Technical Data Sheet

DOWSIL™ 67 Additive
DOWSIL™ 500W Additive
DOWSIL™ 501W Additive
DOWSIL™ 502W Additive

FEATURES & BENEFITS

- Recoatable
- No significant impact on slip properties
- Low VOC
- Effective at low addition levels
- BTX-free
- DOWSIL™ 500W Additive is stable even at high pH
- All substances intentionally formulated in DOWSIL™ 67 Additive are listed on Annex 6, Part A or Part B, of the Swiss Ordinance RS 817.023.21(1)
- All substances intentionally formulated in DOWSIL™ 501W Additive and DOWSIL™ 502W Additive are listed on Annex 6, Part B, of the Swiss ordinance RS 817.023.21(1)

COMPOSITION

- Solventless
- 100% silicone polyether copolymer
- Clear to slightly hazy colorless to amber liquids

[1]Status on 1 July 2013.

Silicone wetting agents for waterborne and radiation curable coatings, inks and overprint varnishes

APPLICATIONS

With a range of different functionalities and hydrophilicities, this family of wetting additives allows the formulator to choose exactly the right product for the formulation and substrate.

- Effective in both waterborne and radiation curable formulations
- Suitable across a wide range of substrates, including wood and plastics
- Suitable for use in food packaging inks (DOWSIL 67 Additive, DOWSIL 501W Additive and DOWSIL 502W Additive)
- Long lasting performance in high pH binders (DOWSIL 500W Additive)

TYPICAL PROPERTIES

Specification Writers: These values are not intended for use in preparing specifications.

		Result			
Property	**Unit**	DOWSIL 67 Additive	DOWSIL 500W Additive	DOWSIL 501W Additive	DOWSIL 502W Additive
Viscosity at 25°C/77°F (CTM* 0004A)	cSt	31–51	25.5–29.5	10–30	49–75
Surface Tension TIS 2003-I0000-52348 (0.1%)	MN/m	21.0	22.0	20.5	22.4
Cloud Point (1% solution)	°C (°F)	< RT (< RT)	< RT (< RT)	< RT (< RT)	57 (135)
HLB Range		11.5	10.7	10.6	13.2
Polyether End Capping		OH	OAc	OMe	OH

*CTM: Corporate Test Method, copies of CTMs are available on request.

DESCRIPTION

DOWSIL 67 Additive, DOWSIL 500W Additive, DOWSIL 501W Additive and DOWSIL 502W Additive are low molecular weight organofunctional silicones that give excellent wetting properties in both waterborne and radiation curable coating formulations.

These 100% active, low VOC additives offer formulation flexibility and effective performance at low addition levels. The excellent surface mobility of these additives can be demonstrated by the low surface tensions of aqueous solutions as shown in the typical properties above.

HOW TO USE

Even at low addition levels, these additives are effective on difficult-to-wet substrates such as wood and plastics. Recommended addition level for this family of wetting additives is 0.1–0.4% as supplied, based on total formulation. Figure 1 demonstrates that excellent wetting performance can be achieved at levels as low as 0.2%. As low viscosity liquids, they can be added and incorporated easily during the letdown stage of the process.

WETTING PERFORMANCE

The wetting performance of the DOWSIL™ additives is consistent from one formulation to another, as demonstrated in a waterborne polyurethane dispersion (PUD)-based wood coating (Figure 2) and a waterborne acrylic-based wood coating (Figure 3). Varying in their architecture, these additives allow for some subtle performance variation in different coatings and inks formulations, allowing the formulator to choose exactly the right additive for an application. The performance of many of the competitor additives is inferior to the DOWSIL™ additives and inconsistent between formulations. The Dow toolbox of products gives the paint chemist confidence that they will get a consistent performance across their entire product range, and therefore the amount of additives they need to include in their raw material portfolio can be minimized.

SLIP PROPERTIES

Traditional silicone additive technology also often brings modifications in slip properties that are undesired by the formulator.

This family of wetting agents brings excellent wetting performance with little or no impact on the surface coefficient of friction.

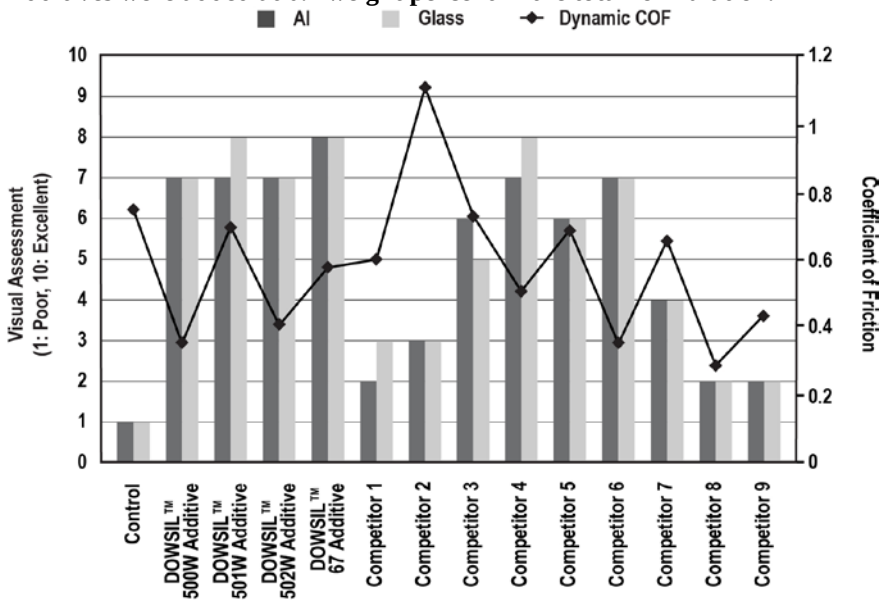
Traditional silicone wetting additives often come with increased slip properties, as demonstrated in Figure 4.

Figure 1: Surface of a waterborne PUD-based wood coating with and without DOWSIL 67 Additive. Additive was added at 0.2 weight percent in the total formulation.

Control – No Additive

With DOWSIL™ 67 Additive

Figure 2: Surface appearance and slip properties of a waterborne PUD-based wood coating with the addition of DOWSIL 67 Additive, DOWSIL 500W Additive, DOWSIL 501W Additive and DOWSIL 502W Additive. Additives were added at 0.2 weight percent in the total formulation.



By offering a choice, Dow enables tailoring of the desired properties.

FOAM CONTROL

By the very nature of being surfactants, all wetting additives promote foam generation to some extent, as shown in Figure 5. The chemistry of the surfactant and the total formulation dictates the level of foam generated. Important to the formulator is that this foam can be controlled using foam control additives (Figure 6).

pH STABILITY

The chemistry of silicone surfactants can often mean they are not stable in higher pH formulations and performance is lost during storage of the coating or ink.

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Figure 3: Surface appearance and slip properties of a waterborne acrylic-based wood coating with the addition of DOWSIL 67 Additive, DOWSIL 500W Additive, DOWSIL 501W Additive and DOWSIL 502W Additive. Additives were added at 0.2 weight percent in the total formulation.

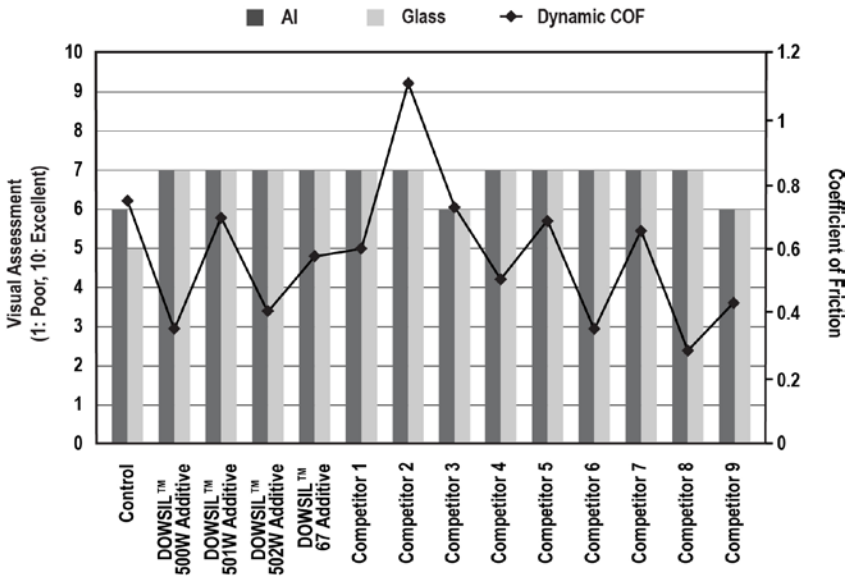
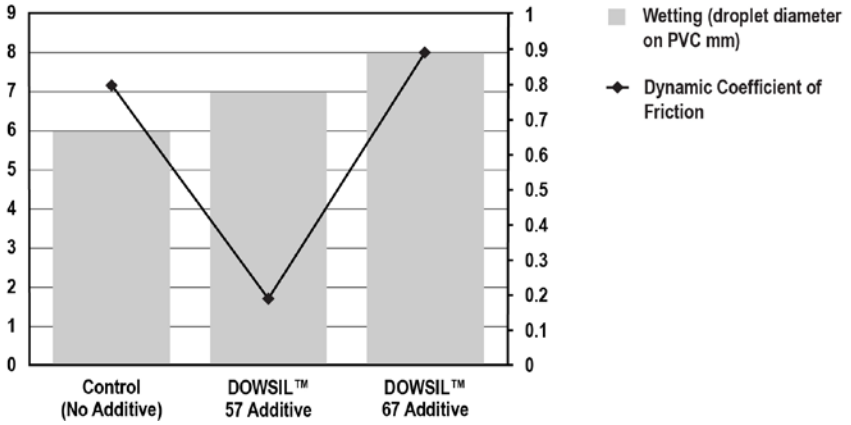


Figure 4: Wetting (droplet diameter on PVC, mm) and dynamic coefficient of friction of a solventless UV acrylate coating with the addition of DOWSIL™ 57 Additive and 67 Additive. DOWSIL 57 Additive gives good wetting performance, while reducing the slip properties of the coating. DOWSIL 67 Additive gives the same good wetting performance but without impacting the slip properties. This offers the formulator further choices, depending on the intended application.



DOWSIL 500W Additive is ideally suited for higher pH formulations, showing good wetting performance initially and on longer-term storage (Figure 7).

PACKAGING INFORMATION

These products are available in 20 kg (44.1 lb) pails and 200 kg (441 lb) drums.

Samples are available in 120 ml (4 fl oz) containers.

HANDLING PRECAUTIONS

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LIMITATIONS

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

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To support customers in their product safety needs, Dow has an extensive Product Stewardship organization and a team of product safety and regulatory compliance specialists available in each area.

For further information, please see our website, www.consumer.dow.com or consult your local Dow representative.

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Figure 5: Foam generation in a flexographic printing ink; additives added at 0.5 weight percent in the ink formulation. Density is measured after high speed shearing.

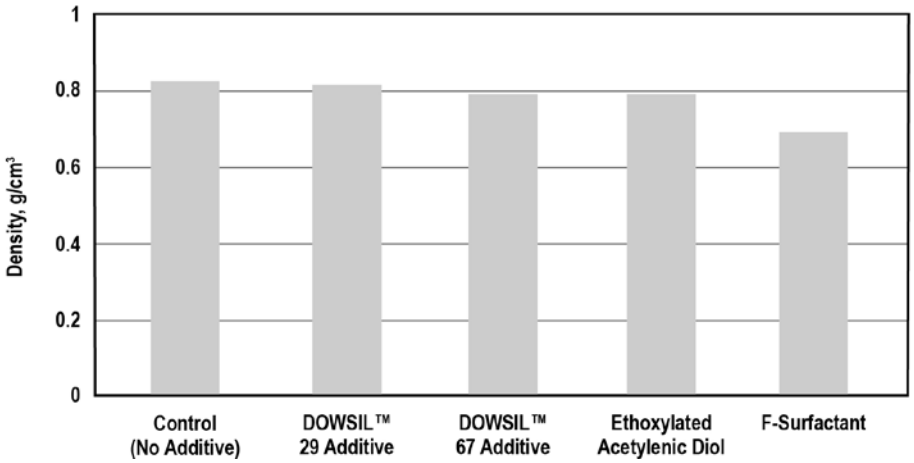
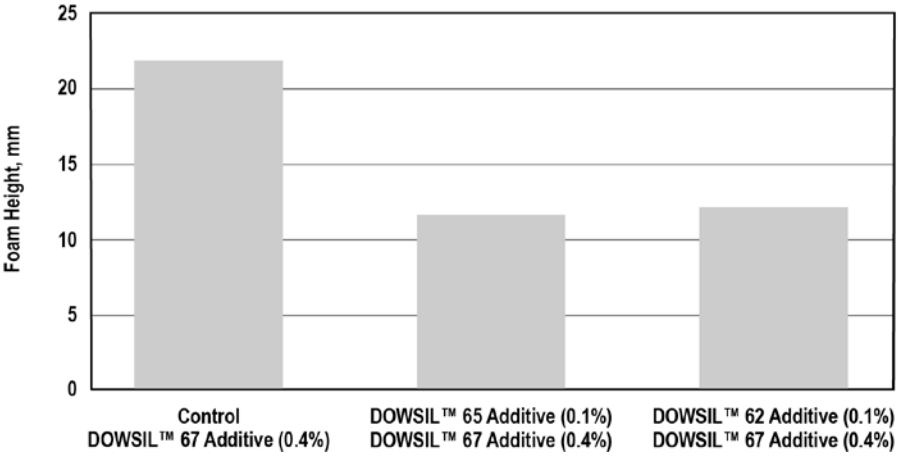


Figure 6: Example of performance of DOWSIL™ antifoams when formulated into surfactants. DOWSIL 67 Additive is added at 0.4 weight percent into a flexographic gravure ink formulation. Antifoams were added at just 0.1 weight percent in the total formulation. Foam height is measured after high speed shearing, and this is clearly vastly reduced with the addition of both DOWSIL™ 62 Additive and DOWSIL™ 65 Additive.[1]



[1]APEO-free version is available as DOWSIL™ 68 Additive.

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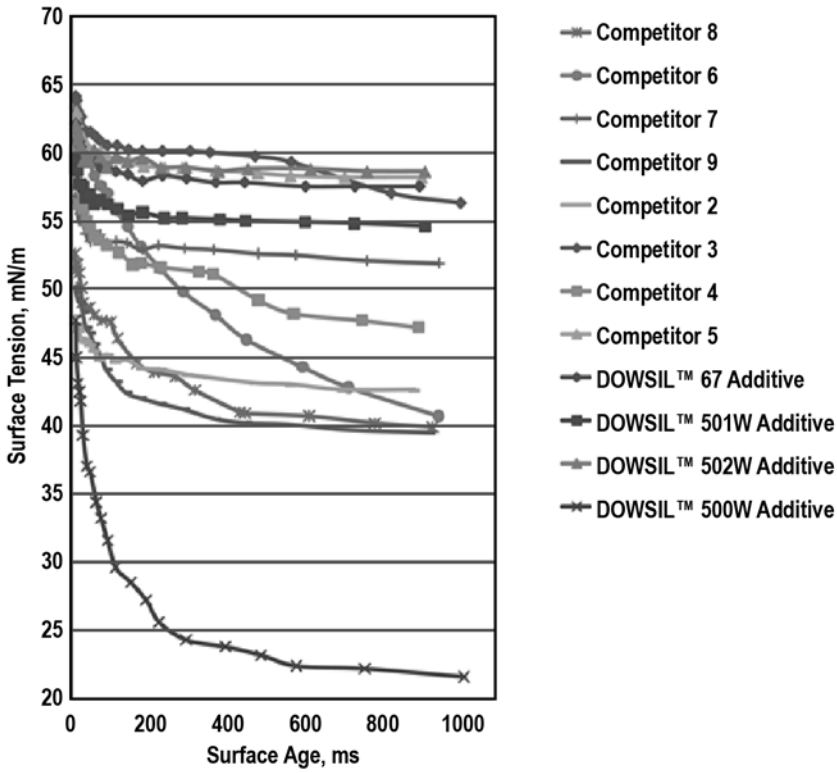
Figure 7: Stability of DOWSIL 500W Additive as demonstrated by surface tension stability over time in a pH 11 solution. Static surface tension remains consistent even after 1 month of storage.



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