



CARPENTER

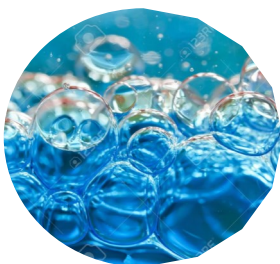
Surfactants / Polyglycols



**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.



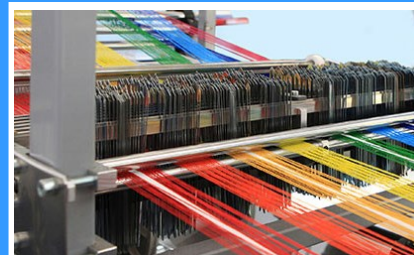
Emulsions & Dispersions

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 NIONIC L-61 Surfactant produces low foaming while the NIONIC 850 polyglycol and NIONIC TDA-10 produce the most. 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.



Typical Physical Properties

Surfactants and Polyglycols	NIONIC L-61	NIONIC L-81	NIONIC L-101	NIONIC L-64	NIONIC 850	NIONIC 1400
	Surfactant	Surfactant	Surfactant	Surfactant	Polyglycol	Polyglycol
Structure	Linear	Linear	Linear	Linear	Branched	Branched
Actives (wt%)	100	100	100	100	100	100
Cloud Point (°C)	25	---	20	59	19	77
HLB ⁽¹⁾	4.8	---	<2	---	<2	---
EO	Yes	Yes	Yes	Yes	Yes	Yes
Pour Point (°C)	-32	---	-20	---	-14	---
Appearance	Clear Liquid	Clear Liquid	Clear Liquid	Clear Liquid	Clear Liquid	Clear Liquid
Viscosity @ 25°C (cP)	325	505	725	630	850	1400
Density @ 25°C (g/ml)	1.00	1.02	1.03	1.05	1.03	1.01
Surface Tension (dynes/cm)	33.6	---	33.5	---	33.6	---
Ross-Miles Foam Height ⁽²⁾ (mm)	(0/0/0/0)	---	(22/13/10/10)	(38/19/15/14)	(35/18/15/15)	---
Draves 20 sec Wetting Conc. ⁽³⁾ (wt%)	0.30	---	0.12	2.6	0.08	> 5

Polypropylene Glycols and Alcohol Ethoxylates	NIONIC P1000	NIONIC P1200	NIONIC P2000	NIONIC P3000	NIONIC P4000	NIONIC TDA10
	Polyglycol	Polyglycol	Polyglycol	Polyglycol	Polyglycol	Alcohol Ethoxylate
Structure	Linear	Linear	Linear	Linear	Branched	Branched
Actives (wt%)	100	100	100	100	100	100
HLB ⁽¹⁾	---	---	---	---	---	---
EO	No	No	No	No	No	Yes
Cloud Point (°C)	---	---	---	---	---	74
Appearance	Clear Liquid	Clear Liquid	Clear Liquid	Clear Liquid	Clear Liquid	Opaque Liquid
Viscosity @ 25°C (cP)	165	210	300	600	935	90
Density @ 25°C (g/ml)	1.00	1.00	1.00	1.02	1.00	1.00
Ross-Miles Foam Height ⁽²⁾ (mm)	---	---	---	---	---	(130/113/80/28)

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, mm at 0.1 wt% actives, 25°C, t = 0 / t = 1 min / t = 3 min / t = 5 min

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

Certified Kosher: NIONIC L-61, NIONIC L-81, NIONIC L-101, NIONIC L-64, NIONIC P1000, NIONIC P1200, NIONIC P2000, NIONIC P3000, NIONIC P4000

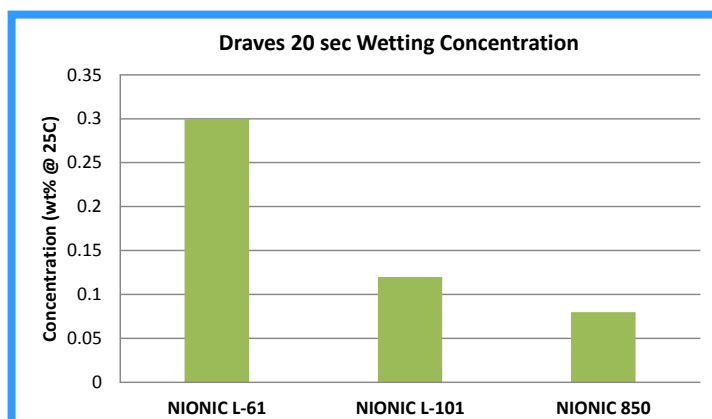
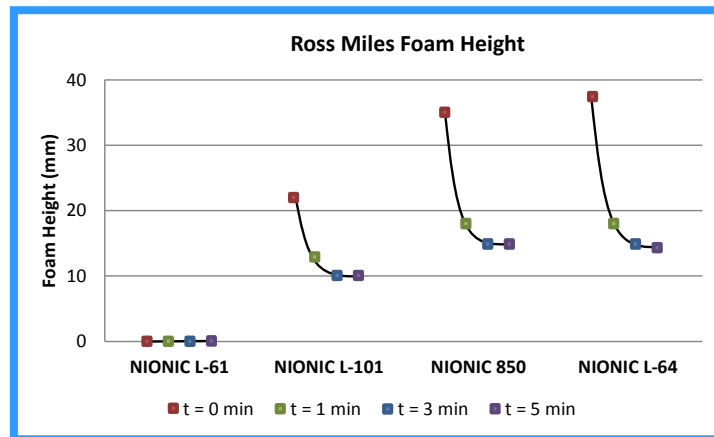
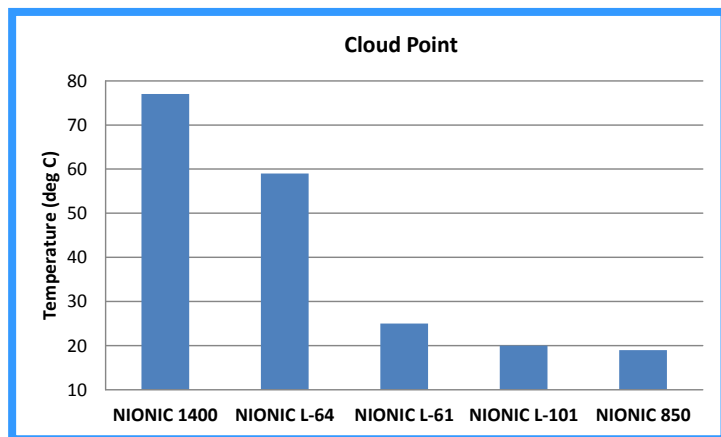
Certified Halal: NIONIC L-61, NIONIC L-81, NIONIC L-101, NIONIC L-64, NIONIC P2000



Manufacturing Facility

NIONIC™





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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