of final products.

Colonial Chemical offers formulators an exceptional capabilities package:

- A range of proven, available chemistries that meet diverse performance requirements.
- Our industry knowledge and expertise fosters innovation and collaboration, bringing new products and technologies as we work with you to meet your current and future needs.
- Awareness of regulations and legislation allows us to provide you with the most up-to-date information as well as valuable assistance with product stewardship.
- Our global sales, distribution and technical support network means we are "on the ground" in your local area, ready to serve your surfactant needs.
- World-class surfactant manufacturing facilities contribute to the operational excellence of Colonial Chemical, for high-performance products that are consistently high-quality and cost-effective.

Product Name | Chemistry	Features	Application

Functionalized Alkyl Poly Glucosides and Blends

Product Name | Chemistry	Features	Application
Cola®Tex 127 Proprietary Surfactant Blend of Functionalized Alkyl Poly Glucosides (nonionic and anionic)	• Anionic / nonionic • Predominately derived from vegetable sources • EO free, 1,4 Dioxane free, alkyl phenol ethoxylate (APE) free, Sulfate free • Easy to handle • Stable at high and low pH • Simplifies and speeds the manufacturing process • Small particle size with low coagulation	• Single product to make acrylic latex formulations for excellent cost/performance • Industrial emulsion polymers • Coatings, adhesives, sealants, elastomers • Personal care waxes, films, cosmetics • Effective primary surfactant for acrylic, styrene acrylic, vinyl acrylic, and styrene butadiene formulations ≥55% total solids content (TSC)
Suga®Tex 1000 APG-Based Surfactant (Patent Pending)	• Nonionic • 100% Biobased • Environmentally safe • EO free, alkyl phenol ethoxylate (APE) free • Easy to handle • Mild to skin and eyes • Readily biodegradable • Meets criteria for direct release (EPA)	• Blended with primary anionic surfactants, works well with both acrylic and styrene acrylic formulations as a co-surfactant • Co-emulsifier with anionic primary surfactants • Used in personal care and industrial emulsions • Green alternative replacement for alcohol ethoxylate and alkyl phenol ethoxylates (APE)
Suga®Nate 160NC Sodium Laurylglucosides Hydroxypropyl Sulfonate (Patent Pending)	• Anionic • 100% Biobased • Environmentally safe with low aquatic toxicity • EO free, 1,4 Dioxane free • Easy to handle • Mild to skin and eyes • Readily biodegradable • Meets criteria for direct release (EPA) • Low coagulum and small particle formation in latexes • Improves mechanical stability • Bimodal • Creates particle size distribution	• Performs well in styrene acrylic formulations on its own and would be useful blended with nonionics in acrylic and vinyl acrylic formulations up to ≥45% total solids content (TSC) • Co-emulsifier with anionic primary surfactants • Used in personal care and industrial emulsions • Green alternative replacement for sulfates
Suga®Fax D10NC Sodium Decylglucoside Hydroxypropyl Phosphate (Patent Pending)	• Anionic • 100% Biobased • Environmentally safe • Easy to handle • Stable at high and low pH • Mild to skin and eyes • Readily biodegradable • Creates particle size distribution	• Performs well in styrene acrylic formulations on its own and would be useful blended with nonionics in acrylic and vinyl acrylic formulations up to ≥45% total solids content (TSC) • Blended with nonionic surfactants, the product will work well with acrylic formulations • Replacement for traditional phosphate esters
Poly Suga®Glycinate C Sodium Bis-Hydroxyethylglycinate Coco-Glucosides Crosspolymer (Patent Pending)	• Amphoteric • Environmentally safe • Easy to handle • Mild to skin and eyes • Readily biodegradable	• Works by itself to make perfect acrylic latex up to ≥45% total solids content (TSC) • Co-emulsifier with anionic primary surfactants • Used in personal care and industrial emulsions

Product Name | Chemistry	Features	Application

Phosphate Esters are useful in emulsion polymerization. These materials produce polymers with the desirable characteristics. By varying the mono to di-ester ratio, the HLB value can be tuned to give optimum performance.

Product Name | Chemistry	Features	Application
Cola®Fax 3376 Nonylphenol-9 Phosphate Ester	• Anionic after neutralization • 100% active • Effective in all types of emulsion polymers • Low coagulum in finish latex • Improved stability in latex • Enhances color properties • Excellent wetting and dispersion of pigments • Improved substrate wetting • Improved freeze-thaw resistance	• Increases gloss in paints • Emulsifier for multiple emulsion polymers • Rust inhibition
Cola®Fax 3380 Linear Alcohol Ethoxylate Phosphate Ester	• Anionic after neutralization • 100% active • Alkyl phenol ethoxylate (APE) free • Excellent wetting	• Replacement for alkyl phenol ethoxylate (APE) phosphate esters in emulsion polymerization
Cola®Fax 3389 Linear Alcohol Ethoxylate Phosphate Ester	• Excellent wetting • Pigment dispersion • Improves gloss • Flash and nail head rust inhibition • Low water sensitivity • Solvent-free	• Anionic emulsifier used in the emulsion polymerization of monomers like pure acrylic, styrene-acrylic acid esters and vinyl acetate. Improves freeze-thaw resistance of paint and provides corrosion protection for various ferrous metals commonly used in exterior building construction.
Cola®Fax 3397 Linear Alcohol Ethoxylate Phosphate Ester	• Anionic after neutralization • Long-chain, fatty alcohol-based phosphate ester • 100% active • Provides rust protection properties	• Replacement for alkyl phenol ethoxylate (APE) phosphate esters in emulsion polymerization. Emulsification and rust protection properties for both ferrous and nonferrous metallurgies.

Reactive Monomers for Performance Enhancement

Product Name | Chemistry	Features	Application
Cola®Mer HMP Hydroxyethyl Methacrylate Phosphate	• Adhesion promotion • Corrosion inhibition • Surface preparation • Static charge reduction • Emulsion stabilization • Low color preferred in optical applications • Flame retardant	• Adhesives and plastics • Paints and coatings • Composites and prepregs • UV inkjet inks • Gel coats • Fibers • Dentin treatment to improve bonding of adhesives

Alcohol Ether Carboxylate

Product Name | Chemistry	Features	Application
Cola®Carb TDC Trideceth-7 Carboxylic Acid	• Anionic • 90% active material • Alkyl phenol ethoxylate (APE) free	• As a standalone emulsifier gives excellent properties in all acrylic latex formulations • Can be used in hard water and with a multitude of different surfactant classes (including blending) with nonionics to improve properties and latex stability • Capable of being neutralized and used in a variety of latex formulations • Provides good latex stability

Product Name | Chemistry	Features	Application
Sulfosuccinates		
Cola®Wet A100 Disodium ethoxylated nonylphenol half ester of sulfosuccinic acid	• Anionic • Excellent compatibility with divalent and trivalent cations and quarternary ammonium surface active agents • Surface modifying properties at low concentrations • Very effective in producing latexes with very low particle size and narrow PSD for high-gloss systems, at low usage levels	• Can produce high solids latex (50% +) at manageable viscosity. • Provides latexes with good mechanical and electrolyte stability and very low coagulum levels. • Latexes form clear and continuous films with good resistance to moisture and yellowing on heating, especially in comparison to sulfates and sulfonates in vinyl-acrylic systems. • Stabilizer/dispersant in low to medium-HLB resin/pigment systems
Cola®Mate LA-40 Disodium Lauryl Sulfosuccinate	• APE-free alternative of ColaWet A-100 • Compatible with anionic, nonionic and amphoteric surfactants	• APE-free emulsifier for high gloss vinyl acetate and acrylic emulsion systems • Small particle size with clarity
Cola®Wet MA80 Sodium Dihexyl Sulfosuccinate in mixture of Isopropanol and Water	• Post add wetting agent for latex systems. • High electrolyte stability • Improved adhesion of dry films • Calcium tolerant • Dynamic wetting with flash foam	• Emulsifier for acrylic, styrene-acrylic and styrene butadiene systems • Adhesion, emulsifying, dispersing and solubilizing agent
Cola®Wet TDS-35 Tetrasodium Dicarboxyethyl Stearyl Sulfosuccinamate	• Effective Emulsifier for all types of emulsion polymers • High electrolyte stability • Stable in up to 35% NaOH or KOH solutions	• Reduce particle size in acrylic and styrene-acrylic emulsions • Post additive for mechanical stabilization of emulsion

Example 1: Acrylic Emulsion Polymer utilizing low levels of Cola®Tex 127

	INGREDIENT	Wt. %	Wt. gm
Reactor Charge			
1	Water	22.21	165.00
2	*Cola®Tex 127* / Functionalized Alkyl Poly Glucosides	0.03	0.20
3	Sodium Persulfate	0.05	0.37
Pre-emulsion			
1	Water	6.33	47.00
2	*Cola®Tex 127* / Functionalized Alkyl Poly Glucosides	1.97	14.60
3	Methyl Methacrylic	23.95	177.95
4	Butyl Acrylate	28.34	210.52
5	Acrylic Acid	2.02	15.00
Initiator			
1	Water	14.81	110.00
2	Sodium Persulfate	0.30	2.25
	TOTAL	100.00	630.64

PROCEDURE:

1. Charge all ingredients to their respective vessels.
2. Heat to 80 – 85˚C.
3. Begin preemulsion and initiator feeds simultaneously.
4. Feed pre-emulsion over 5 hours and initiator feed over 5.5 hours.
5. Once feeds are complete, hold at 80-85˚C for 30 minutes and cool below 50˚C.
6. Once cool, neutralize to a pH of 7 with ammonium hydroxide.

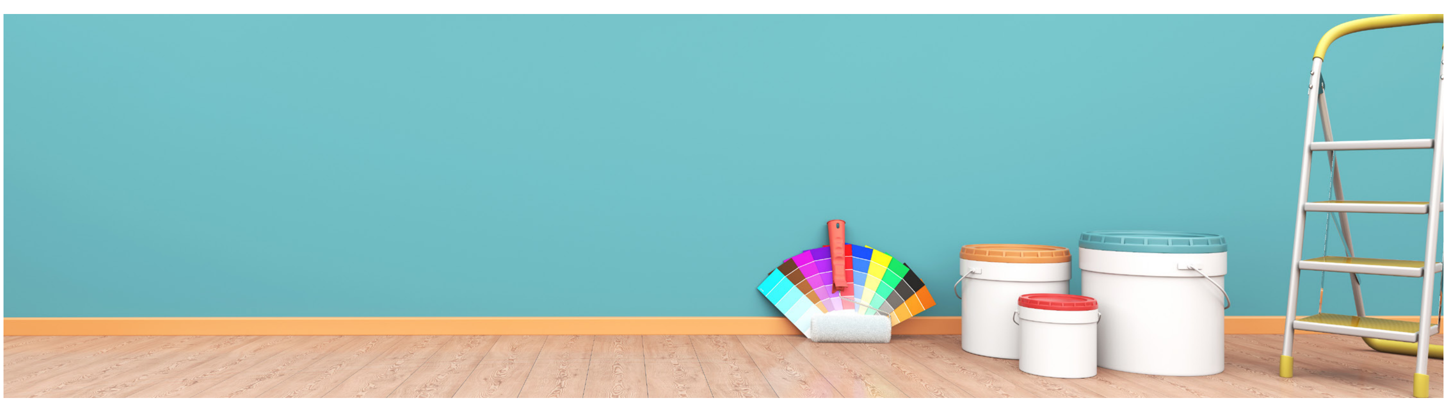
Example 2: Styrene Acrylic Emulsion Polymer utilizing low levels of Cola®Tex 127

	INGREDIENT	Wt. %	Wt. gm
Reactor Charge			
1	Water	22.31	165.00
2	*Cola®Tex 127* / Functionalized Alkyl Poly Glucosides	0.03	0.20
3	Sodium Persulfate	0.05	0.37
Pre-emulsion			
1	Water	6.36	47.00
2	*Cola®Tex 127* / Functionalized Alkyl Poly Glucosides	1.97	14.60
3	Styrene	25.09	185.52
4	Butyl Acrylate	27.44	202.95
5	Acrylic Acid	1.37	10.12
Initiator			
1	Water	14.87	110.00
2	Sodium Persulfate	0.23	1.68
	TOTAL	100.00	739.51

PROCEDURE:

1. Charge all ingredients to their respective vessels.
2. Heat to 80 – 85˚C.
3. Begin preemulsion and initiator feeds simultaneously.
4. Feed pre-emulsion over 5 hours and initiator feed over 5.5 hours.
5. Once feeds are complete, hold at 80-85˚C for 30 minutes and cool below 50˚C.
6. Once cool, neutralize to a pH of 7 with ammonium hydroxide.

							CaCl2 Stability		
	g/L Coagulum	Solids	Viscosity, cP	Surface Tension	pH	Freeze Thaw Stability	10%	20%	30%
ColaTex 127 Acrylic Emulsion Polymer	0.51	54.85	345	37	7.21	3 Cycles	PASS	PASS	PASS
ColaTex 127 Styrene Acrylic Emulsion Polymer	<0.1	55	980	41.15	6.95	3 Cycles	FAIL	FAIL	FAIL



Example 3: Styrene-Acrylic Paint Emulsion Polymerization utilizing low levels of Suga®Nate 160NC

	INGREDIENT	Wt. %	Wt. gm
Reactor Charge			
1	Water	45.79	1377.00
2	***Suga®Nate 160NC*** / Sodium Laurylglucosides Hydroxypropylsulfonate	0.03	1.00
Pre-emulsion			
1	Butyl Acrylate	15.70	472.00
2	Styrene	21.95	660.00
3	Dodecyl Mercaptan	0.47	14.10
4	Acrylic Acid	1.20	36.00
5	Water	7.85	236.00
6	***Suga®Nate 160NC*** / Sodium Laurylglucosides Hydroxypropylsulfonate	2.37	19.60
Initiator			
1	Water	5.89	177.00
2	Sodium Persulfate	0.47	14.10
	TOTAL	**100.00**	**3006.80**

PROCEDURE:

1. Load all raw materials into their respective vessels.
2. Heat reactor to 180˚F.
3. Begin monomer feed at 4 hours and initiator feed at 5.5 hrs. feed times simultaneously.
4. After feeds are complete, hold at 180˚F for 30 minutes.
5. Cool while mixing.

Example 4: Acrylic Emulsion Polymerization utilizing low levels of Cola®Carb TDC

	INGREDIENT	Wt. %	Wt. gm
Reactor Charge			
1	Water	34.28	617.04
2	Sodium Persulfate	0.04	0.72
3	***Cola®Carb TDC*** / Trideceth-7 Carboxylic Acid	0.03	0.54
Pre-emulsion			
1	Methyl Methacrylate	28.83	518.94
2	Methacrylic Acid	0.87	15.66
3	Acrylic Acid	0.87	15.66
4	Butyl Acrylate	12.31	221.58
5	Water	8.07	145.26
6	***Cola®Carb TDC*** / Trideceth-7 Carboxylic Acid	1.53	27.54
7	Sodium Hydroxide	0.10	1.8
Initiator			
1	Water	12.86	231.48
2	Sodium Persulfate	0.21	3.78
	TOTAL	**100.00**	**1800.00**

PROCEDURE:

1. Load all raw materials into their respective vessels.
2. Heat reactor to 180˚F.
3. Begin monomer feed at 4 hours and initiator feed at 5.5 hrs. feed times simultaneously.
4. After feeds are complete, hold at 180˚F for 30 minutes.
5. Cool while mixing.

Example 5: **Acrylic Emulsion Polymerization utilizing low levels of Poly Suga®Glycinate C**

	INGREDIENT	Wt. %	Wt. gm
Reactor Charge			
1	Water	34.50	621.00
2	Sodium Persulfate	0.04	0.72
3	***Poly Suga®Glycinate C*** / Sodium Bis-Hydroxy-ethylglycinate Coco-Glucosides Crosspolymer	0.03	0.54
Pre-emulsion			
1	Methyl Methacrylate	29.01	522.18
2	Methacrylic Acid	0.87	15.66
3	Acrylic Acid	0.87	15.66
4	Butyl Acrylate	12.39	223.02
5	Water	8.13	146.34
6	***Poly Suga®Glycinate C*** / Sodium Bis-Hydroxy-ethylglycinate Coco-Glucosides Crosspolymer	1.00	18.00
Initiator			
1	Water	12.95	233.10
2	Sodium Persulfate	0.21	3.78
	TOTAL	**100.00**	**1800.00**

PROCEDURE:

1. Load all raw materials into their respective vessels.
2. Heat reactor to 180˚F.
3. Begin monomer feed at 4 hours and initiator feed at 5.5 hrs. feed times simultaneously.
4. After feeds are complete, hold at 180˚F for 30 minutes.
5. Cool while mixing.

Example 6: **Styrene-Acrylic Emulsion Polymerization utilizing Suga®Tex 1000 as co-surfactant**

	INGREDIENT	Wt. %	Wt. gm
Reactor Charge			
1	Water	34.28	617.04
2	***Cola®Fax 3397*** / Alcohol Ethoxylate Phosphate Ester	0.04	0.72
Pre-emulsion			
1	Butyl Acrylate	15.50	279.00
2	Styrene	21.68	390.24
3	Dodecyl Mercaptan	0.22	3.96
4	Acrylic Acid	1.18	21.24
5	Water	7.75	139.50
6	***Cola®Fax 3397*** / Alcohol Ethoxylate Phosphate Ester	1.49	26.82
7	***Suga®Tex 1000*** / APG-Based Surfactant	0.50	9.00
8	Sodium Hydroxide	0.11	1.98
Initiator			
1	Water	5.83	104.94
2	Sodium Persulfate	0.46	8.28
	TOTAL	**100.00**	**1800.00**

PROCEDURE:

1. Load all raw materials into their respective vessels.
2. Heat reactor to 180˚F.
3. Begin monomer feed at 4 hours and initiator feed at 5.5 hrs. feed times simultaneously.
4. After feeds are complete, hold at 180˚F for 30 minutes.
5. Cool while mixing.

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. **www.colonialchem.com**

Colonial Chemical

225 Colonial Drive · South Pittsburg, TN 37380
Phone: 423-837-8800
www.colonialchem.com

Innovative Specialty Surfactants