

STEPAN SPECIALTY AMPHOTERICs FOR HI&I CLEANING

Alternatives to Cocamide DEA

California's Office of Environmental Health Hazard Assessment (OEHHA) has listed Cocamide DEA (CAS No. 68603-42-9) on Proposition 65. For those looking to reformulate, Stepan is providing the following performance comparison and alternative surfactant recommendations to NINOL® 40-CO (1:1 Cocamide DEA) and NINOL® 11-CM (2:1 Cocamide DEA) for use in liquid dish detergents, all-purpose cleaners, degreasers, and vehicle care detergents.

Stepan has a broad amphoteric product line and the technical expertise in hard surface care to assist our customers with product recommendation and reformulation. The recommended surfactants noted below take into consideration performance, handling, typical lead time, and estimated market price. If you require further assistance, please contact your local Stepan sales representative or Stepan U.S. Technical Service at techserv@stepan.com or (800) 745-7837.

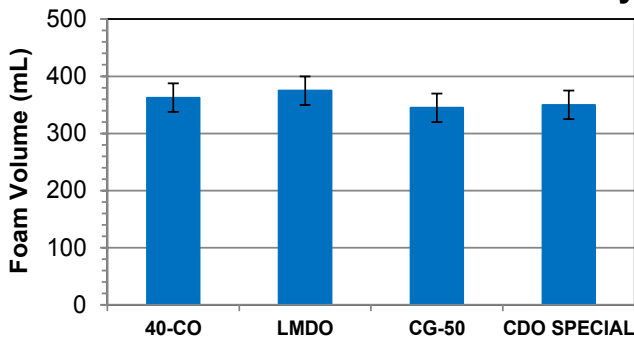
LIQUID DISH DETERGENTS (LDL)

For an LDL economy formulation containing Linear Alkylbenzene Sulfonate (LAS) and Sodium Laureth Sulfate (SLES), the following surfactants showed equivalent or improved foam mileage and equivalent foam volume compared to NINOL® 40-CO on an equal actives basis.

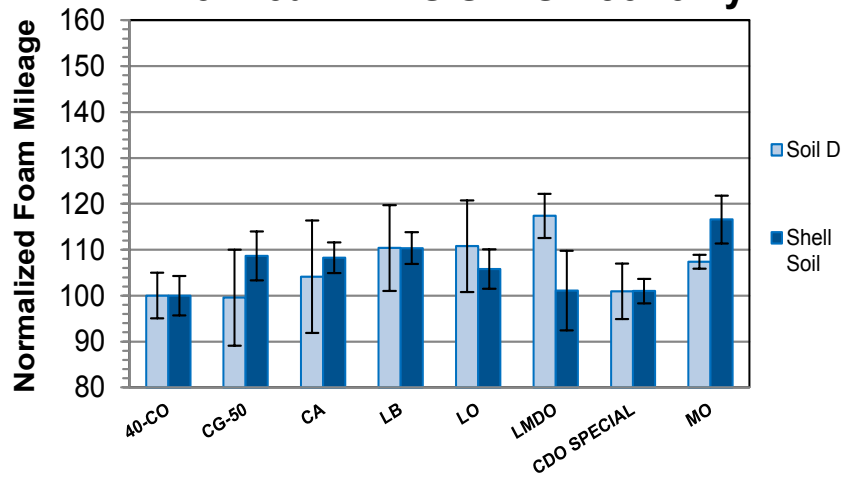
Recommendations

- AMMONYX® LMDO (Lauramidopropylamine Oxide)
- AMPHOSOL® CG-50 (Cocamidopropyl Betaine)
- AMMONYX® CDO SPECIAL (Cocamidopropylamine Oxide)

Shake Foam: LAS/SLES Economy



Mixer Foam: LAS/SLES Economy

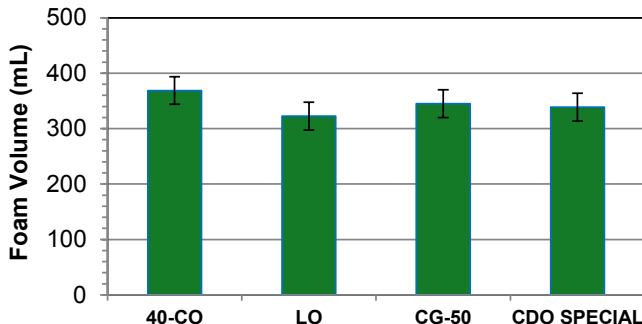


For an LDL premium formulation containing Sodium Lauryl Sulfate (SLS) and Sodium Laureth Sulfate (SLES), the following surfactants showed equivalent or improved foam mileage and equivalent foam volume compared to NINOL® 40-CO on an equal actives basis.

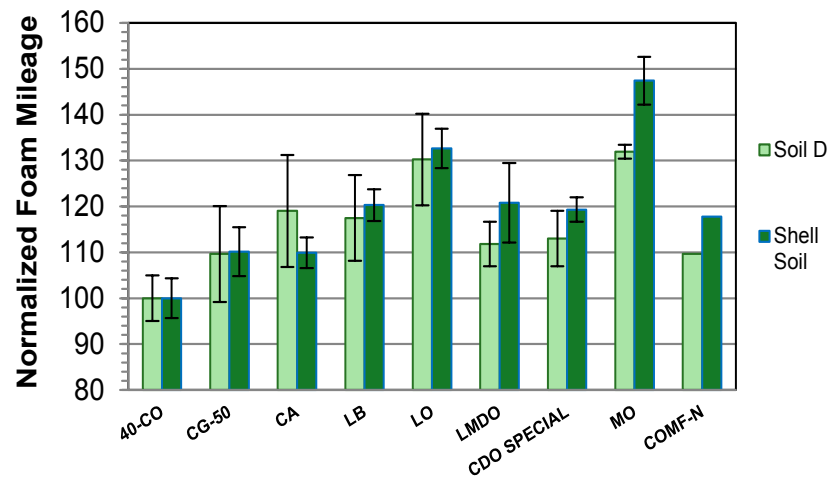
Recommendations

- AMMONYX® LO (Lauramine Oxide)
- AMPHOSOL® CG-50 (Cocamidopropyl Betaine)
- AMMONYX® CDO SPECIAL (Cocamidopropylamine Oxide)

Shake Foam: SLS/SLES Premium



Mixer Foam: SLS/SLES Premium



Stepan Product	Chemical Description	Abbreviation	Stepan Product	Chemical Description	Abbreviation
AMMONYX® CDO SPECIAL	Cocamidopropylamine Oxide	CDO SPECIAL	AMPHOSOL® 810-B	Capryl/Capramidopropyl Betaine	810-B
AMMONYX® DO	Decyl Amine Oxide	DO	AMPHOSOL® CA	Cocamidopropyl Betaine	CA
AMMONYX® LMDO	Lauramidopropylamine Oxide	LMDO	AMPHOSOL® CG-50	Cocamidopropyl Betaine	CG-50
AMMONYX® LO	Lauramine Oxide	LO	AMPHOSOL® CS-50	Cocamidopropyl Hydroxysultaine	CS-50
AMMONYX® MO	Myristamine Oxide	MO	AMPHOSOL® LB	Lauramidopropyl Betaine	LB
			NINOL® COMF-N	Cocamide MEA	COMF-N

NEUTRAL ALL-PURPOSE CLEANERS

For a concentrated all-purpose cleaner formulation evaluated by the Gardner Straight Line Washability (Stroke-by-Stroke) Test on vinyl tiles with ASTM D4488-95-A5 soil, the following surfactants showed improved cleaning in the first few strokes compared to NINOL® 11-CM on an equal actives basis.

Recommendations

AMPHOSOL® CS-50
(Cocamidopropyl Hydroxysultaine)

AMPHOSOL® CG-50
(Cocamidopropyl Betaine)

AMPHOSOL® CA
(Cocamidopropyl Betaine)

Gardner Stroke #1

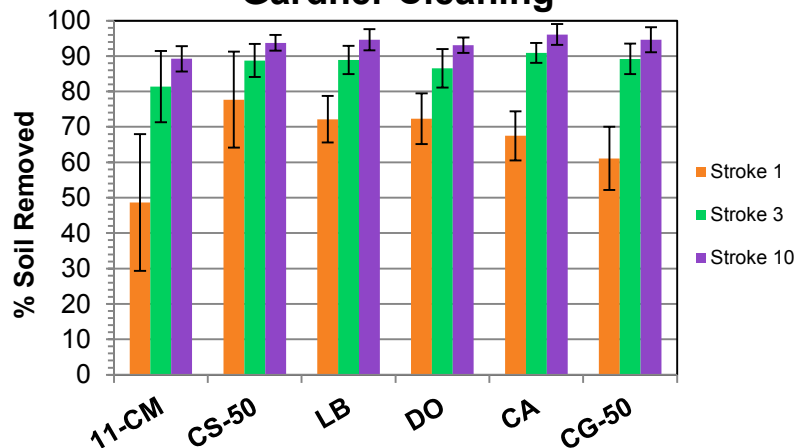


NINOL® 11-CM



AMPHOSOL® CS-50

Gardner Cleaning



SPRAY & WIPE DEGREASERS

For a ready-to-use degreaser formulation tested with the Spray Test on enamel tiles using aged kitchen grease, AMMONYX® LO removed more grease than NINOL® 11-CM, and the other surfactants showed equivalent grease removal compared to NINOL® 11-CM on an equal actives basis.

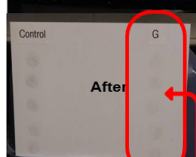
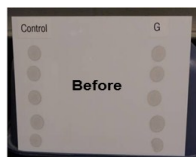
Recommendations

AMMONYX® LO
(Lauramine Oxide)

AMPHOSOL® 810-B
(Capryl/Capramidopropyl Betaine)

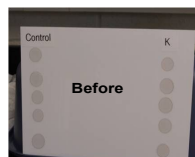
AMMONYX® CDO SPECIAL
(Cocamidopropylamine Oxide)

AMMONYX® LO



Improved

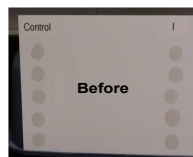
AMMONYX® MO



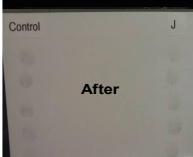
AMPHOSOL® 810-B



AMMONYX® CDO SPECIAL



AMMONYX® DO



Equivalent

VEHICLE CARE DETERGENTS

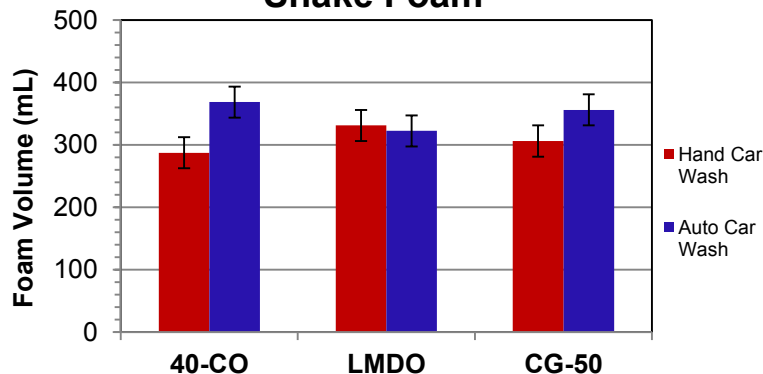
For manual (hand) and automatic car wash detergent formulations the following surfactants had equivalent shake foam compared to NINOL® 40-CO on an equal actives basis.

Recommendations

AMMONYX® LMDO
(Lauramidopropylamine Oxide)

AMPHOSOL® CG-50
(Cocamidopropyl Betaine)

Shake Foam



Test Methods - Shake Foam: SM O10-D (screening test for ASTM D4009-92), Mixer Foam: SM 229-C, Gardner: SM 250-O Application O1, and Spray Test: SM 250-D.

Error bars are included in each graph to represent standard deviations.

Formulation prototypes utilized for comparison testing were: Neutral Hard-Surface Cleaner No. 571, Spray And Wipe Degreaser No. 1099, High Foam Car Wash No. 89, and Car Wash For Car Wash Operators No. 866. These formulation prototypes may contain other ingredients listed on Proposition 65.

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