CARPENTER

Surfactants / Polyglycols

BLOCK COPOLYMERS

NONIONIC SURFACTANTS

CARPOL® NIONIC™

Carpenter Co.'s line of nonionic surfactants makes use of our expertise in alkoxylation to provide a range of EO/PO block copolymers which serve a wide variety of markets where defoaming, wetting and emulsifying are critical. By controlling the relationship between EO and PO, Carpenter Co. is able to tailor the final properties to deliver the exact benefits desired.

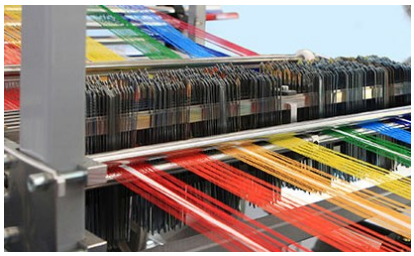
CARPOL® NIONIC™ surfactants and polyglycols are high performance products with excellent solubility and solvency. Each of these materials are incredibly stable chemically and are non-hazardous with high flash points. This makes them inert; thus, safe to handle. These materials are very stable in storage and do not hydrolyze or become rancid.

Emulsions & Dispersions

The key to CARPOL NIONIC surfactants in providing excellent properties for dispersions, emulsions, and emulsion polymerization is the chemical structure of the materials. These materials have a large hydrophobic portion encompassed by hydrophilic sections. The hydrophobic portion adsorbs on the surfaces of the substrate, particle or droplet while the hydrophilic sections interact with the water surrounding the particle.

Neither pH nor water hardness alters these surfactants. In the case of pigment dispersions and emulsion polymerization, the hydrophilic sections interact with solvents to form a hydration coating. The CARPOL NIONIC Surfactants inhibit agglomeration of particles by physically keeping the particles apart.

They exhibit no adverse effects on bacterial activity or the fermentation process. In addition some of these products are Kosher certified.



Foam Behavior

One of the key characteristics of the NIONIC series is their foaming or defoaming properties. By adjusting the size of the molecules as well as their EO/PO ratios, we are able to provide a wide range of foaming properties.

The CARPOL NIONIC L-61 Surfactant produces the lowest foaming while NIONIC 850 Polyglycol produces the most. The defoaming performance is a function of cloud point and end use temperature. These materials are water soluble at low temperatures. They will flocculate when warmed above their cloud point.

Foam can be destabilized by reducing either the surface elasticity or the viscosity of the bubble. In addition these products are easily removed and leave no residue on the surfaces.

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Typical Physical Properties

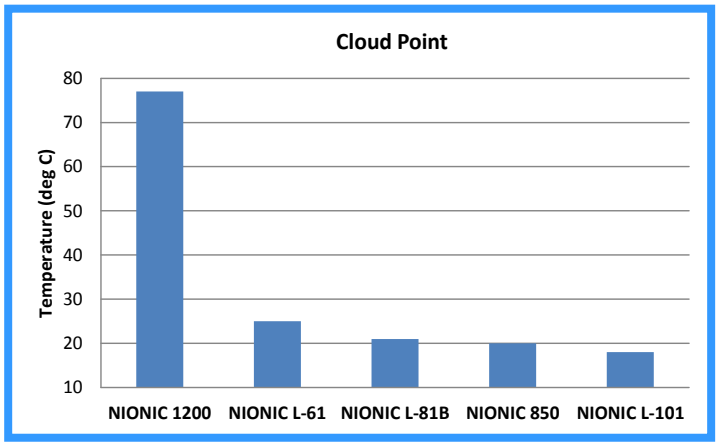
	NIONIC L-61	NIONIC L-81B	NIONIC L-101	NIONIC 850	NIONIC 1200	NIONIC P2000	NIONIC P4000
	Surfactant	Surfactant	Surfactant	Polyglycol	Polyglycol	Polyglycol	Polyglycol
Structure	Linear	Linear	Linear	Branched	Branched	Linear	Linear
Actives (wt%)	100	100	100	100	100	100	100
Cloud Point (°C)	25	21	20	19	77	——	——
HLB[1]	4.8	2.8	<2	<2	TBD	——	——
EO	Yes	Yes	Yes	Yes	Yes	No	No
Pour Point (°C)	-32	-29	-20	-14	——	——	——
Appearance	Clear Liquid	Clear Liquid	Clear Liquid	Clear Liquid	Clear Liquid	Clear Liquid	Clear Liquid
Viscosity @ 25°C (cP)	317	TBD	660	850	1200	300	890
Density @ 25°C (g/ml)	1.00	1.00	1.03	1.03	1.01	1.00	1.00
Surface Tension (dynes/cm)	33.6	33.9	33.5	33.6	——	——	——
Ross-Miles Foam Height[2] (mm)	(0/0/0/0)	(15/10/5/0)	(22/13/10/10)	(35/18/15/15)	——	——	——
Draves 20 sec Wetting Conc.[3] (wt%)	0.30	0.21	0.12	0.08	> 5	——	——

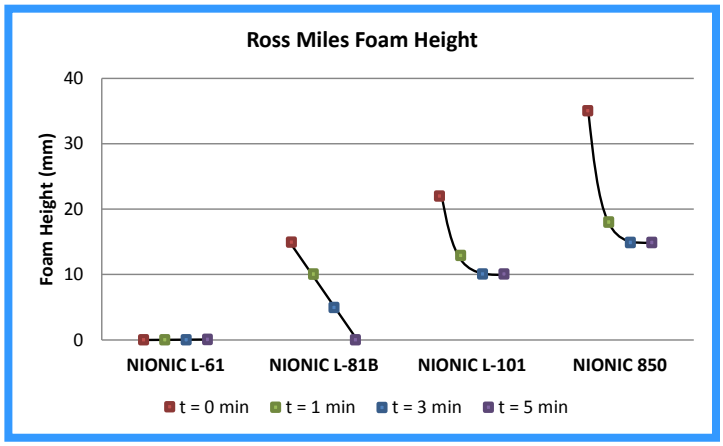
Please note that these values are not specifications

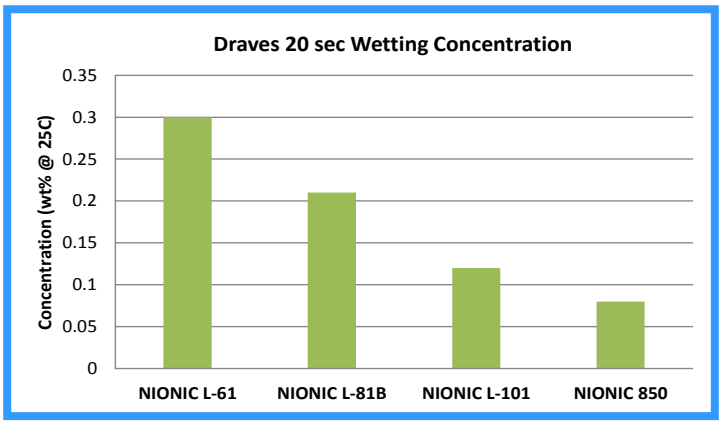
(1) HLB Values were measured using UPLC w/ Evaporative Light Scattering Detection against known standards

(2) ASTM D1173-07, t = 0 / t = 1 min / t = 3 min / t = 5 min

(3) ASTM D2281-10, Evaluation of Wetting Agents by the Skein Test







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FDA Clearance Status of CARPOL NIONIC Surfactants and Polyglycols

Carpenter Product	§ 172.210	§ 172.808	§ 172.820	§ 173.310	§ 173.340	§ 175.105	§ 175.300	§ 176.170	§ 176.180	§ 176.200	§ 176.210	§ 177.1200	§ 177.1210	§ 177.1400	§ 177.1680	§ 177.2260	§ 177.2600	§ 177.2800	§ 178.3120	§ 178.3740	§ 178.3750	§ 178.3910
CARPOL NIONIC L-61 Surfactant		‡			✔	✔			✔	✔	✔	✔		✔	✔		€		€			
CARPOL NIONIC L-81B Surfactant		‡			✔	✔			✔	✔	✔	✔		✔	✔		€		€			
CARPOL NIONIC L-101 Surfactant		‡			✔	✔			✔	✔	✔	✔		✔	✔		€		€			
CARPOL NIONIC 850 Polyglycol						✔																
CARPOL NIONIC 1200 Polyglycol						✔									✔							
CARPOL NIONIC P2000 Polyglycol				✔	✔	✔	*,†	✔	✔	✔	✔		†		✔		€		€	**		
CARPOL NIONIC P4000 Polyglycol				✔		✔	*,†	✔	✔	✔			†		✔					**		

* permitted for use in resinous and polymeric coatings side seam cements [i.e., Section 175.300(b)(3)(xxxii)]

** permitted for use as a plasticizer for polystyrene complying with Section 177.1640

† permitted for use in resinous and polymeric coatings as esters with listed substances [see Section 175.300(b)(3)(ii)]

‡ POP mole limits and cloud point specifications apply; permitted for use as a processing aid and wetting agent in combination with dioctyl sodium sulfosuccinate for fumaric acid

€ permitted for use as a defoamer used in the manufacture of animal glue; in animal glue permitted for use in repeat-use rubber articles at levels up to 5% by weight of the finished article

APPLICATIONS

- Adhesives
- Agriculture
- Bottle Wash
- Cement Admixtures
- Chemical Intermediates
- Cutting Fluids
- Defoamers
- Degreasing
- Dishwasher Detergents
- Emulsion Polymerization
- Fermentation
- Foam Control
- Food Processing
- Fragrance Stabilization
- Hard Surface Cleaners
- Industrial/Institutional Cleaning
- Metal Cleaning
- Metal Working
- Mold Release Agents
- Oil & Gas
- Paints & Coatings
- Pesticide Concentrates
- Pigment & Dye Dispersions
- Pulp & Paper Processing
- Rinse Aids
- Textiles
- Water Treatment
- Wetting Aids

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