

CHEMICAL AND INDUSTRIAL MANUFACTURING

# Silicone surfactants that enable improved foam properties

**VORASURF™ Polyurethane additives selection guide**





# The solutions you seek. The quality you deserve.

We get it. Your requirements are specific, and for good reason. You need reliability. Quality. Dependability. On-time, in-spec delivery. Technical expertise.

This checklist isn't demanding. It's a necessity, which is why we make it our priority to not only check all of your boxes, but to serve as your dedicated supplier of high-quality silicone surfactants. We offer a broad range of options for ideal performance and adaptability.

With our team comes a robust resume centered on global experience and trust. We deliver:

- Experience in the development, production and customization of silicone surfactants for polyurethane foam applications
- An extensive toolbox of proven Dow silicone surfactants for flexible, rigid and microcellular polyurethane foam
- An array of global resources, game-changing science and technical know-how
- An exceptional range of value-added polyurethane systems, components and additives

## Our tools, your answers

Achieve multiple goals with silicone surfactants from Dow. With innovation on your side, you can increase the compatibility of your raw materials. You can decrease the surface tension of your polyurethane foam system. Our silicone surfactants can improve emulsification and nucleation, prevent coalescence and stabilize cell membranes.

## Let's bridge the gap with understanding

Success and solution begin and end with understanding. We aren't in the business of keeping secrets. Our team wants to open a dialogue with you in order to bridge the gap and share our deep understanding of silicone surfactant technology.

We want to equip and empower you with knowledge. Together, we can start a discussion so your questions are answered. You will not only understand how the surfactant affects polyurethane foam formulation, but how you can maximize its ability to achieve desired foam characteristics.

To us, collaboration across the polyurethane foam industry isn't just an idea. It's a reality.

# VORASURF™

silicone polyurethane additives by



## Continuous conventional and viscoelastic foam

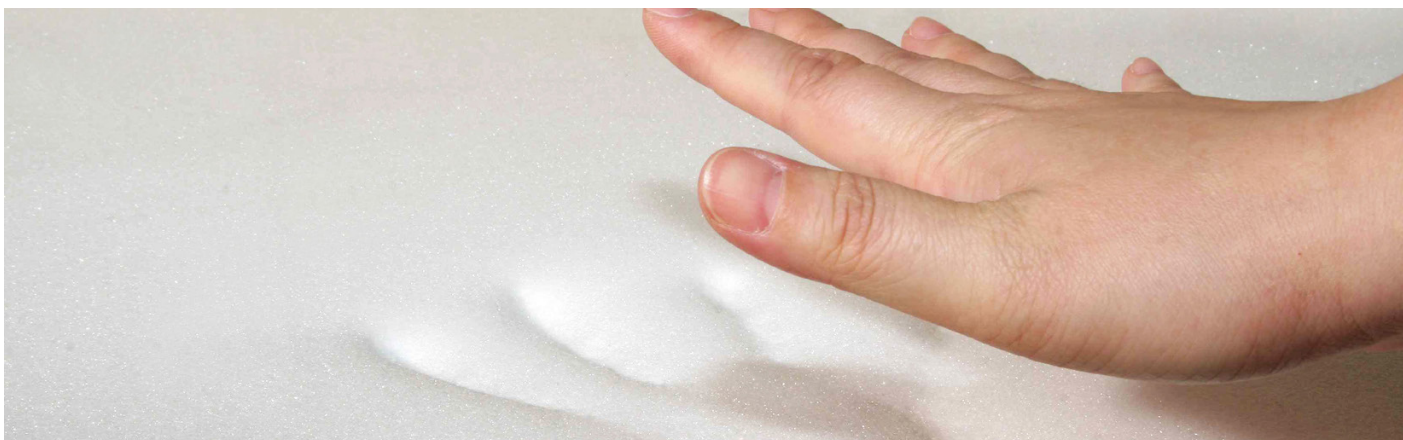
Product	Processing window	Effective bulk stabilizer	Good mixing of components	Fine cell structure	High cell opening	FR Compatible surfactants	Viscoelastic foams	Alternate blowing agents	Reduced VOC	Features and benefits
VORASURF™ DC 5125 Additive	***	***	*	*	*	**				High bulk stabilizing surfactant used for soft, low-medium density foams
VORASURF™ DC 198 Additive	**	**	**	**	**	*	X	X		High-efficiency silicone surfactant used for a wide variety of formulations
VORASURF™ DC 5188 Additive	*	*	***	***	***	*				Excellent emulsifying surfactants for incompatible components in formulations and discontinuous applications
VORASURF™ DC 5950 Additive	***	***	**	**	***	***	X			Medium-efficiency surfactant for a wide variety of formulations • Provides exceptional performance for FR foams and high-density foams
VORASURF™ FF 5950LV Additive	***	***	**	**	***	***	X		X	Medium-efficiency surfactant for a wide variety of formulations • Provides exceptional performance for FR foams and high-density foams.
VORASURF™ DC 5943 Additive	***	**	***	**	**	**			X	Medium-efficiency surfactant for a wide variety of formulations, from low to high densities
VORASURF™ DC 5160 Additive	***	***	*	*	*	**				High bulk-stabilizing surfactant used for soft, low-medium-density foams
VORASURF™ DC 5417 Additive	***	***	*	*	*	**			X	High bulk-stabilization surfactant used for soft, low-medium density foams
VORASURF™ DC 5951 Additive	***	**	***	*	**	*		X		New surfactant for high ethylene oxide rich polyol (cell opener) systems and for alternate blowing agent foams • Well suited for low- medium-density foams
VORASURF™ DC 5810 Additive	**	**	***	**	***	**			X	Improved mixing of incompatible components in different formulations • High-efficiency surfactant • Compatible with high filler content
VORASURF™ DC 5900 Additive	***	***	*	**	**	**	X			Excellent bulk stabilization and cell opening characteristics
VORASURF™ DC 5906 Additive	**	***	**	***	***	**	X	X	X	Excellent bulk stabilization and compatibility with different blowing agents • Surfactant applicable to a wide range of formulations • Compatible with high filler content
VORASURF™ DC 5933 Additive	***	**	***	**	***	*			X	High-emulsification surfactant compatible with high PO containing polyols
VORASURF™ DC 5982 Additive <sup>1</sup>	***	***	*	**	**	**	X	X		Medium-efficiency surfactant, compatible with a wide range of formulations and CO2 blown foams
VORASURF™ DC 5986 Additive	**	**	**	**	***	**	X	X		Medium-efficiency surfactant compatible with a wide range of formulations
VORASURF™ DC 5987 Additive	**	***	***	**	***	**	X	X		Surfactant compatible with a wide formulation range
VORASURF™ DC 5990 Additive	**	**	*	*	**	***				Excellent FR surfactant • Used in conjunction with flame retardants
VORASURF™ DC 5901 Additive <sup>2</sup>	***	***	*	**	**	**	X	X		Medium-efficiency surfactant, compatible with a wide range of formulations and CO2 blown foams

\*Low performance \*\*Moderate performance \*\*\*High performance X = Attribute present in product

<sup>1</sup>Product unavailable in the E.U.

<sup>2</sup>Product only available in the E.U.

Relative product performance listed in these tables is indicative of typical properties of these surfactants. However, the final performance of these surfactants is dependent on specific application formulations and application techniques. These are typical properties not to be construed as specifications.



## Conventional box foams

Product	Rectangular block	Cylindrical block	Good mixing of components	High filler content	High cell opening	FRCompatible Surfactants	Features and benefits
VORASURF™ DC 5933 Additive	***	**	***	*	**	*	High-emulsification surfactant compatible with high PO containing polyols • Wide processing window for discontinuous process
VORASURF™ DC 5417 Additive	***	***	**	*	**	*	Medium-efficiency surfactant for a wide range of formulations in discontinuous process, both rectangular and cylindrical blocks
VORASURF™ DC 5906 Additive	**	***	***	***	***	**	Good cell opening, provides excellent stabilization to cylindrical blocks • Compatible with high-filler content
VORASURF™ DC 5810 Additive	***	***	**	***	**	***	Improved mixing of incompatible components in different formulations • High-efficiency surfactant forming finer and homogeneous cells • Compatible with high-filler content
VORASURF™ DC 5986 Additive	***	***	***	**	*	***	Medium-efficiency surfactant compatible with a wide range of formulations in continuous and discontinuous • Improves utilization of FR additives
VORASURF™ DC 5950 Additive	***	***	*	**	***	***	Medium-low efficiency surfactant for densities from 45 to 100 kg/m3 • Excellent mixing of components and FR additives

## TDI Viscoelastic foams

Product	Processing window (usage range)	Fine cell Structure	High cell opening	Low VOC	Type of foam
VORASURF™ SZ 1959 Additive	*	***	**		TDI Viscoelastic foam, mechanical froth
VORASURF™ SZ 1979 Additive	*	***	**	X	TDI Viscoelastic foam, mechanical froth
VORASURF™ SZ 1952 Additive	*	**	***	X	TDI Viscoelastic foam, mechanical froth

\*Low performance \*\*Moderate performance \*\*\*High performance X = Attribute present in product

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HR Slab foams

Product	Processing window	Fine cell Structure	High cell opening	Bulk stabilization	Type of foam
VORASURF™ DC 5043 Additive	***	***	***	**	Wide latitude HR slab surfactant with balanced nucleation and cell stabilization properties
VORASURF™ DC 6070 Additive	***	***	**	***	High stabilization and high cell regulation HR slab surfactant • Well suited for low-density foams or foams with high co-polymer polyol content

\*Low performance \*\*Moderate performance \*\*\*High performance

Relative product performance listed in these tables is indicative of typical properties of these surfactants. However, the final performance of these surfactants is dependent on specific application formulations and application techniques. These are typical properties not to be construed as specifications.



## Silicone surfactants for HR molded foam

Product	Foam system stability	MDI	TDI/MDI	TDI	Low emission	Co-surfactant recommended	Potency	Recommended use (pph)	Features and benefits
VORASURF™ DC 3042 Additive	Direction of decreasing foam system stability	-	-	XXX	+++	✓	Extremely high	0.2-0.6	High potency, low emission, bulk-stabilizing surfactant • Best suited for TDI systems and should be used in combination with low emission cell regulating surfactant such as VORASURF™ DC 2584 or VORASURF™ DC 2525 Additives
VORASURF™ HR 7164 Additive		-	X	XXX	+++	✓	Very high	0.2-0.6	Low emission, bulk-stabilizing surfactant • Best suited for T/M and TDI systems • Can be a 1:1 replacement for VORASURF™ DC 5164 Additive • Recommended to be combined with cell-regulating surfactant such as VORASURF™ DC 2584 or VORASURF™ DC 2525 Additives
VORASURF™ DC 5164 Additive		-	-	XXX	-	✓	Very high	0.2-1.0	Traditional, strong bulk stabilizing surfactant • Best when used in combination with cell-regulating surfactant such as VORASURF™ DC 3043 Additive
VORASURF™ DC 6070 Additive		-	XXX	XXX	-	-	Medium-high	0.5-0.8	Particularly recommended for low-density foams and foams with high amounts of copolymer polyol
VORASURF™ HR 7053 Additive		-	XXX	XXX	+++	-	Medium-high	0.2-0.8	Low emission • Used for TDI and TDI/MDI cold cure formulations • Can be used alone as sole stabilizer or can be combined with low-emission cell regulating surfactant to boost foam surface aesthetics
VORASURF™ TF 1348 Additive		-	XXX	XXX	+++	-	Medium-high	0.2-0.8	Low emission and low odor balanced • Used for TDI and TDI/MDI cold cure formulations • Can be combined with low-emission cell-regulating surfactant to boost foam surface aesthetics
VORASURF™ DC 5043 Additive		-	XXX	XX	-	-	Medium	0.5-1.0	Broad processing latitude • Used for TDI and TDI/MDI based HR molded foam • Provides fairly balanced cell-regulation and bulk-stabilizing performance
VORASURF™ DC 3043 Additive		-	XX	•••	-	-	High	0.5-1.0	Strongest cell regulating surfactant • Modest stabilizing effect • Low fogging alternative to VORASURF™ DC 5179 Additive • Can be used alone, generally recommended to be used in combination with a bulk stabilizer like VORASURF™ DC 5164 or VORASURF™ DC 3042 Additives
VORASURF™ DC 2584 Additive		XX	XX	••	+	-	Medium-high	0.5-1.0	Low VOC • Medium-to-high potency • Cell regulating • Suitable for standalone use in less stable MDI and MDI/TDI HR molded systems
VORASURF™ DC 2585 Additive		XXX	-	-	++	-	Medium	0.5-1.0	Low VOC • Designed to perform in a variety of MDI HR molded systems - particularly NVH applications • Capable of producing courser, more open foam
VORASURF™ DC 2550 Additive		XXX	-	-	++	-	Medium	0.5-1.0	Low VOC • Medium potency • Used for MDI based HR systems
VORASURF™ HR 8835 Additive		XXX	-	-	+++	-	Low-medium	0.5-1.0	Low VOC and low odor • Used for MDI based cold-cure foam
VORASURF™ DC 2525 Additive		XXX	-	-	+++	-	Low-medium	0.5-1.0	Very low VOC • Low-medium potency • Used for MDI based HR systems
VORASURF™ DC 5258 Additive		XXX	-	•	-	✓	Low-medium	0.5-1.0	Low potency, high cell opening • Suitable for stand alone use in MDI HR molded foams • Best suited as a cell opening co-surfactant used in conjunction with higher potency surfactants such as VORASURF™ DC 2584 Additive

••• Strongly Recommended as co-surfactant, •• Recommended as co-surfactant, • Can be used as co-surfactant

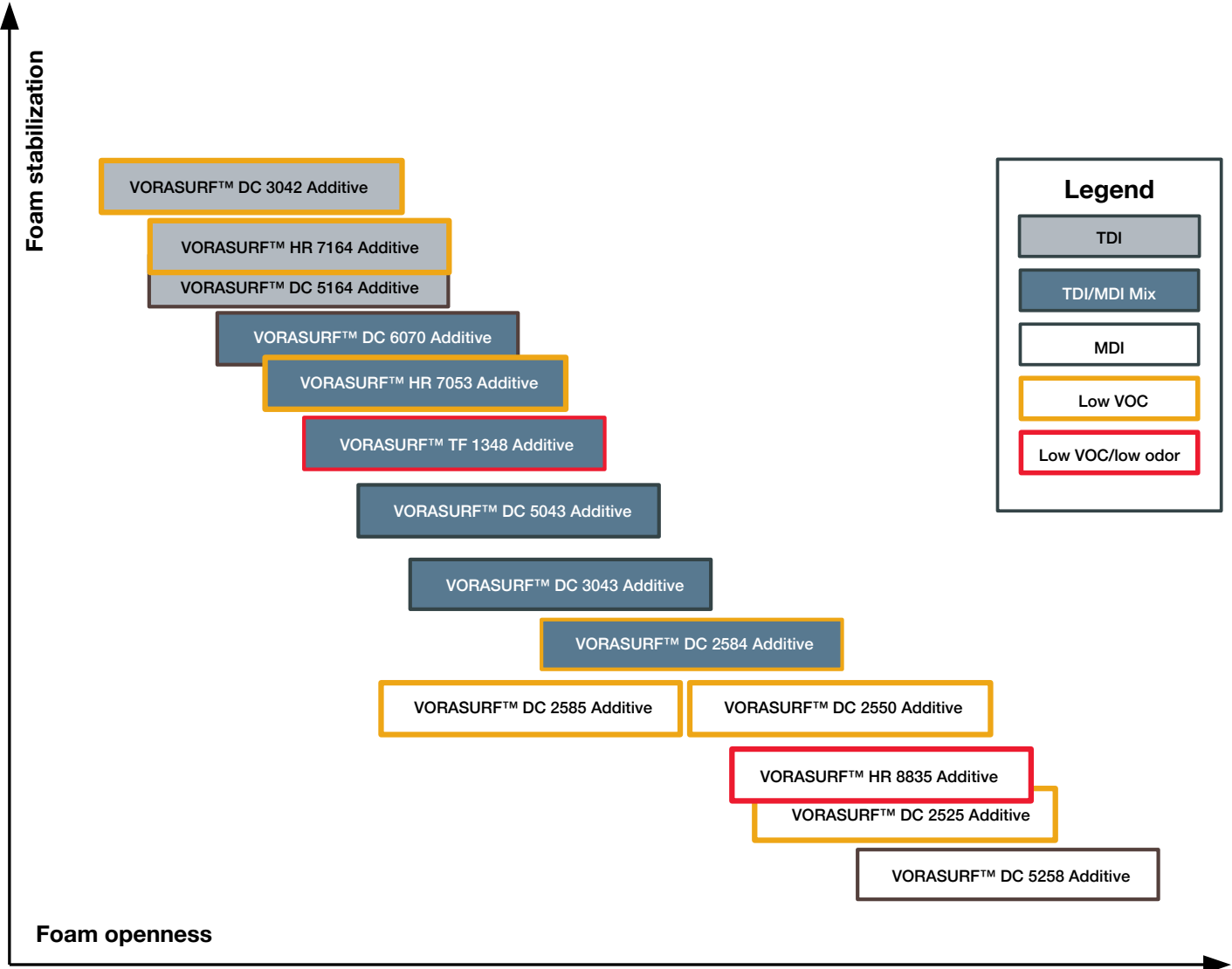
XXX Strongly recommended for application, XX Recommended for application, X Can use for application

+++ Very low VOC, ++ Low VOC, + Low VOC at use levels, - Not applicable

These are typical properties not to be construed as specifications.



Silicone surfactants for HR molded foam





Polyester foam

Product	Features and benefits
VORASURF™ DC 1990 Additive	Surfactant for polyester flexible slabstock foam applications with low emission requirements • Can be used in flexible molded foam for cell opening, and for rigid foam applications
VORASURF™ TF 3607 Additive	Surfactant for ester slabstock foam and TDI/MDI HR molded foam systems • Surfactant for urethane elastomer foam and footwear (shoe sole) applications
VORASURF™ FF 5526 Additive	Surfactant for polyester slabstock foam

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## Rigid foam

Product	Bunstock	High-density molded	Pour-in-place	Appliance	Lamination board	Spray foam	PIR Boardstock	Features and benefits
VORASURF™ DC 193 Additive	X	X	X	X	X	X	X	General-purpose surfactant for rigid foam applications • Surfactant for footwear (shoe sole) and integral skin applications
VORASURF™ DC 197 Additive		X				X		Silicone surfactant for use in high-density rigid, molded, and spray foam
VORASURF™ SZ 1605 Additive		X	X			X		Surfactant for insulation panels and spray foam • Surfactant for footwear (shoe sole) applications
VORASURF™ TF 1771 Additive					X	X		General surfactant for all water-blown and HFC rigid-foam systems
VORASURF™ SF 2937 Additive	X	X	X	X	X	X		Surfactant for rigid foam • Suitable for HFOs as blowing agent
VORASURF™ SF 2938 Additive			X	X	X	X	X	Refractant for PUR/PIR insulation panels, hydrocarbon-blown appliance systems, and water-blown spray foam • Suitable with bio-based polyols
VORASURF™ DC 5098 Additive	X		X					Isocyanate-compatible silicone surfactant for use in a variety of rigid foam applications
VORASURF™ DC 5103 Additive	X	X	X	X	X	X	X	General-purpose surfactant for rigid foam applications • Improved product clarity and reduced melting point compared to VORASURF™ DC 193 Additive
VORASURF™ DC 5350 Additive						X		Silicone surfactant for bulk stabilization of water-blown spray polyurethane foam
VORASURF™ DC 5357 Additive			X	X	X			Surfactant for appliance and insulation panels, including pour-in-place applications
VORASURF™ RF 5374 Additive			X	X				Surfactant for pentane-blown rigid foam systems
VORASURF™ RF 5382 Additive			X	X				Newly engineered surfactant with improved system compatibility in pentane-blown appliance formulations
VORASURF™ RF 5388 Additive			X	X				Newly engineered surfactant with improved system compatibility and foam-surface aesthetics in pentane-blown appliance formulations
VORASURF™ RF 5575 Additive				X	X	X		General surfactant for hydrocarbon and water-blown rigid foam systems
VORASURF™ DC 5585 Additive							X	Silicone surfactant for polyisocyanurate foam systems - including flexible faced applications
VORASURF™ DC 5588 Additive	X				X			High-efficiency silicone surfactant for rigid lamination and bunstock foam
VORASURF™ DC 5604 Additive	X	X	X	X	X	X	X	General-purpose, rigid foam surfactant for use in polyurethane and polyisocyanurate foams • Gives enhanced aesthetics to pentane-blown appliance applications

X = Attribute present in product

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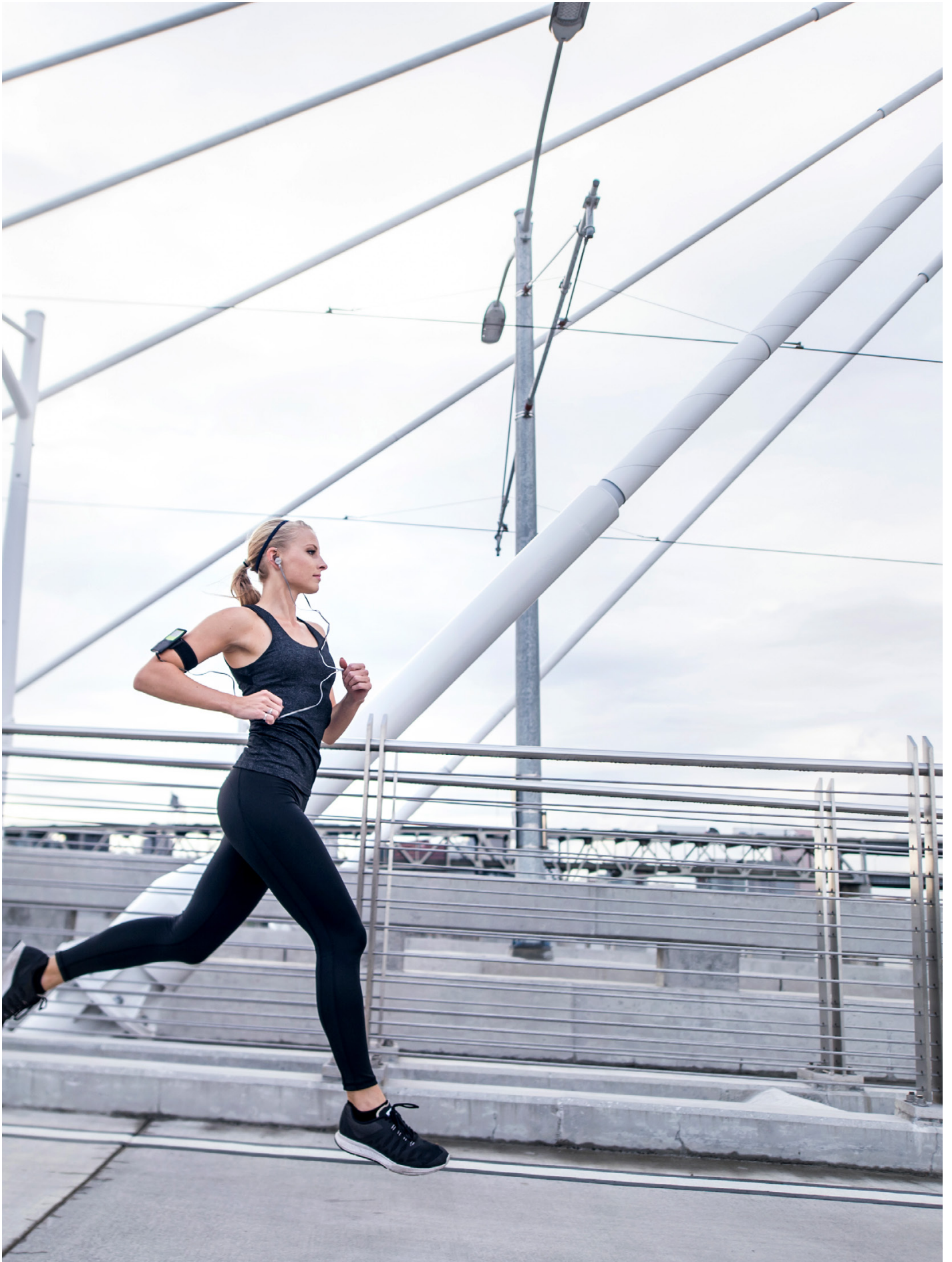
### Shoe sole, microcellular, and mechanical froth foams

Product	Shoe sole - density		Microcellular	Mechanical froth	Features and benefits
	High	Low			
VORASURF™ DC 193 Additive	X		X		General-purpose surfactant for rigid foam applications • Used for footwear (shoe sole) and integral skin applications
VORASURF™ SZ 1605 Additive	X				Surfactant for insulation panels and spray foam • Used for footwear (shoe sole) applications
VORASURF™ TF 1771 Additive	X	X	X		Newly engineered surfactant designed for a wide range of shoe sole applications
VORASURF™ SZ 1952 Additive				X	High-efficiency, non-hydrolysable, mechanical froth foam surfactant
VORASURF™ SZ 1959 Additive				X	High-efficiency, non-hydrolysable, mechanical froth foam surfactant leading to fine cells, and high-frothing efficiency
VORASURF™ DC 1990 Additive			X		Silicone surfactant designed for general use in microcellular foam applications
VORASURF™ SF 2937 Additive			X		General-purpose surfactant for rigid foam • Surfactant for microcellular foam
VORASURF™ DC 3042 Additive	X	X	X		Bulk-stabilizing surfactant for use in microcellular applications • Provides uniform cell structure, good surface appearance, and improved dimensional stability
VORASURF™ DC 3043 Additive	X	X	X		Bulk-stabilizing surfactant for use in all microcellular applications
VORASURF™ DC 5179 Additive	X	X	X		Bulk-stabilizing surfactant for use in elastomeric foam applications
VORASURF™ TF 3607 Additive	X				Surfactant for ester slabstock foam and TDI/ MDI HR molded-foam systems • Used for urethane elastomer foam and footwear (shoe sole) applications
VORASURF™ DC 5043 Additive			X		Surfactant for TDI HR molded and slabstock foam applications • Surfactant for microcellular foam

X = Attribute present in product

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## Here for you...wherever your “here” may be

Our words are proven by action. Across the globe—no matter your location— our team at Dow is committed to delivering with dependability. Our extensive network of sales, application engineering, product development, manufacturing and delivery capabilities best equip you to get what you need, when you need it, where you need it.

Whether your industry is construction, transportation, appliances, consumer goods, or electronics, we can provide you with the technical results and support to ensure success from start to finish.

Let's do more. Let's create innovative polyurethane foam products that perform better. Smarter. Safer. More efficiently. Together.

Learn how we can collaborate at [www.dow.com/vorasurf](http://www.dow.com/vorasurf).



# Seek Together™

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