SAMPLES & INFORMATION

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SAMPLE SIZE

1 Quart	2 LB	(~1 KG)
1 Gallon	8 LB	(~4 KG)
5 Gallons	40 LB	(~20 KG)

PRODUCTS PACKAGED/SHIPPED

Drum	460 LB	(~208 KG)
Totebin (IBC)	2300 LB	(~1043 KG)
Tank Truck	~44400 LB	(~20 MT)
Flexitank	~44400 LB	(~20 MT)
Railcar	~185000 LB	(~84 MT)

NIONIC™ SURFACTANTS

Formulate for the Future™

Founded in 1950, Carpenter Co. is one of the world's largest chemical manufacturers, producing polyurethane foam, bedding and furniture foam, carpet cushion, expanded polystyrene, air filtration media, polyether polyols, specialty polyurethane systems, and nonionic surfactants.

CARPENTER

CARPENTER

Our Plant

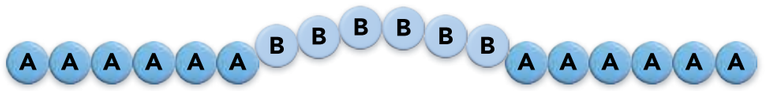
Carpenter began alkoxylate production at our Roger W. Powell Plant in 1972. This facility, located on a 70-acre site in Pasadena, TX, is continually upgraded with state-of-the-art technologies and capabilities.

Nonionic Surfactants

Utilizing our expertise in alkoxylation technology, we designed the Carpenter NIONIC™ surfactant and polyglycol product lines for use in a multitude of markets. By controlling the relationship between ethylene oxide (EO) and propylene oxide (PO), Carpenter is able to tailor the final properties to deliver the exact benefits desired.

Our NIONIC™ surfactants and polyglycols are non-hazardous, chemically stable, and have a high flash point. These products are safe to handle and do not hydrolyze or become rancid.

L Series



Hydrophilic — Hydrophobic — Hydrophilic

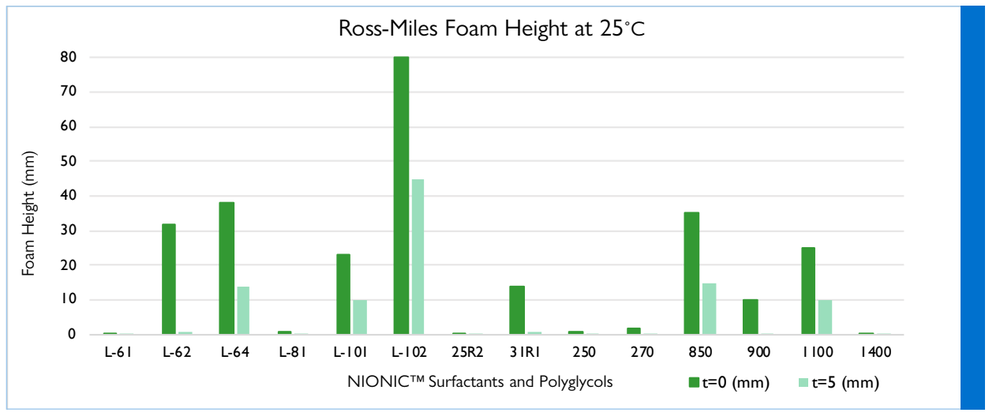
R Series

Hydrophobic — Hydrophilic — Hydrophobic

Foam Control

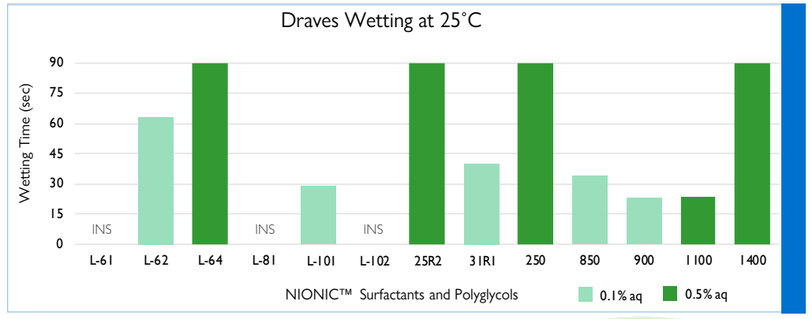
The chemical structure of many NIONIC™ surfactants and polyglycols makes them well suited in applications requiring foam control. The need for foam control covers a variety of applications including fermentation, food processing, pulp and paper, and textiles.

The Ross-Miles test is one method of evaluating a surfactant's ability to control foam. By this method, a low t_0 value indicates the prevention of foam formation. The faster the rate of decline between t_0 and t_5, the more efficient the surfactant is as a defoamer. Additionally, because defoaming performance occurs best just below the polymer's cloud point, the NIONIC™ surfactant and polyglycol lines have been designed to cover a wide range of cloud points to cater to different processing needs.



Wetting Agents

NIONIC™ surfactants and polyglycols can improve wetting properties by modifying the surface tension between a liquid and a solid. This allows the liquid to more thoroughly and evenly coat a solid, which is advantageous in applications such as dishwashing, agriculture, and textiles. The Draves Wetting Test is an indicator of how quickly a surfactant can effectively wet out a cotton skein. The data in the chart shows that Carpenter NIONIC™ surfactant and polyglycol products with the shortest times at low concentration are the most efficient wetting agents.



Lubricants & Metalworking Fluids

Surface tension and viscosity affect a nonionic surfactant's performance in lubricants and metalworking fluids. NIONIC™ surfactants and polyglycols can be used either to modify the viscosity of a liquid or to promote lubricity by reducing friction between the fluid and metal. Nonionic surfactants can be utilized as defoamers, emulsifiers, and cleaners in metalworking.

Paints & Coatings

NIONIC™ surfactants can serve many functions in paints and coatings chemistries. These surfactants can be used as carriers for pigments to effectively wet out and disperse the solid particles into an easily processed liquid form. NIONIC™ surfactants can also aid in the emulsification of formulated paints and coatings.

Agrochemicals

Wetting is an important property in the application of pesticides and humectants used in agriculture. The NIONIC™ surfactant and polyglycol lines contain products that can increase the wetting capacity to ensure consistent application of agrochemicals. Some downstream agriculture processes require the use of a defoamer. A suitable NIONIC™ surfactant or polyglycol can be selected based on an appropriate cloud point for the application.

Household/Industrial Cleaning

Nonionic surfactants are commonly included in household and industrial cleaning product formulations. NIONIC™ products can be utilized to form dirt-trapping micelles in detergents, help promote compatibility of a mixture, and aid in the wetting process.

	NIONIC™	Product Highlight	Contains EO	Cloud Point (°C, 1% aq)	Surface Tension (dynes/cm, 1% aq, 25°C)	Foam Height [1] (mm, t_0/5min, 0.1% aq, 25°C)	Viscosity (cP, 25°C)	Wetting Time [2] (sec, 0.1% aq, 25°C)	Density (lb/gal, 25°C)	Form (25°C)	Applications
L-Series	L-61	Halal Kosher	Yes	24	36	0/0	320	INS	8.33	Liquid	Foam control for fermentation, food washing, water treatment, MWF, machine dishwash, food and dairy process cleaning, agrochemicals
	L-62	Halal Kosher	Yes	32	36	32/1	450	63	8.68	Liquid	Foam control for fermentation, water treatment, MWF, food and dairy process cleaning, paints and coatings, agrochemicals
	L-64	Halal Kosher	Yes	62	33	38/14	470	>90 [3]	8.76	Liquid	High temperature foam control for fermentation, food processing, adhesives, paper processing, MWF, sanitizing
	L-81	Halal Kosher	Yes	20	33	1/0	500	INS	8.76	Liquid	Fermentation, MWF, degreasing chemicals, cutting oils, chemical intermediates, rinse aids, industrial cleaning
	L-101	Halal Kosher	Yes	18	33	22/10	660	29	8.60	Liquid	Low temperature foam control for fermentation, MWF, degreasing chemicals, cutting oils
	L-102	Kosher	Yes	28	32	80/45	1000	INS	8.60	Liquid	Low temperature foam control for fermentation, MWF, degreasing chemicals, cutting oils
R-Series	25R2	Halal Kosher	Yes	31	36	0/0	600	>90 [3]	8.60	Liquid	Foam control, MWF, household cleaning, water treatment, agrochemicals, chemical intermediates, paper processing
	31R1	Halal Kosher	Yes	24	–	14/1	600	40	8.51	Liquid	Foam control, MWF, household cleaning, water treatment, agrochemicals, chemical intermediates, paper processing

[1]ASTM D1173-07 [2]ASTM D2281-10 [3]0.5% aq INS: Insoluble

P-Series

NIONIC™	Product Highlight	Molecular Weight (Da)	Foam Height [1] (mm, t_0/5min, 0.1% aq, 25°C)	Viscosity (cP, 25°C)	Density (lb/gal, 25°C)	Form (25°C)	Applications
P400	Halal Kosher	400	0/0	75	8.30	Liquid	Synthetic lubricants, foam control, chemical intermediates, cosolvents, mining
P1000	Kosher	1000	0/0	165	8.28	Liquid	Synthetic lubricants, foam control, chemical intermediates, cosolvents, mining
P1200	Kosher	1200	0/0	210	8.33	Liquid	Synthetic lubricants, foam control, chemical intermediates, cosolvents, mining
P2000	Halal Kosher	2000	0/0	300	8.33	Liquid	Synthetic lubricants, foam control, chemical intermediates, cosolvents, mining
P3000	Halal Kosher	3000	INS	600	8.47	Liquid	Synthetic lubricants, foam control, chemical intermediates, cosolvents, mining
P4000	Halal Kosher	4000	INS	935	8.33	Liquid	Synthetic lubricants, foam control, chemical intermediates, cosolvents, mining

[1]ASTM D1173-07 INS: Insoluble

Branched Polyglycols

NIONIC™	Cloud Point (°C, 1% aq)	Surface Tension (dynes/cm, 1% aq, 25°C)	Foam Height [1] (mm, t_0/5min, 0.1% aq, 25°C)	Viscosity (cP, 25°C)	Wetting Time [2] (sec, 0.1% aq, 25°C)	Density (lb/gal, 25°C)	Form (25°C)	Applications
250	64	38	1/0	240	>90 [3]	8.36	Liquid	Synthetic lubricants, foam control, chemical intermediates, viscosty modifiers
270	73	42	2/0	260	–	8.56	Liquid	Foam control, chemical intermediates, viscosity modifiers
850	45	33	35/15	835	34	8.59	Liquid	Foam control, chemical intermediates, viscosity modifiers
900	18	38	10/0	840	23	8.43	Liquid	Foam control, chemical intermediates, viscosity modifiers
1100	15	32	25/20	1150	24 [3]	8.44	Liquid	Foam control, chemical intermediates, viscosity modifiers
1400	77	44	0/0	1200	>90 [3]	8.41	Liquid	Foam control, chemical intermediates, viscosity modifiers

[1]ASTM D1173-07 [2]ASTM D2281-10 [3]0.5% aq