



**TERGITOL™ L Series  
Biodegradable Surfactants**

**TERGITOL™ L-61 E, L-62 E, L-64 E, L-81 E**

**Defoaming Surfactants**

## TERGITOL™ L Series Surfactants

### A Full Line of Nonionic Options

TERGITOL™ L Series surfactants capitalize on Dow's extensive expertise in ethylene oxide (EO) and propylene oxide (PO) chemistry. We have expanded our line of nonionic surfactants with the TERGITOL™ L Series surfactants, which have numerous applications in defoaming, wetting, and emulsifying.

### Compliance with European Detergent Regulation...

TERGITOL™ L surfactants pass OECD 301 ready biodegradability screening tests and comply with the biodegradability criteria as laid down in Regulation (EC) No 648/2004 of the European Parliament and of the Council of 31 March 2004 on detergents. The ultimate biodegradability of these products, coupled with their low acute environmental and mammalian toxicity, means that they carry no European hazard classification. Consequently, they are ideal for replacing non-compliant surfactants in formulations which will be impacted by the European Detergent Regulation.

### Dow Achieves Multi-Property Control

Dow has unlocked the synergy between its global surfactants and polyglycols businesses to further explore EO and PO chemistry. We have incorporated EO and PO into the same molecule to produce TERGITOL™ L Series surfactants. These products take advantage of our ability to adjust the oxide ratio and oxide amount to control the chemical and physical properties of the final product.

This enables us to deliver a range of products providing the right features and benefits for specific applications.

Dow's unique raw materials position (we are a back-integrated global manufacturer of both EO and PO) helps ensure you of consistent product quality and a secure supply of TERGITOL™ L Series products.

### Flexible Properties for Defoaming, Wetting, and Emulsifying

TERGITOL™ L Series surfactants are high performance products that feature excellent solvency, low foam characteristics, and chemical stability. Other valuable performance properties include good thermal stability, broad compatibility with additives, and miscibility in various organic liquids. TERGITOL™ L Series products are liquid at room temperature and have little to no odor.

These surfactants have high flash points, and their low flammability makes them safe to handle and store. TERGITOL™ L Series surfactants are inert and stable. They do not hydrolyze or become rancid in storage and they are pH stable and non-corrosive. Solubilities in common solvents are displayed in the solubility table on page 3.

### The Line of TERGITOL™ L Series Surfactants Includes...

#### **TERGITOL™ L-61 E**

TERGITOL™ L-61 E surfactant is an efficient foam control agent because of its low foam characteristics and inverse water solubility. Low surface tension makes TERGITOL™ L-61 E a particularly efficient rinse aid and low foam wetting agent in autodish detergents, industrial and institutional cleaning, and in clean-in-place (CIP) applications such as food, dairy, and brewery cleaning.

#### **TERGITOL™ L-62 E**

TERGITOL™ L-62 E surfactant provides both foam control and detergency. It is an efficient foam control agent because of its low foam characteristics and inverse water solubility. TERGITOL™ L-62 E is used in rinse aid applications, autodish detergents, industrial and institutional cleaning.



### Typical Properties<sup>1</sup>

Product	Molecular Weight	Pour Point °C	Cloud Point 1% aq (°C)	Surface Tension <sup>2</sup> (dynes/cm)	Ross-Miles Foam Height <sup>3</sup> initial (mm)/final (mm)
TERGITOL™ L-61 E	1900	<-20	23	35	10/0
TERGITOL™ L-62 E	2350	-5	32	34	50/7
TERGITOL™ L-64 E	2700	7	62	39	60/8
TERGITOL™ L-81 E	2700	<-20	20	35	2/0

<sup>1</sup>Typical Properties, not to be construed as specifications.

<sup>2</sup>Surface Tension at 0.1% aqueous, 20°C.

<sup>3</sup>Ross-Miles Foam Height at 0.1% aqueous, 25°C.

### Solubility

	TERGITOL™ L-61 E	TERGITOL™ L-62 E	TERGITOL™ L-64 E	TERGITOL™ L-81 E
Water	Insoluble	>10%	>10%	Insoluble
Ethanol	>10%	>10%	>10%	>10%
Isopropanol	>10%	>10%	>10%	>10%
Ethylene Glycol	Insoluble	Insoluble	Insoluble	Insoluble
Propylene Glycol	<10%	>10%	>10%	Insoluble
Toluene	>10%	>10%	>10%	>10%
Kerosene	<10%	Insoluble	Insoluble	<10%
Mineral Oil	Insoluble	Insoluble	Insoluble	Insoluble



### TERGITOL™ L-64 E

TERGITOL™ L-64 E surfactant has good wetting ability, a high degree of detergency, and low foam characteristics. It is readily miscible in water and can be used in combination with other surfactants in a wide range of aqueous formulations. TERGITOL™ L-64 E is an exceptional high temperature foam control agent due to its inverse water solubility and low foam characteristics. TERGITOL™ L-64 E is used as a rinse aid, and as a component of sanitizing solutions. TERGITOL™ L-64 E is the most hydrophilic of the TERGITOL™ L Series products.

### TERGITOL™ L-81 E

Low foam characteristics and inverse water solubility make TERGITOL™ L-81 E surfactant an excellent foam control agent. TERGITOL™ L-81 E surfactant is used in rinse aid and other industrial and institutional cleaning applications.

# Performance of TERGITOL™ L Series Surfactants

The following data show the performance and properties of TERGITOL™ L Series surfactants.

## Foam Behavior Waring Blender Foam

The charts below compare the foam characteristics of aqueous solutions of TERGITOL™ L Series surfactants at 25°C and 50°C. The data show that TERGITOL™ L-61 E surfactant produces the lowest foam, with no foam at 50°C. TERGITOL™ L-62 E surfactant produces the most unstable foam. TERGITOL™ L-64 E surfactant develops the highest levels of foam, with greater foam instability at the higher temperature. TERGITOL™ L-81 E is water dispersible (not soluble) and no foam measurements were made.

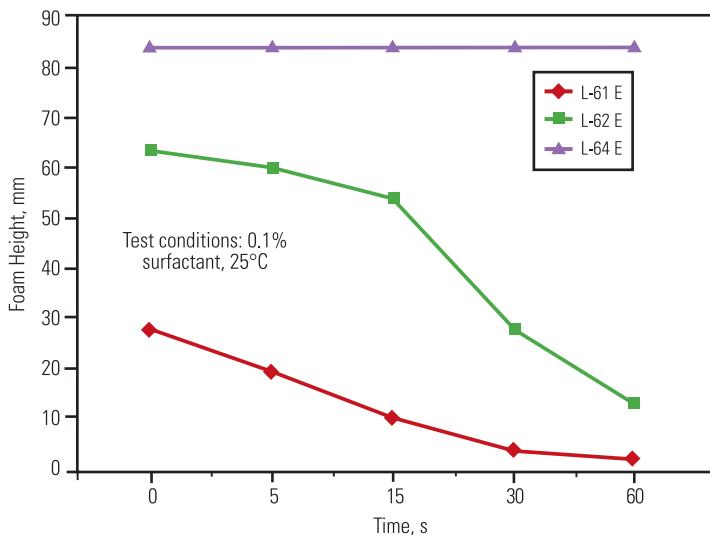
## Defoaming Performance

Defoaming performance provided by TERGITOL™ L Series surfactants is a function of cloud point and end-use temperature. TERGITOL™ L Series surfactants are water-soluble at low temperatures but flocculate upon warming beyond a particular “cloud” point. Each surfactant has its own characteristic cloud point. TERGITOL™ L-81 E surfactant has the lowest cloud point among L Series products while TERGITOL™ L-64 E has the highest cloud point. The chart at the top right (facing page) shows the operating ranges for aqueous defoaming of TERGITOL™ L Series surfactants. TERGITOL™ L-61 E and L-81 E are the best defoamers in the L Series product line.

The charts at the bottom of page five provide examples of defoaming performance of TERGITOL™ L-61 E and L-81 E surfactants. TERGITOL™ L-61 E and L-81 E effectively control the foam produced by milk solids in built formulations. Milk soil defoaming is often necessary for food and dairy process cleaners, as well as machine dishwash and rinse aid applications.

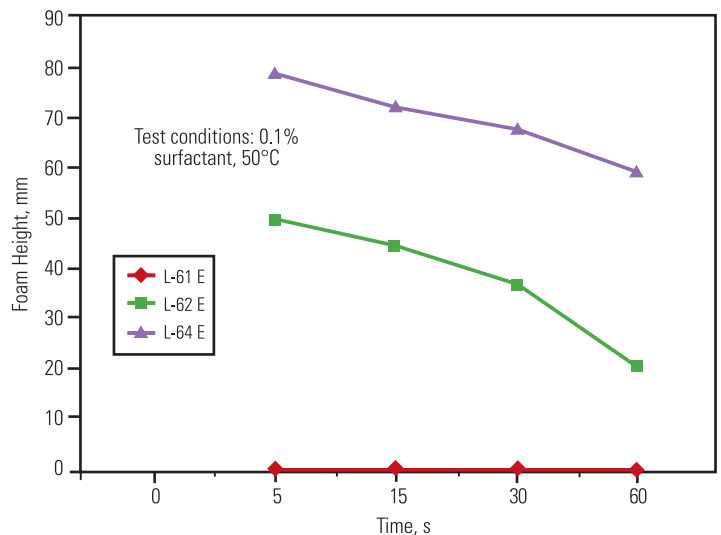


Waring Blender Foam Height at 25°C



Note: TERGITOL™ L-81 E is insoluble.

Waring Blender Foam Height at 50°C

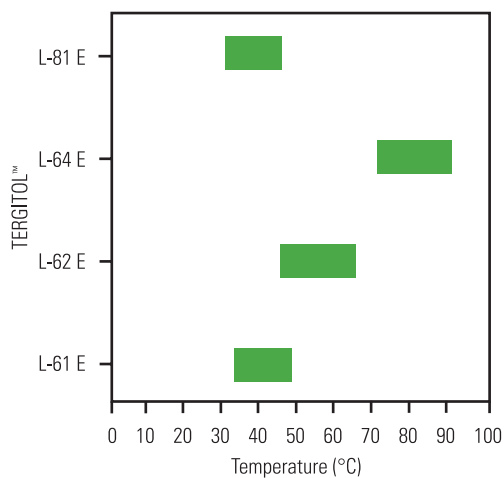


Note: TERGITOL™ L-81 E is insoluble.

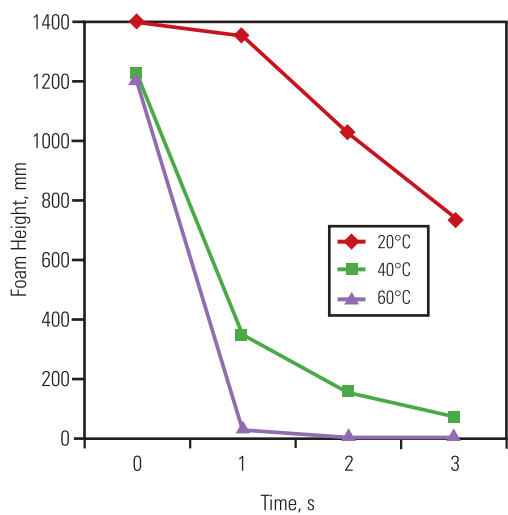




**Operating Ranges for Defoaming Aqueous Solutions**

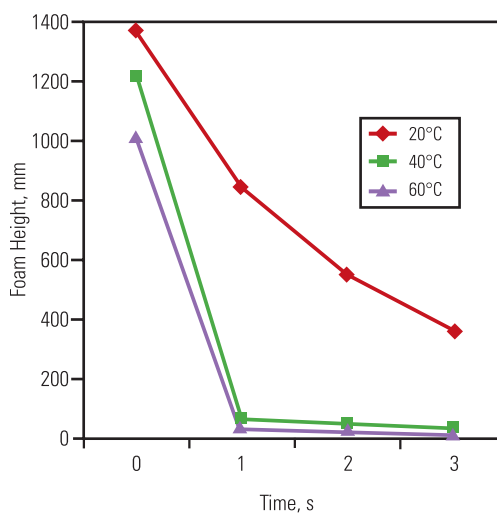


**Milk Soil Defoaming: TERGITOL™ L-61 E†**



†Test conditions: 2.0g NaOH 50%, 0.12g TERGITOL™ L, 1.8g milkpowder, 1796g deionized water.

**Milk Soil Defoaming: TERGITOL™ L-81 E†**



†Test conditions: 2.0g NaOH 50%, 0.12g TERGITOL™ L, 1.8g milkpowder, 1796g deionized water.

## Wetting

Wetting is a useful measure for choosing surfactants in cleaning applications. Wetting increases sheeting action to help reduce spotting or filming on dishware and other hard surfaces.

### Spread Index Wetting

The chart at right compares the wetting performance of TERGITOL™ L Series surfactants on glass and stainless steel using the spread index method. The data show that TERGITOL™ L-61 E and L-64 E are the best wetting products on hard surfaces such as stainless steel.

### Draves Wetting

The next chart compares the Draves wetting performance of TERGITOL™ L Series surfactants. The data show that TERGITOL™ L-61 E and TERGITOL™ L-62 E are the best wetting products on soft (or cloth) surfaces.



## Applications

TERGITOL™ L Series surfactants are used in a wide variety of cleaning applications. The defoaming performance of these products, coupled with their inverse water solubility, wetting, and emulsifying behaviors, provides the key to their broad utility.

Following are example applications for TERGITOL™ L Series surfactants by key performance property. The Selection Guide on page 7 identifies applications for individual products.

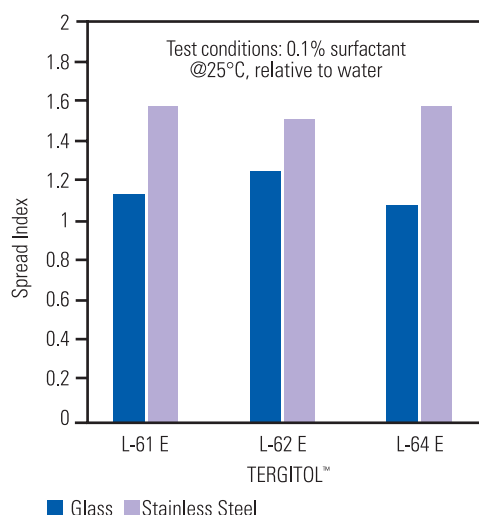
### Foam Control and Defoaming

- Machine Dishwash and Rinse Aids
- Metal Cleaning

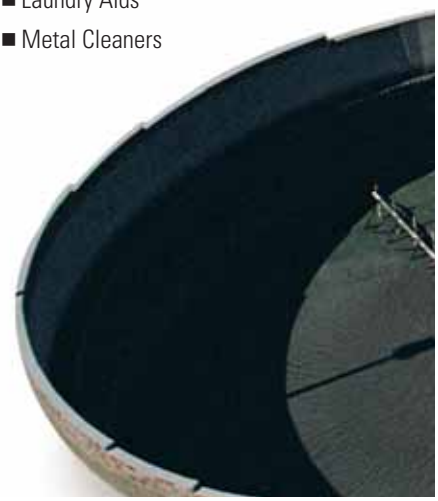
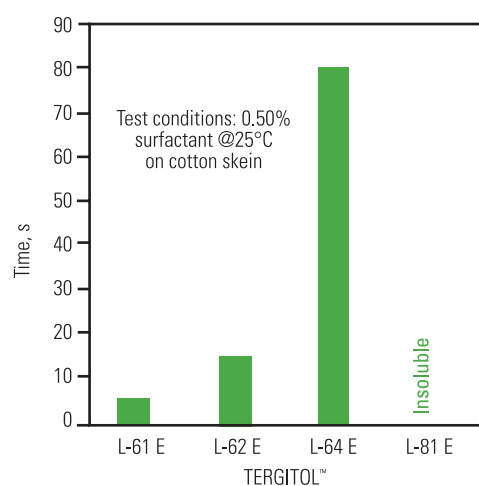
### Wetting

- Dishwash Detergents and Rinse Aids
- Hard Surface Cleaners
- Laundry Aids
- Metal Cleaners

Spread Index Wetting



Draves Wetting





### TERGITOL™ L Series Selection Guide

	TERGITOL™ L-61 E	TERGITOL™ L-62 E	TERGITOL™ L-64 E	TERGITOL™ L-81 E
Bottle Washing	■	■		
Dishwash Detergent Tablets	■	■		
Rinse Aids	■	■	■	■
Hard Surface Cleaning	■	■	■	
Metal Cleaning	■	■	■	
Laundry Aids	■	■		

### TERGITOL™ L Series Surfactants FDA Clearances

TERGITOL™	L-61 E	L-62 E	L-64 E	L-81 E
21 CFR 172.808	■	■	■	■
21 CFR 173.340	■	■	■	■
21 CFR 176.180	■	■	■	■
21 CFR 176.200	■	■	■	■
21 CFR 176.210(d)(3):	■	■	■	■

21 CFR 172.808: Food contact  
 21 CFR 173.340: Defoaming agent for use in food processing  
 21 CFR 176.180: Paper and paperboard in contact with dry food  
 21 CFR 176.200: Defoaming agent for use in paper coatings  
 21 CFR 176.210(d)(3): Defoaming agent for use in the manufacture of paper and paperboard

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# TERGITOL™ L Series



## To Learn More...

To learn more about TERGITOL™ L Series surfactants and the full line of Dow nonionic and anionic surfactants – or to receive product samples – contact the Dow location for your region, listed below.

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