



## DOWSIL™ 52 Additive

### FEATURES & BENEFITS

- Flowable liquid for processing ease
- Good compatibility with waterborne acrylic, alkyd, polyester, epoxy, PU and vinyl resin based coatings
- Imparts very low Coefficient of Friction
- Effective at very low addition levels
- Does not influence surface hardness
- No negative impact on water resistance
- Novel surfactant technology to deliver high molecular weight PDMS into waterborne systems
- Easy to incorporate/disperse – can be added during let-down or post-addition
- Good compatibility in multiple coatings formulations
- Good slip, abrasion resistance, scratch resistance and anti-blocking
- Recoatable
- Good cost-in-use performance
- No impact on mechanical properties
- Suitable for use in exterior coatings
- Compliant with U.S. FDA 21 CFR 176.210
- Please contact your local customer center to receive the EU Food Profile.

### COMPOSITION

- Ultra-high molecular weight silicone dispersion
- 64% solids in water
- APEO-free

Ultra-high molecular weight silicone dispersion for slip, abrasion resistance, scratch resistance and anti-blocking in waterborne paints, inks and coatings

### APPLICATIONS

- Wood coatings (Acrylic and PUD based)
- Inks and Overprint varnishes
- Interior and exterior paints

### TYPICAL PROPERTIES

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

CTM*	Property	Unit	Result
0050	Viscosity	cP	3000-5000
0176	Appearance		Smooth milky white liquid
0208	Non-volatiles	%	62-67

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

### DESCRIPTION

DOWSIL™ 52 Additive is a silanol functional, ultra-high molecular weight silicone dispersion in water (64% solids content).

### HOW TO USE

The low viscosity of DOWSIL 52 Additive facilitates the easy incorporation into waterborne formulations, allowing it to be added during the let-down or to be post-added.

DOWSIL 52 Additive is effective at low concentrations. It is used at typical concentrations of 0.01 – 3.5% as supplied in waterborne systems, based on total formulation. Pre-dilution with water can be made if required. The amount to use will vary depending on the coating formulation and should be checked before industrial use.

DOWSIL 52 Additive is compatible with acrylic, alkyd, epoxy, polyesters, polyurethane and vinyl based resin systems.

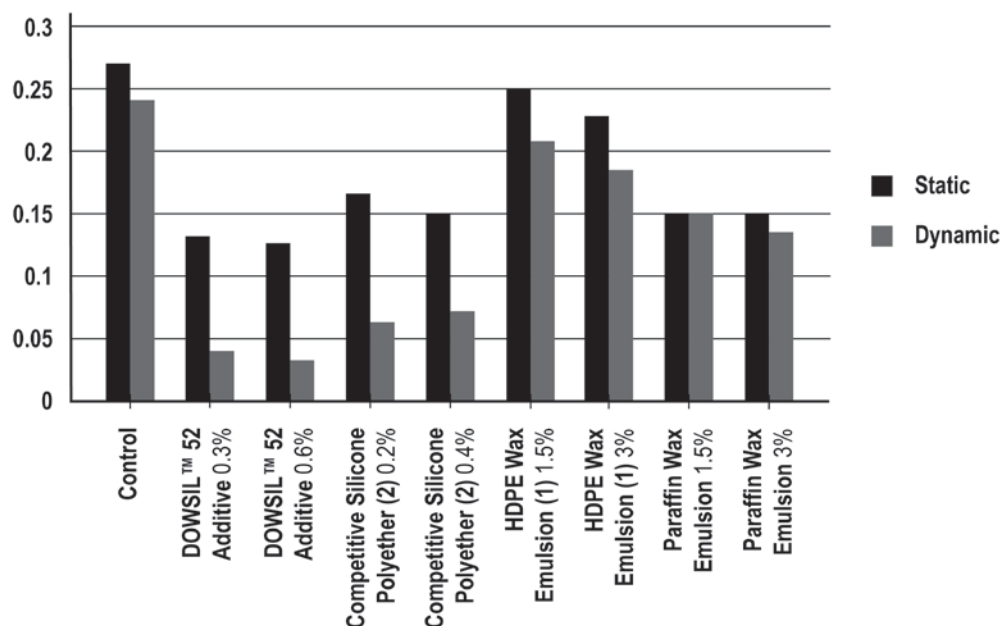
**HANDLING PRECAUTIONS**  
**PRODUCT SAFETY**  
**INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW WEBSITE AT WWW.CONSUMER.DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.**

## SLIP PERFORMANCE

Very low coefficient of friction (CoF) values are achievable with DOWSIL 52 Additive in acrylic and polyurethane based formulations.

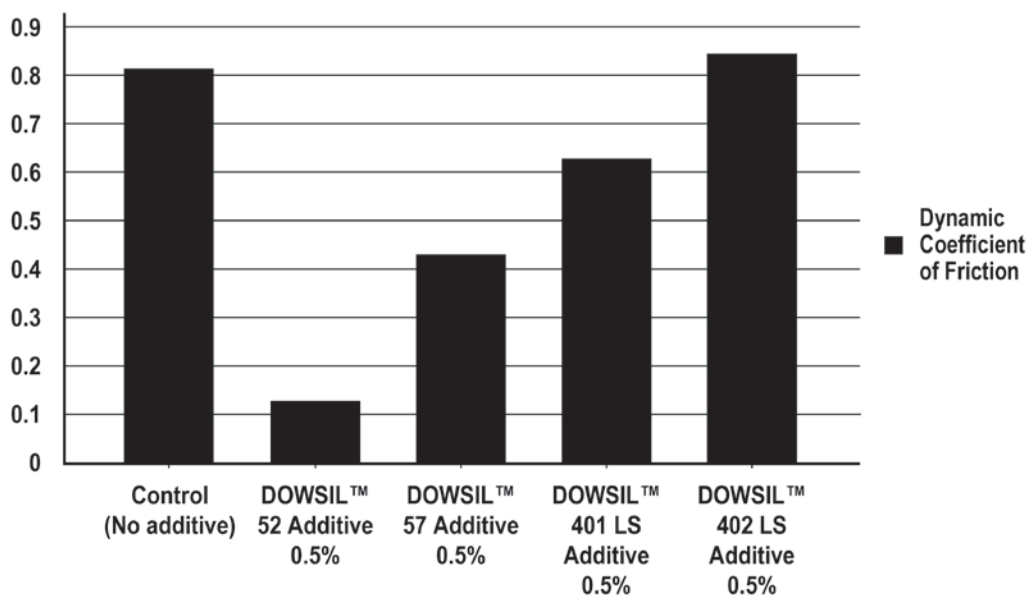
### Acrylic-polyurethane Based Formulation

**Figure 1:** Coefficient of friction of a waterborne acrylic-polyurethane hybrid based wood coating with the addition of DOWSIL 52 Additive versus a competitive silicone polyether and wax emulsion additives. The best slip properties (lowest CoF) are seen with DOWSIL 52 Additive.



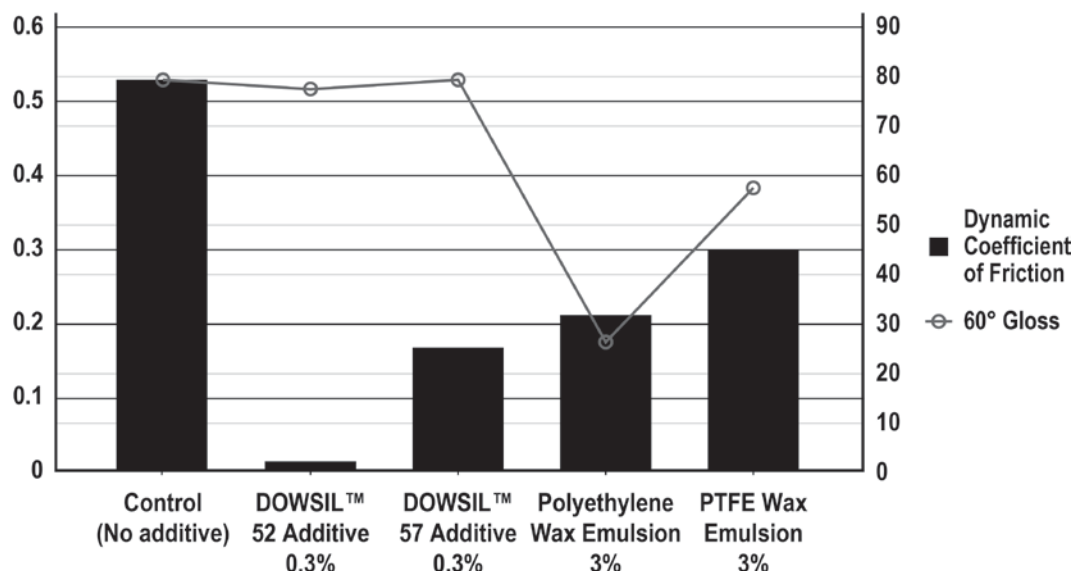
### Acrylic based Formulation

**Figure 2:** Coefficient of friction of a waterborne acrylic based ink with the addition of DOWSIL 52 Additive versus silicone polyether based additives. Additives were added at 0.5 weight percent in the total formulation. Again the best slip properties (lowest CoF) are seen with DOWSIL 52 Additive.



## Polyurethane Based Formulation

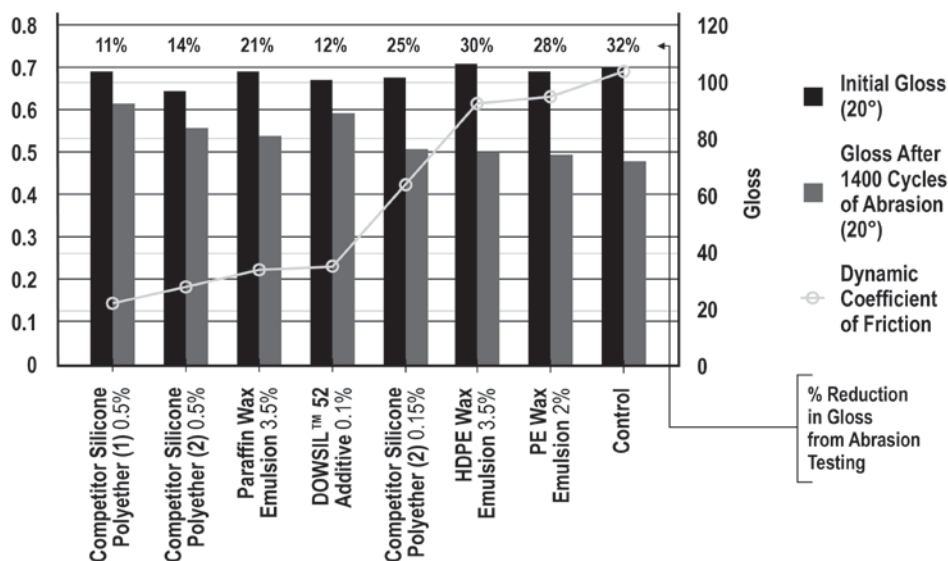
**Figure 3:** Coefficient of friction and 60° gloss of a waterborne acrylate-PU based gloss paint with the addition of DOWSIL 52 Additive versus wax additives. DOWSIL 52 Additive was added at 0.3 weight percent in the total formulation, one-tenth of the level of wax used. Waxes failed to achieve the very low CoF and had a significant impact on the gloss level.



## ABRASION RESISTANCE

With reduced coefficient of friction comes an improvement in abrasion resistance with the ultra-high MW DOWSIL 52 Additive (Figures 4, 5 and 6).

**Figure 4:** Slip and abrasion resistance of a waterborne acrylic wood coating with the addition of DOWSIL 52 Additive versus competitive additives. For high gloss systems, DOWSIL 52 Additive at 0.1 weight percent has little impact of gloss while providing good slip and abrasion resistance at much lower levels (0.1% versus 3.5%) than competitor waxes.



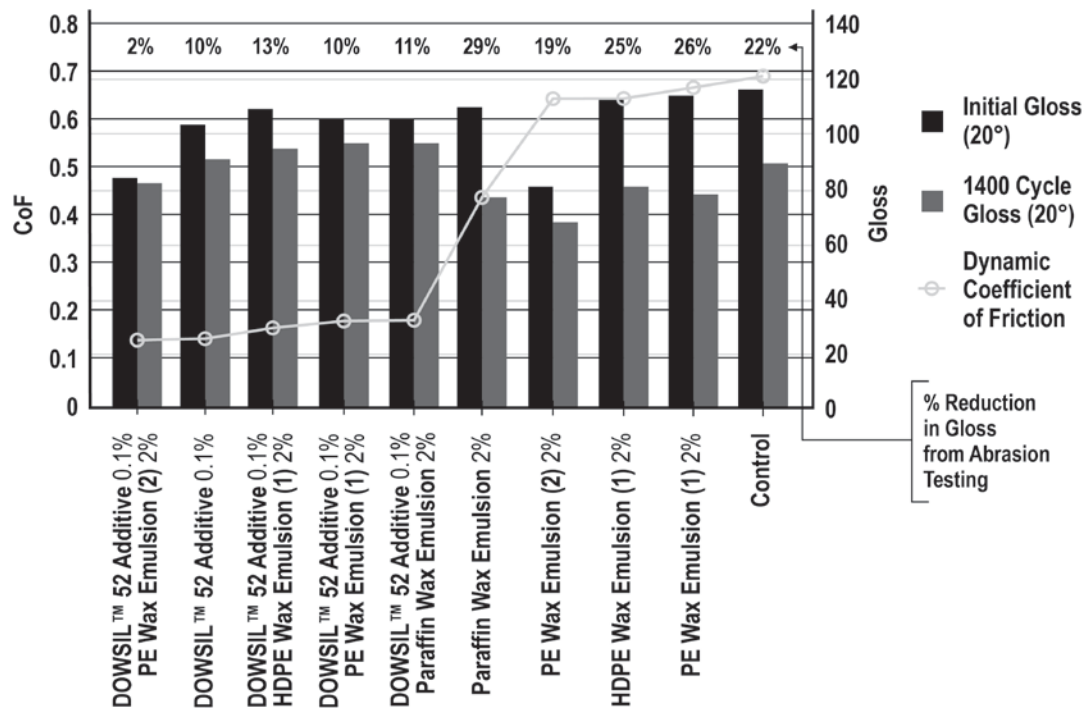
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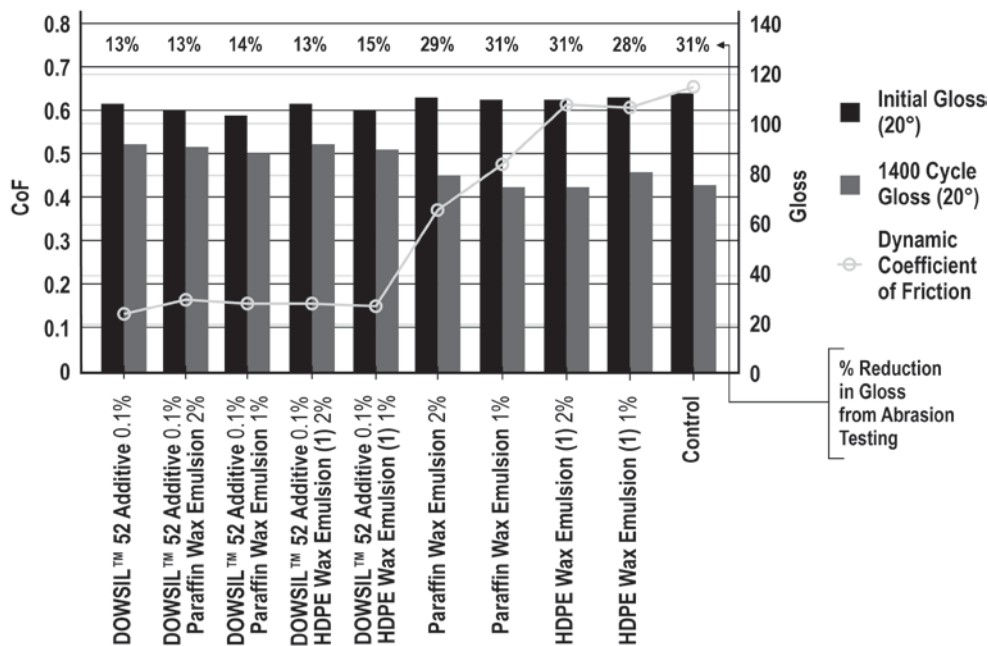
DOWSIL™ 52 Additive

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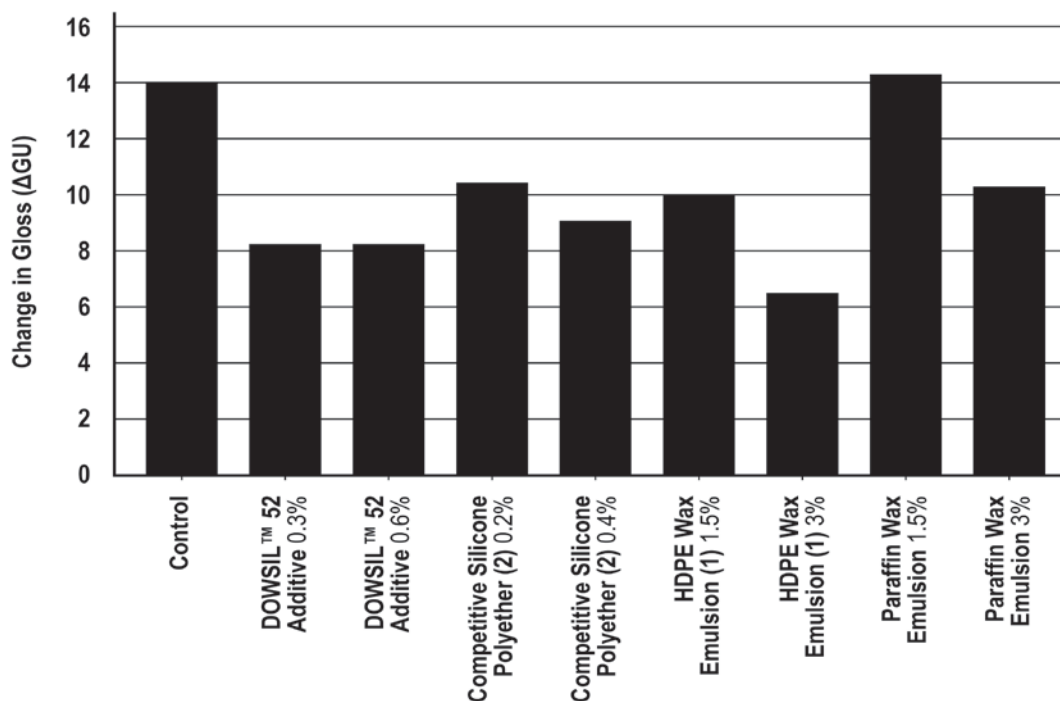
**Figure 5:** Slip and abrasion resistance of a waterborne acrylic wood coating with the addition of DOWSIL 52 Additive in combination with wax emulsions. DOWSIL 52 Additive alone or in combination with wax performs significantly better for slip and abrasion resistance than the control without additive and the samples containing only the wax emulsion.



**Figure 6:** Slip and abrasion resistance of a waterborne acrylic wood coating with the addition of DOWSIL 52 Additive in combination with wax emulsions. DOWSIL 52 Additive alone or in combination with wax performs significantly better for slip and abrasion resistance than the control without additive and the samples containing only the wax emulsions.



**Figure 7: Scratch resistance of a waterborne acrylic-polyurethane hybrid based wood coating with the addition of DOWSIL 52 Additive versus a competitive silicone polyether and wax emulsion additives. The difference in gloss before and after Quartant abrasion testing was used to determine the scratch resistance. DOWSIL 52 Additive at 0.3 and 0.6% performed well versus the competitive silicone polyether and paraffin wax emulsion. It also performed well versus the HDPE wax emulsion at 1.5%. The HDPE wax emulsion at 3% performed better than DOWSIL 52 Additive; however, it was tested at five times the level of DOWSIL 52 Additive in order to see the scratch resistance benefit.**



**NO NEGATIVE IMPACT ON OTHER KEY PROPERTIES**

While achieving good slip, scratch/abrasion resistance and anti-blocking properties are important, a good formulation must balance these key benefits versus potentially negative attributes an additive can bring to the formulation.

This can include negative impacts on the water resistance, intercoat adhesion and recoatability. In a PUD-based formulation, DOWSIL 52 Additive has not been found to impact these key properties significantly (Table 1).

**Table 1: Water resistance and intercoat adhesion of a waterborne PUD based wood coating with the addition of DOWSIL 52 Additive.**

	<b>WATER RESISTANCE</b>	<b>INTERCOAT ADHESION</b>	<b>RECOATABLE</b>
<b>PUD-BASED WOOD COATING WITH DOWSIL 52 Additive 0.15%</b>	No discoloration or blistering	100%	YES

**Test Protocols (Table 1)**

In the water resistance test, 3 drops of water were placed on the panel after the wood coating dried for 24 hours. The water was covered with a watch glass and allowed to stay on the coating for 24 hours. After the water was removed, any discoloration or blistering was noted.

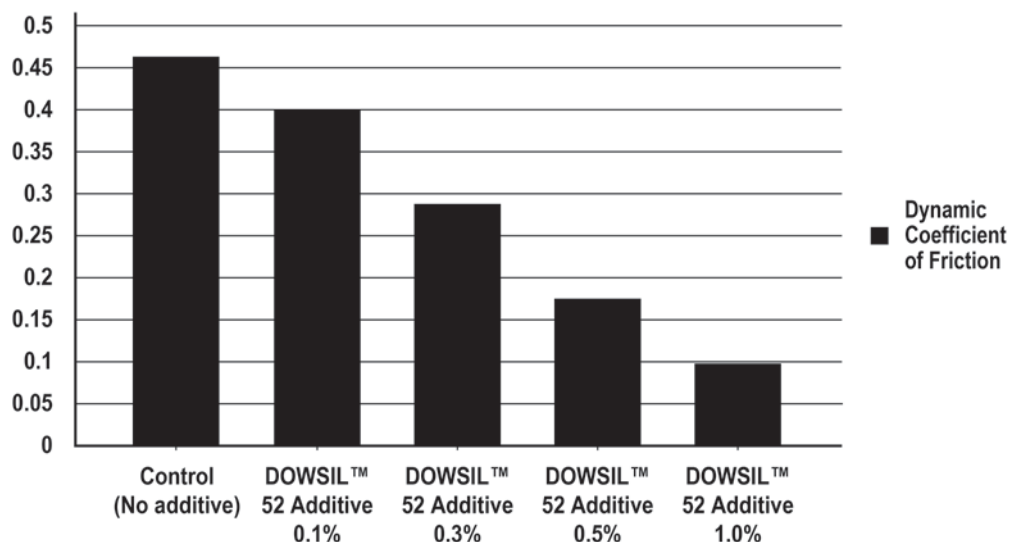
To test intercoat adhesion and recoatability, a first coat containing DOWSIL 52 Additive was applied to the substrate and allowed to dry for 24 hours. A second coat (without DOWSIL 52 Additive) was then applied and allowed to dry. The intercoat adhesion was evaluated by cross-hatch testing, and the recoated appearance was noted.

## DIAL-IN PERFORMANCE

The degree to which a formulator requires slip or scratch/abrasion resistance will change depending on the end application or customer specification.

Figure 8 demonstrates how the performance can be “dialed in” depending on the end use requirements, here shown by increasingly lower CoF values with increased addition of DOWSIL 52 Additive.

**Figure 8: Coefficient of friction of a waterborne overprint varnish with the addition of DOWSIL 52 Additive at different addition levels in the total formulation.**



## PACKAGING INFORMATION

This product is available in 18 kg pails, 190 kg drums and 1070 kg IBCs.

Samples are available in 120 ml containers.

## LIMITATIONS

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

## HEALTH AND ENVIRONMENTAL INFORMATION

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.

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