



**High
Performance,
Low Impact**

**Stepan Company's
U.S. EPA-Approved
Direct Release
Technology**

July 25, 2019
Ron Masters, Ph.D.
Laura Olson

Agenda

- Market Need
- Background U.S. EPA Safer Choice Direct Release
- Introduction to BIO-SOFT[®] DR-13
- Applications for Outdoor Use
- Other Stepan Outdoor-Use Chemistries
- Stepan Resources
- Question & Answer

Market Need

Desire for cleaning ingredients with multi-functionality that meet the U.S. EPA Safer Choice direct release requirements for outdoor use.

- Claim Needs by Retailers
- Must-have for Government Agencies
- Indoor and Outdoor Applications

U.S. EPA Safer Choice Outdoor Use

Acute Aquatic Toxicity Value (L/E/IC50)	Chronic Aquatic Toxicity Value (LOEC)	Persistence (measured in terms of rate of biodegradation)	Bioaccumulation Potential	Status
If acute aquatic toxicity is ≤ 10 ppm...	OR chronic toxicity is ≤ 1 ppm...	=>	=>	Not Acceptable
If acute toxicity is > 10 ppm and < 100 ppm...	AND chronic toxicity is > 1 ppm...	AND biodegradation occurs within a 10-day window without degradation products of concern...	AND BCF/BAF $< 1,000$...	Acceptable
		AND biodegradation does not occur within a 10-day window and/or results in degradation products of concern...	=>	Not Acceptable

- Bypass sewage treatment, limiting time for degradation prior to entering sensitive environments
- Aquatic Toxicity of ≤ 10 mg/L is not allowed in Safer Choice direct release products



CLEANGREDIENTS[®]



epa.gov/saferchoice

Source: <https://www.epa.gov/saferchoice/standard#tab-3>

BIO-SOFT DR-13

- Approved for use in Safer Choice-certified products and meets the direct release screen
- Can be utilized in a variety of different hard surface and outdoor cleaning applications as RTU or concentrate

Versatile
Nonionic
Surfactant

HLB of 13

Effective
Degreaser

Fast
Wetter

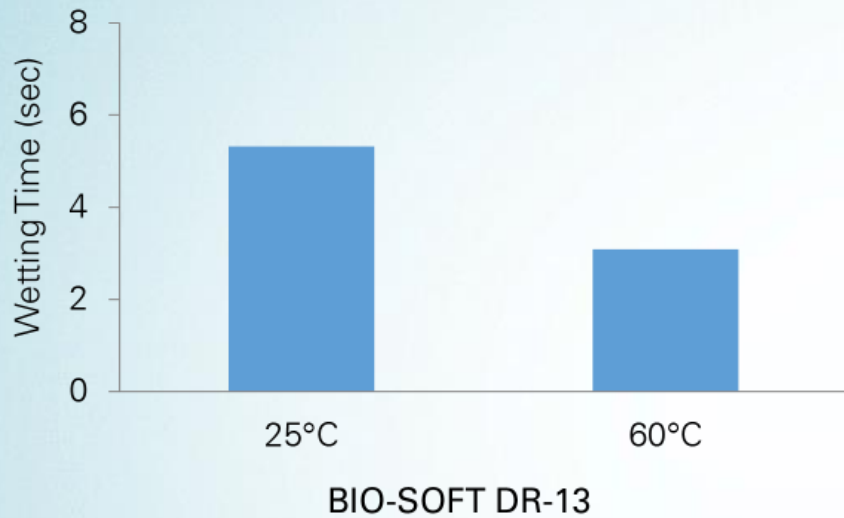
Acid,
Alkaline &
Neutral
Stable

Moderate
Foamer

Physical Properties

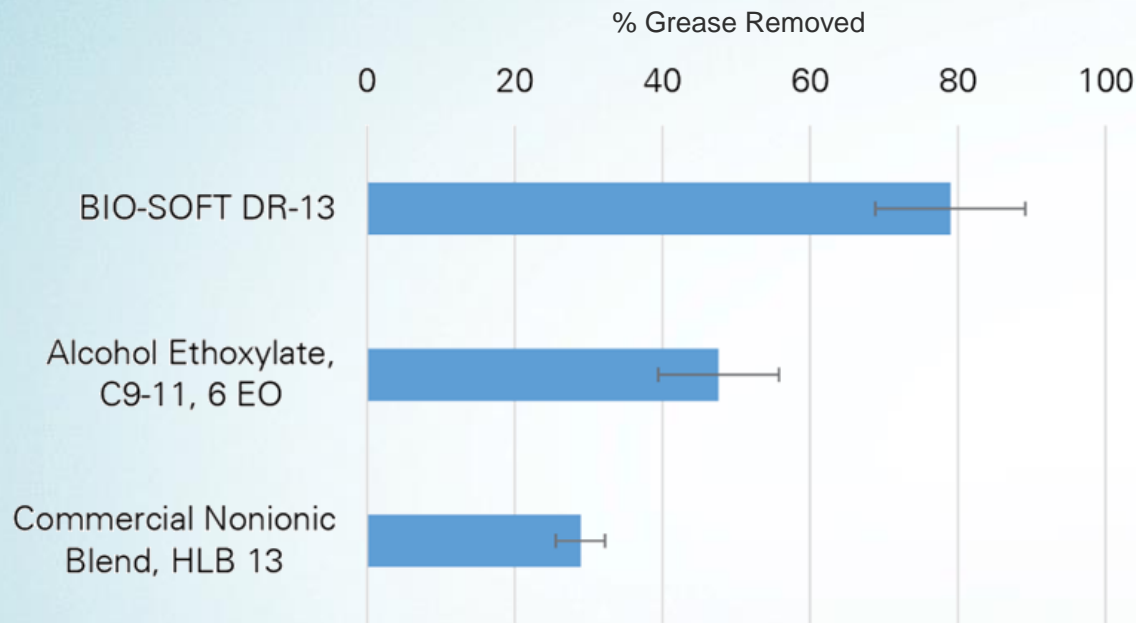
Property	BIO-SOFT DR-13	BIO-SOFT DR-139
Actives, %	100	85
HLB	13	13
Cloud Point (1% in Water), °C, (°F)	56 (132)	56 (132)

Wetting Performance



Method: Draves wetting, ASTM D2188-10, 0.1 wt% in deionized water. Lower numbers indicate faster wetting.

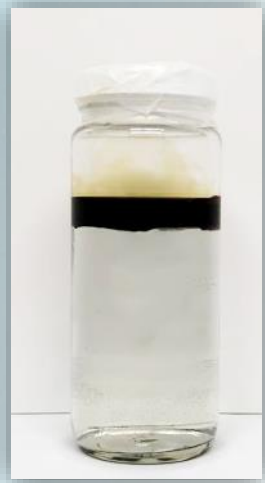
Degreasing Performance



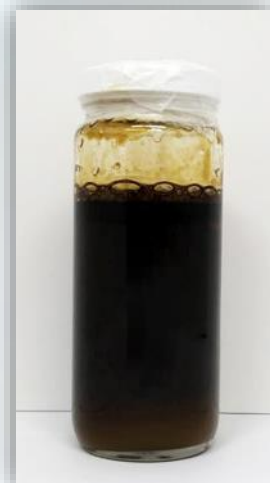
BIO-SOFT DR-13 removed 79% of tough grease.

Method: Immersion degreasing, lithium grease/used motor oil (50/50 by wt%), stainless steel coupon, 22°C, 1,000 RPM, 30 min, gravimetric analysis. Higher numbers indicate more effective degreasing performance.
Formulation: 1 wt% surfactant, 1 wt% potassium hydroxide (45%), 1 wt% sodium metasilicate

Quick Break Performance



Initial



Shaken



1 minute



3 minutes

Method: Modified Australian Motor Trades Association (MTA) "quick break" test method.

Formulation Recommendation

Heavy Duty Degreaser Concentrate

Formulation No. 1323

Dilute this concentrate for general outdoor cleaning applications such as vehicle and patio cleaning. No harsh solvents to affect finishes.

Ingredients	% By Weight	Functionality
Deionized water	82.0	Diluent
BIO-SOFT DR-13	9.0	Cleansing agent
STEPANATE® SXS, 40% solution	4.8	Coupling agent
Trilon® M-95 (MGDA), 95% active (BASF Corporation)	3.5	Chelating agent
Citric acid	q.s. pH 8 - 9	pH Adjuster
Preservatives, dyes, & fragrances	q.s.	Additives

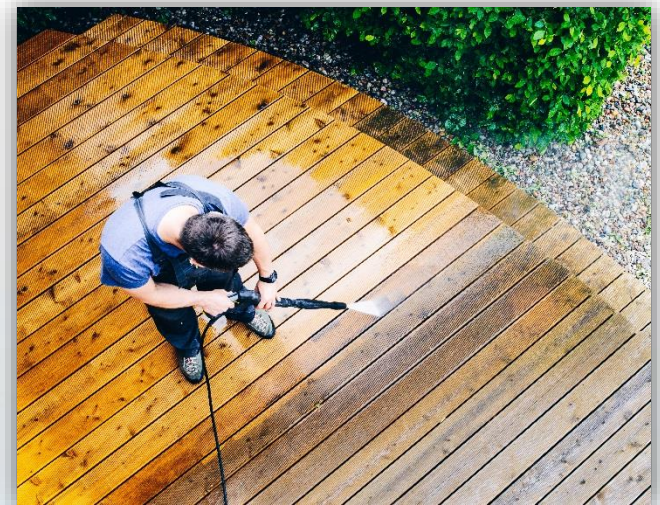
Typical Properties at 25°C

Clear Liquid

pH: 8 – 9

Viscosity: Water thin

Dilution: 1:10 – 1:40



Formulation Recommendation

Spray and Rinse Degreaser (RTU)

Formulation No. 1324

Spray this cleaner directly onto driveways or decks, let sit a few minutes and rinse with hose or powerwasher.

Ingredients	% By Weight	Functionality
Deionized water	92.0	Diluent
BIO-SOFT DR-13	2.0	Cleansing agent
BIO-TERGE® PAS-8S, 38% solution	3.0	Coupling agent
Dissolvine® GL-47-S, 47% solution (Akzo Nobel N.V.)	3.0	Chelating agent
Citric acid	q.s. pH 10 - 11	pH Adjuster
Preservatives, dyes, & fragrances	q.s.	Additives

Typical Properties at 25°C

Clear Liquid	Viscosity: Water thin
pH: 10 – 11	VOC (calculated), as is: 0.15%



Formulation Recommendation

Engine/Truck Degreaser (RTU or Concentrate)

Formulation No. 1326

Use this cleaner as is directly on engines or dilute for more general-purpose cleaning. This combination of BIO-SOFT DR-13, a chelant and solvent helps break through greasy soils.

Ingredients	% By Weight	Functionality
Deionized water	71.0	Diluent
BIO-SOFT DR-13	11.0	Cleansing agent
STEPANATE SXS, 40% solution	7.0	Coupling agent
Diethylene glycol butyl ether	3.8	Solvent
Dissolvine® GL-47-S, 47% solution (Akzo Nobel N.V.)	7.0	Chelating agent
Citric acid	q.s. pH 10 - 11	pH Adjuster
Preservatives, dyes, & fragrances	q.s.	Additives

Typical Properties at 25°C

Clear Liquid	VOC (calculated), as is: 0.38%
pH: 10 – 11	Dilution: 1:10 – 1:20
Viscosity: Water thin	



Formulation Recommendation

Car Wash/Boat Wash

Formulation No. 1328

Dilute this concentrate for light outdoor cleaning, such as boat or car.

Ingredients	% By Weight	Functionality
Deionized water	93.5	Diluent
BIO-SOFT DR-13	3.0	Cleansing agent
Alkyl polyglucoside C9-C11, 50% solution	1.0	Cleansing agent
STEPANATE SXS, 40% solution	1.5	Coupling agent
Trilon® M-95 (MGDA), 95% active (BASF Corporation)	1.0	Chelating agent
Citric acid	q.s. pH 10 - 11	pH Adjuster
Preservatives, dyes, & fragrances	q.s.	Additives

Typical Properties at 25°C

Clear Liquid	Viscosity: Water thin
pH: 10 – 11	Dilution: 1:10 – 1:40



Other Stepan Chemistries for Direct Release

BIO-TERGE PAS-8S

Sodium Capryl Sulfonate
Hydrotrope

STEPANATE SXS

Sodium Xylene Sulfonate
Hydrotrope

STEPAN-MILD[®] GCC

Glyceryl Carylate/Caprates

Stepan References on Direct Release

Stepan Formulation

HEAVY DUTY DEGREASER CONCENTRATE

Name: 1323
 Description: Dilute this concentrate for general outdoor cleaning applications such as vehicle and cleaning. No harsh solvents to affect finishes.

Ingredients	% by Weight	Functions
Deionized Water		82.0 Cleaning
BIO-SOFT® DR-13		9.0 Co-emulsifier
STEPANATE® SX5		4.8 Co-emulsifier
Triton® M-95 (BASF Corporation)		3.5 Chelating
Methylglyoxediacetic Acid		q.s. pH Adjuster
Citric Acid	100.0	

Procedure:

- Mix STEPANATE® SX5 and Deionized Water.
- Add Triton M-95 and mix until thoroughly dissolved.
- Add BIO-SOFT® DR-13.
- Add Citric Acid to adjust the pH to 8 to 9. The typical amount needed is weight.

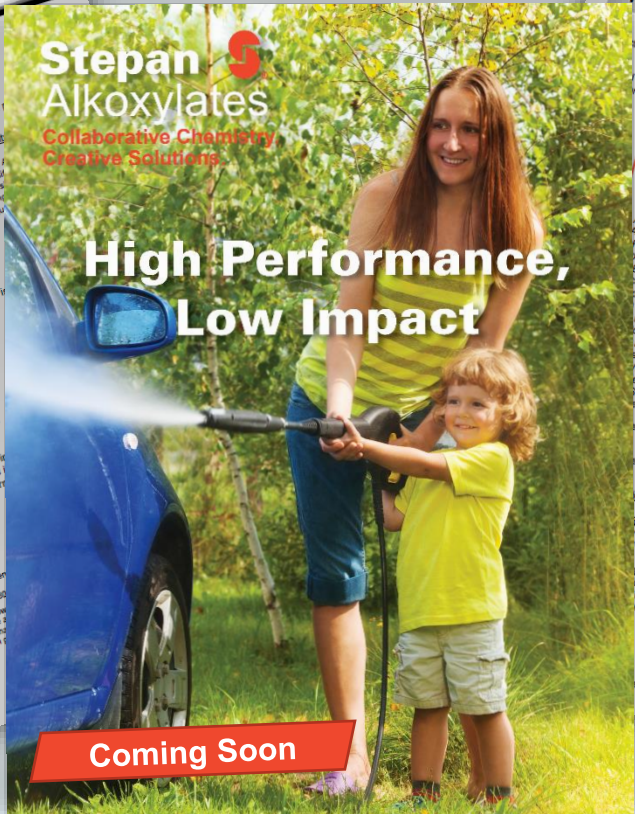
Physical Properties:

- Appearance at 25°C: Clear liquid
- pH, as is: 8 - 9
- Viscosity at 25°C, cps: 6 - 9
- VOC, as is (calculated), %: 0
- Freeze/Thaw, 3 cycles: Pass
- 4 weeks at 50°C: Stable
- 4 weeks at 25°C: Stable
- 4 weeks at 4°C: Stable

External Comment: Marketing Notes: BIO-SOFT® DR-13 is approved for use in Direct Release applications under the surfactant screen of the U.S. EPA Safer Choice Standard and meets the standards to be used in U.S. EPA Safer Choice for cleaning applications. Recommended dilution level is 1:10 to 1:40.

Registered Trademarks of Stepan Company: BIO-SOFT®, STEPANATE®

For Additional Assistance: For applications or product handling assistance, call our Technical Service Department at 1-800-311-3347, 9:00-10:00 (Europe). For ordering assistance, call our Account Service Department at 1-800-311-3347, 9:00-10:00 (Europe). The information contained herein is based on the manufacturer's own data and is not intended to be a substitute for the information contained in the product label. The information is provided for informational purposes only. Stepan Company does not warrant the safety or performance characteristics of the product under conditions of use, handling, storage or disposal or other factors that may affect the safety or performance characteristics. Nothing contained herein shall be construed as a warranty or performance guarantee.



Stepan Product Bulletin

BIO-SOFT® DR-13
 Alcohol Ethoxylate

Experimental

BIO-SOFT DR-13 is approved for use in Direct Release applications under the surfactant screen of the U.S. EPA Safer Choice Standard and is listed on CleanGredients. It meets the standards to be used in U.S. EPA Safer Choice formulations for outdoor use. As an effective degreaser, wetting agent, and solubilizer, BIO-SOFT DR-13 is the nonionic solution you should turn to when formulating an outdoor cleaner. Whether it be a car wash, boat wash, outdoor cleaner, pressure washer, etc., BIO-SOFT DR-13 is the versatile nonionic surfactant that will help meet your formulating needs.

Appearance at 25 °C

Property	Value
Appearance at 25 °C	Slightly hazy to opaque liquid
Viscosity at 25 °C (77 °F), cps	100
Viscosity at 38 °C (100 °F), cps	6.5
Point (PMCC), °C (°F)	50 max.
Point (1% in Water), °C (°F)	13
Point (25 °C), °C (°F)	135
Point (38 °C), °C (°F)	31
Point (50 °C), °C (°F)	13
Point (60 °C), °C (°F)	3
Point (70 °C), °C (°F)	0
Point (80 °C), °C (°F)	0
Point (90 °C), °C (°F)	0
Point (100 °C), °C (°F)	0
Point (110 °C), °C (°F)	0
Point (120 °C), °C (°F)	0
Point (130 °C), °C (°F)	0
Point (140 °C), °C (°F)	0
Point (150 °C), °C (°F)	0
Point (160 °C), °C (°F)	0
Point (170 °C), °C (°F)	0
Point (180 °C), °C (°F)	0
Point (190 °C), °C (°F)	0
Point (200 °C), °C (°F)	0

Expected to be readily biodegradable. Additional information available upon request.

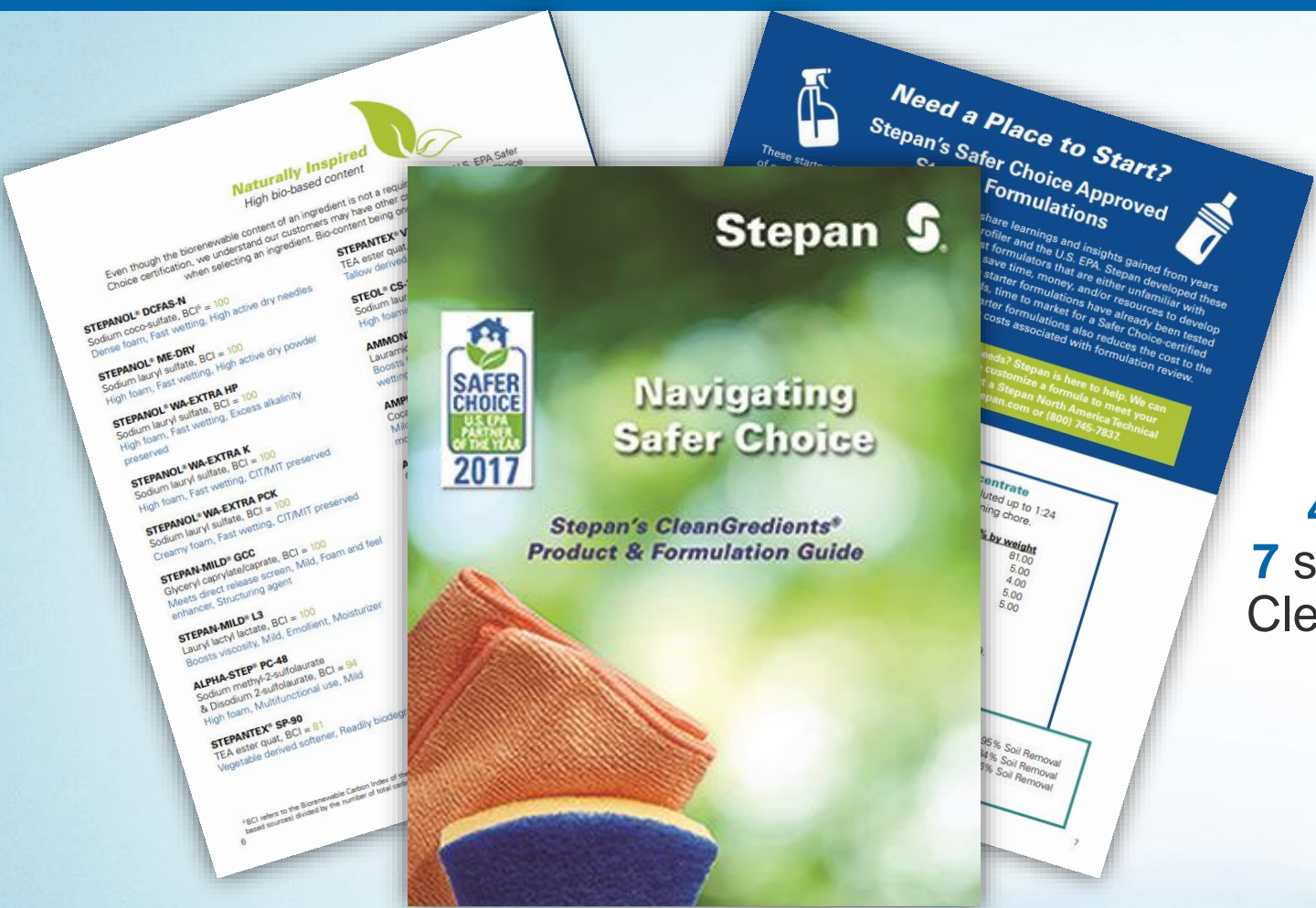
Expected to have an LD50 > 2000 mg/kg (rats). See Safety Data Sheet (SDS) for further information.

Recommendations: BIO-SOFT DR-13 is available in drums, totes, and bulk quantities. If from incompatible materials (see Section 10 of the SDS), if material is frozen, it should be stirred to ensure it is homogeneous before use.

Conditions: BIO-SOFT DR-13 should be stored in closed containers and kept in a cool, dry place. Heating and agitation are recommended for outside storage. Material should be used if heating is required. Pumps, pipes and transfer lines should be 316 stainless steel or 304 stainless steel. An internal haspin coil of 316 stainless steel with low pressure should be used if heating is required. Pumps, pipes and transfer lines should be 316 stainless steel or 304 stainless steel.

© 2011 Stepan Company.

CleanGredients®-Listed Stepan Products



Stepan has **41** products and **7** starter formulations CleanGredients-listed

Questions?

Turn to Stepan as your partner in solving formulation challenges!



www.stepan.com/alkoxylates



+1-800-745-7837 (Technical Service)



techserv@stepan.com
alkoxylates@stepan.com

תודה
Dankie Gracias
Спасибо شكراً
Merci Takk
Köszönjük Terima kasih
Grazie Dziękujemy Děkojame
Ďakujeme Vielen Dank Paldies
Kiitos Täname teid 谢谢
Thank You Tak
感谢您 Obrigado Teşekkür Ederiz
Σας Ευχαριστούμ 감사합니다
ඔබට
Bedankt Děkujeme vám
ありがとうございます
Tack

© Stepan Company 2019

BIO-SOFT®, BIO-TERGE®, STEPAN-MILD® and STEPANATE® are registered trademarks of Stepan Company.

The information contained herein is based on the manufacturer's own study and the works of others and is subject to change without prior notice. The information is not intended to be all-inclusive, including as to the manner and conditions of use, handling, storage or disposal or other factors that may involve additional legal, environmental, safety or performance considerations. Nothing contained herein grants or extends a license, express or implied, in connection with any patents issued or pending of the manufacturer or others, or shall be construed as a recommendation to infringe any patents. STEPAN COMPANY MAKES NO PRODUCT WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR USE, EXPRESS OR IMPLIED, AND NO OTHER WARRANTY OR GUARANTY, EXPRESS OR IMPLIED, IS MADE, INCLUDING AS TO INFORMATION REGARDING PERFORMANCE, SAFETY, SUITABILITY, STABILITY, ACCURACY, COMPLETENESS, OR ADEQUACY. Stepan Company (and its employees, subsidiaries and affiliates) shall not be liable (regardless of fault) to the vendee, its employees, or any other party for any direct, indirect, special or consequential damages arising out of or in connection with the accuracy, completeness, adequacy, furnishing, use, or reliance upon information provided herein. The vendee assumes and releases Stepan Company (and its employees, subsidiaries and affiliates) from all liability, whether in tort, contract or otherwise to the fullest extent possible under the relevant law.