

DOW SUSTAINABLE LOW FOAM SURFACTANTS FOR AUTOMATIC DISHWASHING

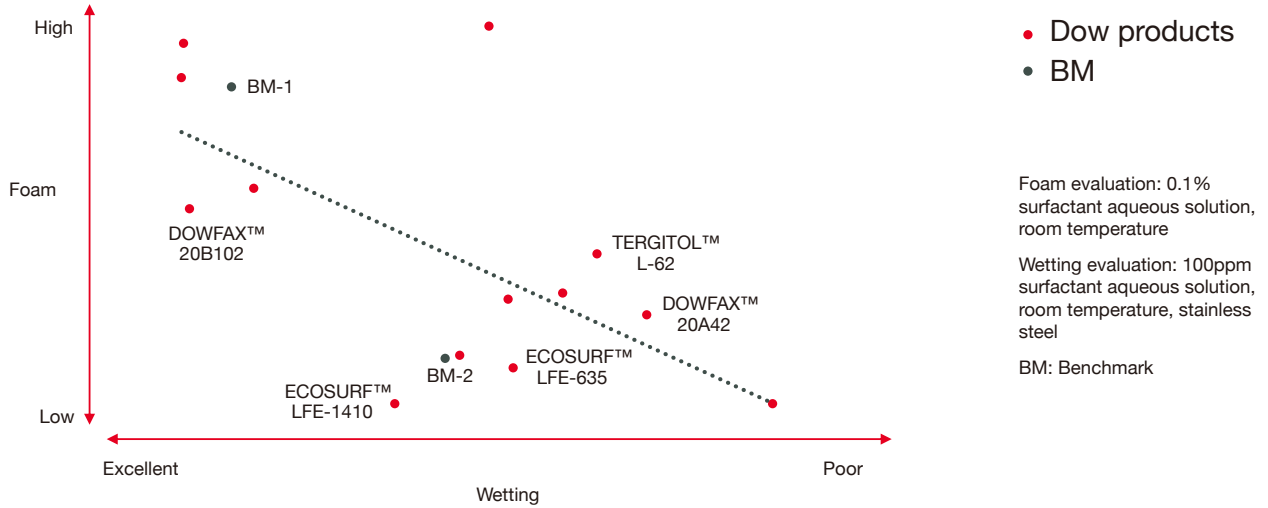
In commercial automatic dishwashing, low foaming and excellent wetting are two critical requirements. A dishwasher detergent should make water easier to penetrate and loosen soil, and suppress foam caused by protein soils such as egg and milk. While rinsing aid allows water to sheet off dishes instead of drying in droplets, thus helping to prevent spotting.

DOWFAX™ 20B102 / ECOSURF™ LFE Surfactant Series – Blends to achieve optimized performance of sheeting and foam control.

Low-foam nonionic surfactants from Dow, including ECOSURF™, DOWFAX™, TERGITOL™ and TRITON™ series, provide a variety of choices in developing high performance automatic dishwashing formulations

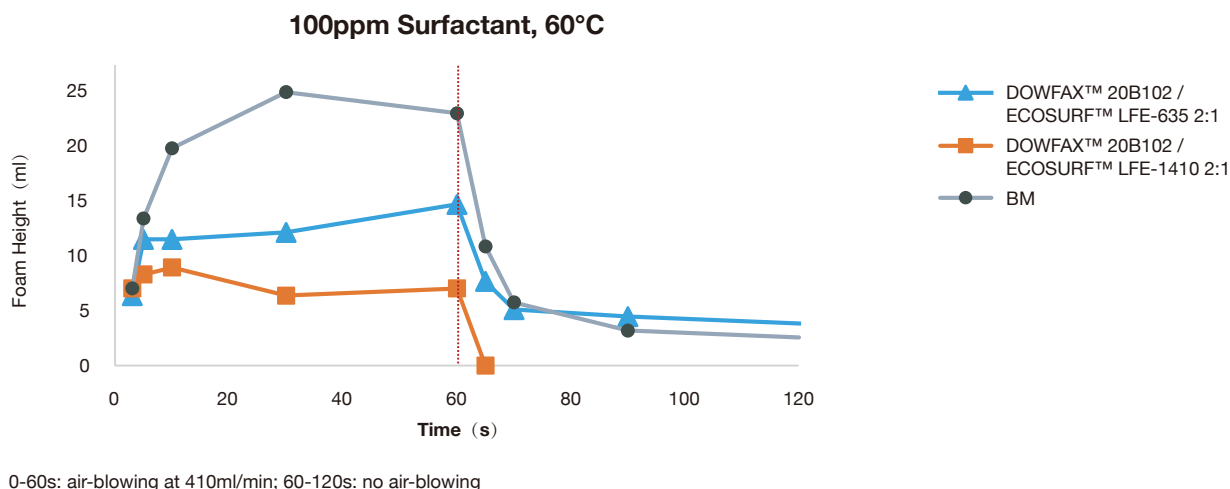
ECOSURF™ LFE series have outstanding low foam properties, while DOWFAX™ 20B102 exhibits excellent wetting performance. The blends deliver an optimized performance in your automatic dishwashing formulations.

Foam / Wetting Properties of Individual Surfactants

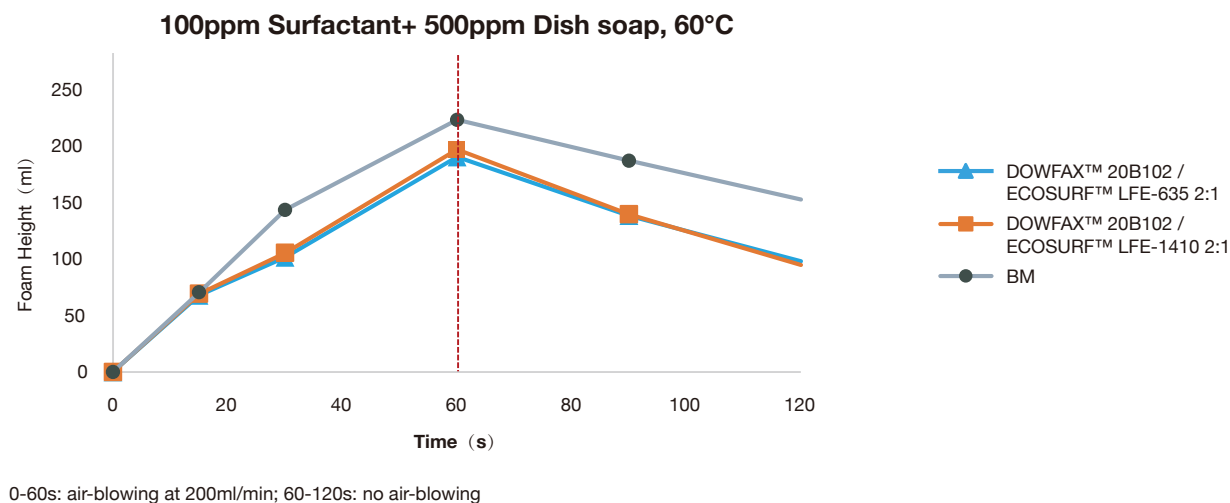
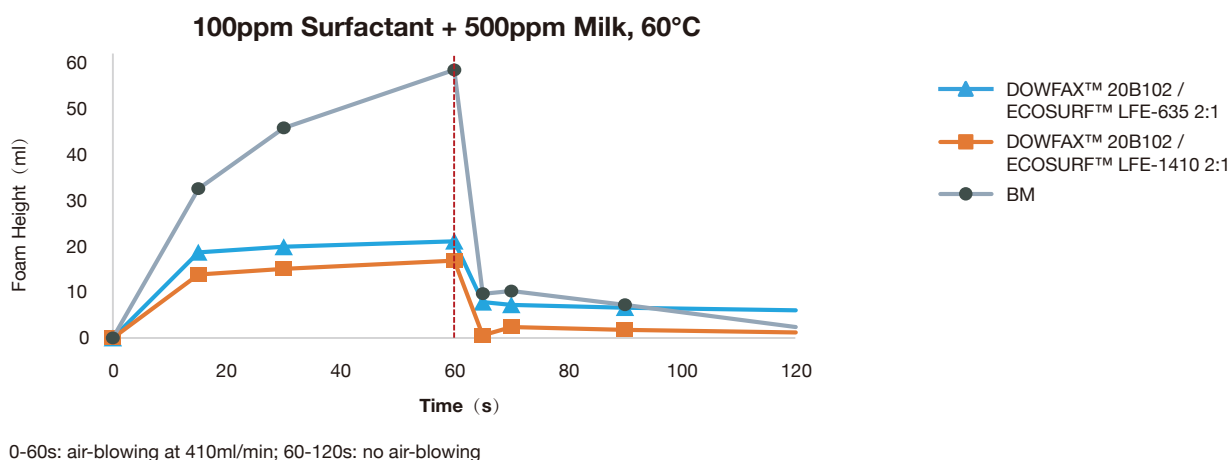


Excellent Low Foaming Properties

DOWFAX™ 20B102 / ECOSURF™ LFE-635 (2:1 wt.) and DOWFAX™ 20B102 / ECOSURF™ LFE-1410 (2:1 wt.) Surfactants are low foam blends under bubbling test condition at 60°C. This makes them ideal to be incorporated into commercial automatic dishwashing formulations. Low foam blends enable you to control foam level during washing and to minimize defoamer usage.

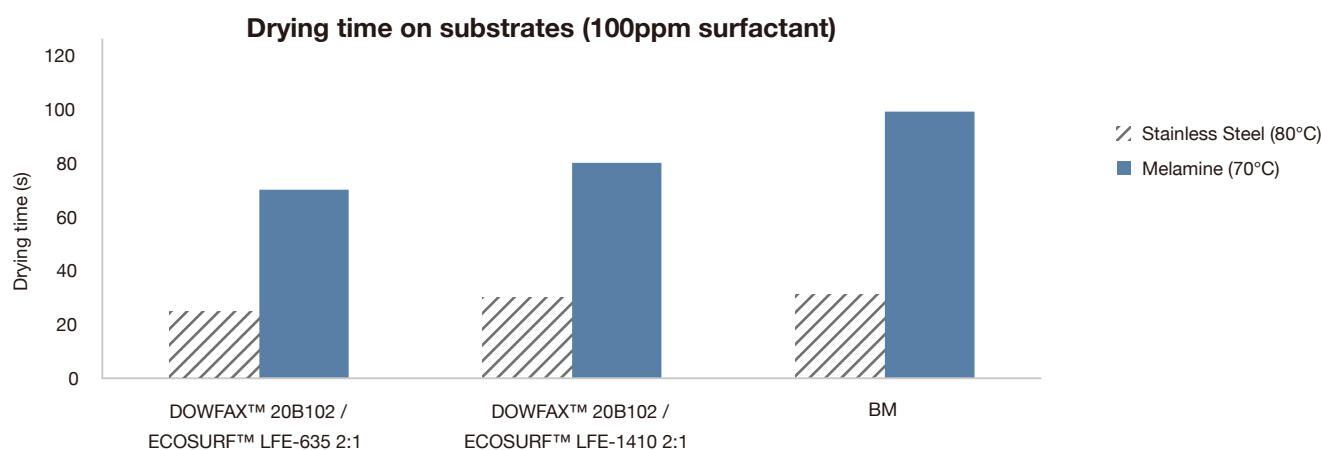


DOWFAX™ 20B102 / ECOSURF™ LFE-635 (2:1) and DOWFAX™ 20B102 / ECOSURF™ LFE-1410 (2:1) surfactant blends effectively control foam generated by milk soil. Even in challenging condition with existence of manual dish soap, they generate less foam than the commercial benchmark.



Reduce Drying Time

DOWFAX™ 20B102 / ECOSURF™ LFE-635 (2:1) and DOWFAX™ 20B102 / ECOSURF™ LFE-1410 (2:1) surfactant blends have excellent wetting attributes on different dishware substrates (melamine, stainless steel, etc). It helps water sheet off dishes faster and reduce drying time or heat consumption to achieve comparable rinsing result.



Physical Properties

	ECOSURF™ LFE-635	ECOSURF™ LFE-1410	DOWFAX™ 20B102	TERGITOL™ L-61	TERGITOL™ L-62
Actives (%)	100	100	100	100	100
Cloud Point, 1% (°C)	35	10	32	24	32
Pour Point (°C)	-42	5	-8	-32	-2
Surface Tension, 1% (mN/m)	32	35	31	40	41
Foam Height, 0.1% (mm, Ross-Miles, Initial/5min)	0/0	0/0	50/5	0/0	45/30

Environmental Profile

ECOSURF™ LFE series, DOWFAX™ 20B102, and TERGITOL™ L series of surfactants help you upgrade the environmental profile of your commercial automatic dishwashing formulations.

Surfactants	Environmental Profile
ECOSURF™ LFE series	<ul style="list-style-type: none"> Readily biodegradable (OECD 301) Good aquatic toxicological profile (LC50/EC50 10-100mg/L) Qualified for US EPA Safer Choice Formulations WGK 1 (German Water Hazard Classification)
DOWFAX™ 20B102	<ul style="list-style-type: none"> Readily biodegradable (OECD 301) Aquatic toxicity range of >1 mg/L in the most sensitive species tested
TERGITOL™ L series	<ul style="list-style-type: none"> Readily biodegradable (OECD 301) Excellent aquatic toxicological profile (LC50/EC50 >100mg/L)

Starting Formulations

Rinsing aid #1 (excellent wetting)	
Citric acid/Phosphoric acid	1-2%
Sodium cumene sulfonate	1%
DOWFAX™ 20B102	6%
ECOSURF™ LFE-635	3%
Water	to 100%

Rinsing aid #2 (extreme low foam)	
Citric acid/Phosphoric acid	1-2%
Sodium cumene sulfonate	2%
DOWFAX™ 20B102	6%
ECOSURF™ LFE-1410	3%
Water	to 100%

Rinsing aid #3 (cost effective)	
Citric acid/Phosphoric acid	1-2%
Sodium cumene sulfonate	2%
ECOSURF™ LFE-635	6%
ECOSURF™ LFE-1410	3%
Water	to 100%

Note: other ingredients (ex. dye) may be incorporated per formulation needs

Contact Us:

North America: (800) 447-4369 Pacific (ex. China): +8 (007) 776-7776
 Latin America: +55 (115) 184-8722 China: (400) 889 -0789
 EMEA: +31 (11) 567-2626 (ToI) <https://www.dow.com>

Product Stewardship

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with Dow products - from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support. Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow.

NOTE: Any photographs of end-use applications in this document represent potential end-use applications but do not necessarily represent current commercial applications, nor do they represent an endorsement by Dow of the actual products. Further, these photographs are for illustration purposes only and do not reflect either an endorsement or sponsorship of any other manufacturer for a specific potential end-use product or application, or for Dow, or specific products manufactured by Dow.

NOTICE: No freedom from infringement of any patent owned by Dow or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, Customer is responsible for determining whether products and the information in this document are appropriate for Customer' s use and for ensuring that Customer' s workplace and disposal practices are in compliance with applicable laws and other government enactments. The product shown in this literature may not be available for sale and/or available in all geographies where Dow is represented. The claims made may not have been approved for use in all countries. Dow assumes no obligation or liability for the information in this document. References to "Dow" or the "Company" mean the Dow legal entity selling the products to Customer unless otherwise expressly noted. NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.

®™ Trademark of The Dow Chemical Company ("Dow") or an affiliated company of Dow.

© 2019 The Dow Chemical Company. All rights reserved.

form number: 119-02589