

# BIO-SOFT® N-Series Blends



Balanced Blends for Consumer and Industrial Applications

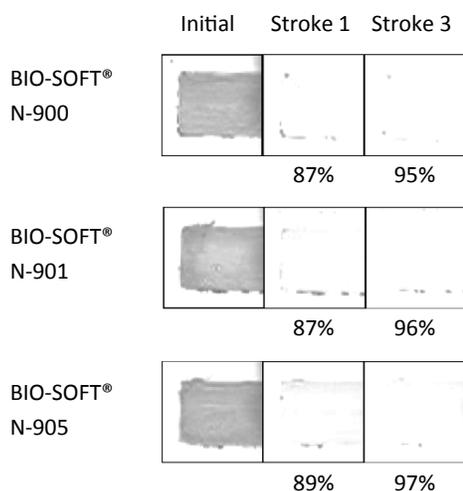
Stepan's balanced portfolio of nonionic linear alcohol ethoxylate (LAE) surfactant blends takes the hassle out of cleaning, simplifies the reformulation process, and streamlines supply chain management. The BIO-SOFT® N-series blends are designed to target cleaning, degreasing, emulsifying, and wetting on a variety of surfaces and soils. These environmentally-friendly and readily-biodegradable blends meet or exceed the performance of individual LAE surfactants and nonylphenol ethoxylates (NPE).

	Applications	HLB
<b>BIO-SOFT® N-400</b>	W/O Emulsifiers, Degreasing Booster, Oilfield	8.8
<b>BIO-SOFT® N-600</b>	I&I Cleaning, CASE*, Paint Additives	10.6
<b>BIO-SOFT® N-900</b>	General Purpose Cleaning, Bathroom Cleaners	13.0
<b>BIO-SOFT® N-901</b>	Degreasers, Kitchen Cleaners, O/W Emulsifiers	12.0
<b>BIO-SOFT® N-905</b>	Degreasers, O/W Emulsifiers, Fragrance Solubilizers	12.0
<b>BIO-SOFT® N-1200</b>	Iodine Sanitizers, O/W Emulsifiers, Fragrance Solubilizers	13.5

\*CASE: Coatings, Adhesives, Sealants, Elastomers

## General Purpose Cleaning

**BIO-SOFT® N-900, BIO-SOFT® N-901, and BIO-SOFT® N-905** quickly tackle everyday dirt.

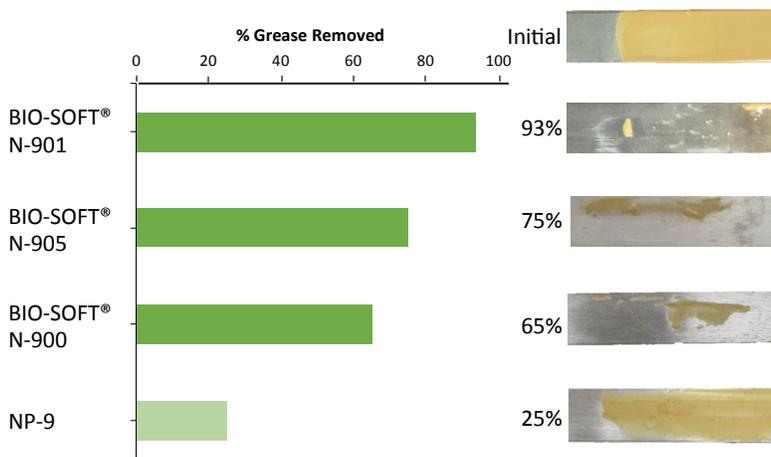


Method: Gardner abrasion cleaning, ASTM 4488-95 (2001) A5, oily/particulate soil, vinyl tiles, formulation diluted 1:8, 22 °C

Formulation: 1 wt% nonionic, 1.5 wt% sodium linear alkylbenzene sulfonate (38%), 0.2 wt% sodium citrate

## Heavy Duty Degreasing

**BIO-SOFT® N-901** is a superior degreaser that cuts through both industrial and household soils.



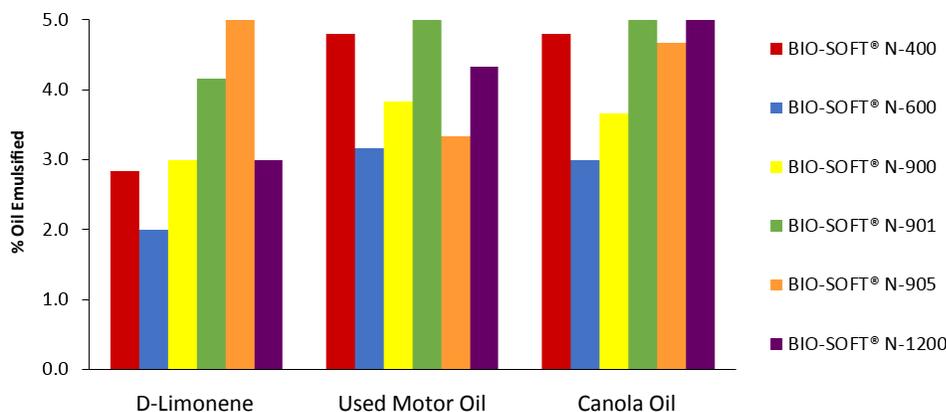
Method: Immersion degreasing, lithium grease/used motor oil (50/50 by wt%), stainless steel, 22 °C, 1000 RPM, 30 min, gravimetric analysis, required HLB for lithium grease (mixture of lithium stearate and lithium hydroxystearate) = 15 and petroleum oils = 10

Formulation: 1 wt% nonionic, 1 wt% potassium hydroxide (45%), 1 wt% sodium metasilicate

## Emulsification Versatility

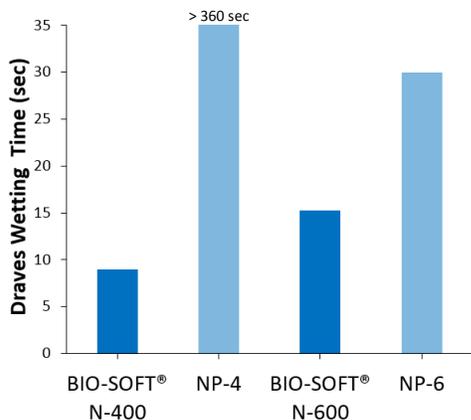
**BIO-SOFT® N-Series Blends** have a high capacity for emulsifying a variety of fragrance, industrial, and food oils.

Method: Oil emulsification capacity, 10 wt% nonionic in deionized water titrated with oil to form a stable emulsion for 20 min, 22 °C, required HLB for d-limonene = 12, petroleum oils = 10, canola oils = 7



## Rapid Wetting

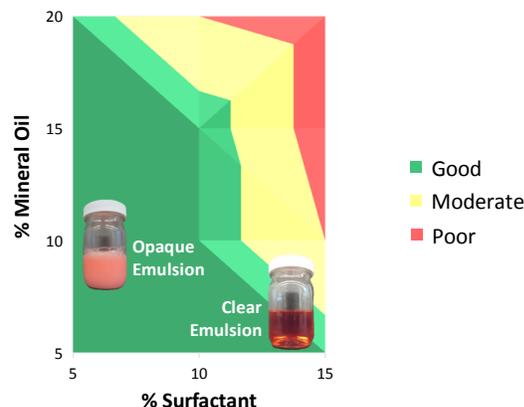
BIO-SOFT® N-400 and BIO-SOFT® N-600 wet surfaces in a fraction of the time compared to the NPE equivalents.



Method: Draves wetting, ASTM D2188-10, 5-g skein, 3-g hook, 0.1 wt% nonionic, deionized water, 25 °C

## Emulsification Efficacy

BIO-SOFT® N-400 and BIO-SOFT® N-900 effectively emulsify nonpolar mineral oil.

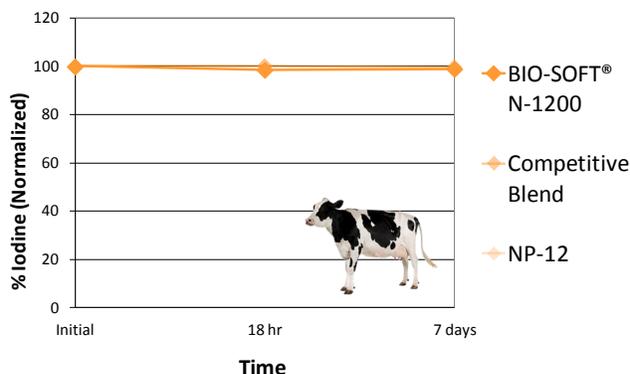


Method: Nonionic/mineral oil emulsions with red dye, 50/50 wt% of BIO-SOFT® N-400 and BIO-SOFT® N-900 in deionized water, stability qualitatively ranked, 20 min, 22 °C, required HLB for mineral oil = 10.5

## Iodine Stability

BIO-SOFT® N-1200 forms stable iodophors and can replace NP-12 in sanitizers for dairy farms and breweries.

Method: The nonionic surfactant complexes with iodine to form iodophors, which can release free iodine when in solution. Free iodine functions as an antimicrobial agent. Potentiometric titration tests showed that the level of free iodine remained constant over the time of the study in the presence of BIO-SOFT® N-1200 and was equivalent to NP-12 and a competitive nonionic blend.



	BIO-SOFT® N-400	BIO-SOFT® N-600	BIO-SOFT® N-900	BIO-SOFT® N-901	BIO-SOFT® N-905	BIO-SOFT® N-1200
Applications	W/O Emulsifiers, Degreasing Booster, Oil Field	I&I Cleaning, CASE*, Paint Additives	General Purpose Cleaning, Bathroom Cleaners	Degreasers, Kitchen Cleaners, O/W Emulsifiers	Degreasers, O/W Emulsifiers, Fragrance Solubilizers	Iodine Sanitizers, O/W Emulsifiers, Fragrance Solubilizers
NPE Equivalent	NP-4	NP-6	NP-9	NP-9	NP-9	NP-12
HLB	8.8	10.6	13.0	12.0	12.0	13.5
Actives, %	100	100	95	96	95	95
EO Content, %	44	53	65	60	59	67
Molecular Weight, g/mol	301	410	484	437	457	585
Hydroxyl Value, mg KOH/g	189	134	118	128	128	96
Cloud Point, °C (°F) (1% aqueous)	< 25 (< 77)	< 25 (< 77)	64 (147)	40 (104)	51 (124)	80 (176)
Pour Point, °C (°F)	-10 (14)	5 (41)	6 (43)	5 (41)	5 (41)	18 (64)
Surface Tension (0.1% aqueous), dynes/cm	27	28	30	28	29	33
Critical Micelle Concentration, mg/L	42	10	159	55	15	19
Draves Wetting @ 25 °C (0.1% aqueous), sec	9	15	8	6	18	18
Draves Wetting @ 60 °C (0.1% aqueous), sec	9	13	5	6	15	11
Ross-Miles, 0.1%, Initial, cm	5.3	4.5	12.0	11.8	11.5	11.4
Ross-Miles, 0.1%, 5 min, cm	4.7	4.0	11.0	10.5	10.8	10.6

\*CASE: Coatings, Adhesives, Sealants, Elastomers

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