Product Information
Paint, Inks
& Coatings

DOW CORNING

Dow Corning® 30 Additive

FEATURES

- Low coefficient of friction
- Readily dispersible in UV formulations
- Low silicone volatility

BENEFITS

- Consistent performance over time
- Compatibility with polyester and epoxy-based acrylate radiation-curable formulations

COMPOSITION

- Clear liquid
- Polyether-modified polydimethylsiloxane

Slip additive for radiation-curable coatings; leveling aid and slip additive in solvent-free, aqueous and solvent-based paints, inks and varnishes

APPLICATIONS

- Designed for use in radiation-curable coatings

TYPICAL PROPERTIES

Specification Writers: These values are not intended for use in preparing specifications. Please contact your local Dow Corning sales office or your Global Dow Corning Connection before writing specifications on this product.

Appearance	Clear liquid
Viscosity, cp	600
Flash Point, zeta flash, ˚C (˚F)	>120 (>248)

DESCRIPTION

Dow Corning® 30 Additive is a polyether-modified polydimethylsiloxane designed for aqueous, solvent-based and radiation-curable coatings. This additive offers excellent slip performance in polyester and epoxy-based acrylate varnishes combining low and consistent coefficient of friction over time.

Dow Corning® 30 Additive is designed for use in radiation-curable coatings. Its performance in other curing systems is being evaluated. It may have application as a leveling aid and slip additive in solvent-free, aqueous and solvent-based paints, inks and varnishes.

Results of an Independent Study on the Low Coefficient of Friction Additives for Overprint Varnishes[1]

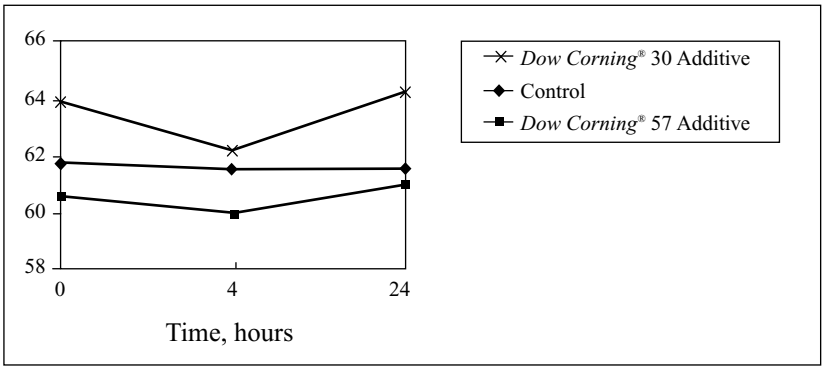
This data is based on laboratory trials using a model system. To test under real life conditions, a study has been carried out at the Leatherhead facility of PIRA International. These tests were carried out using the following equipment:

- A flexographic printing press fitted with dual print heads and Fusion Inc. lamps giving 600 watts per inch
- A commercial ink supplied by Edward Marsden Inks of Hull
- Scancote[2] white back, folded box board

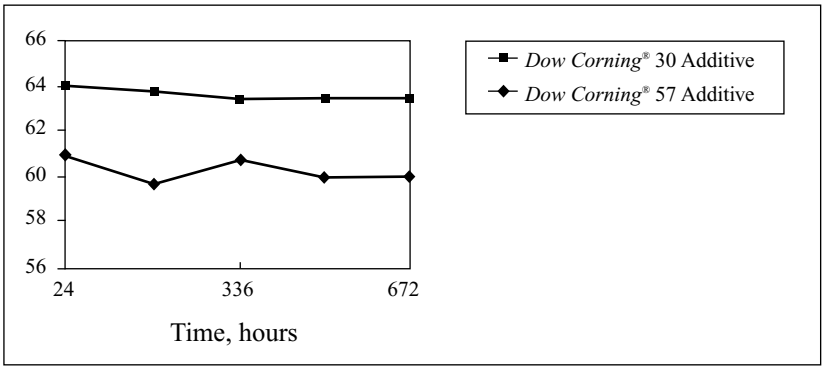
Test Procedure

The ink supplied was initially printed onto the Scancote white back, folded box board. A film of varnish was placed onto the cured ink film using a second print head. The square of ink was laid down slightly off-center and the whole web overvarnished. This varnish was applied across the web at three coat weights ranging from 2.5 to 4.5 g/m^2. In all cases, the testing was performed on the central web section with a varnish coat weight of 3.5 g/m^2. Testing was performed on freshly printed, 4-hour and 24-hour aged board. Longer term testing was performed up to approximately 30 days. The coated board was tested for coefficient of friction under dynamic and static conditions[3], gloss at 60˚[4] and contact angle of water on the coating[5].

Graph 1: 60˚ Gloss in Inked Areas versus Additive



Graph 2: 60˚ Gloss on Blank Board versus Additive



The findings confirmed performance improvements in the model studies and demonstrated that the surface could be made more consistent both in terms of coefficient of friction and in free surface energy. Another advantage was demonstrated as well, showing that migration potential for silicone out of the cured film can be nearly eliminated with *Dow Corning*® 30 Additive. For reference, *Dow Corning*® 30 Additive was compared at a similar active level against *Dow Corning*® 57 Additive, a nonreactive additive specified for wetting, flow out and slip performance.

Graphs 1 and 2 demonstrate the ability of the two additives to enhance the gloss of varnish over an inked surface to make the image sharper and brighter. Though the difference between the two systems is small, *Dow Corning*® 30 Additive offers higher gloss. Over the varnish alone, *Dow Corning*® 30 Additive offers a 10 percent increase in gloss retention compared to *Dow Corning*® 57 Additive, showing the benefit of improved compatibility.

Graph 3 demonstrates the highly efficient coefficient of friction reduction possible with *Dow Corning*® 30 Additive and shows the control over consistency required. *Dow Corning*® 30 Additive allows a much tighter control over the coefficient of friction "window" and allows confidence in early testing and, therefore, in longer term performance.

Graph 4 shows that not only is the surface of the cured film affected by changes due to migration of silicone slip additive, but that the unmodified cured film is itself changing with time. It is not known why the unmodified cured film changes its surface energy. However, changes in the silicone modified varnish can be explained. An increase in contact angle is caused by the migration of free silicone to the surface and any subsequent lowering to the "free" silicone being transmitted to another surface in direct contact, or even to neighboring silicone-free areas.

This can be seen from the *Dow Corning*® 57 Additive profile, where contact angle increases with time, albeit slowly. *Dow Corning*® 30 Additive has a tendency to remain constant throughout the testing period, supporting the theory that it offers little in the way of migration potential. The difference in contact angle between the modified and unmodified varnish also suggests that this slip additive may be in itself overprintable.

These graphs demonstrate that with careful silicone organic structure design, both the compatibility with the resin matrix and consistent performance can be achieved.

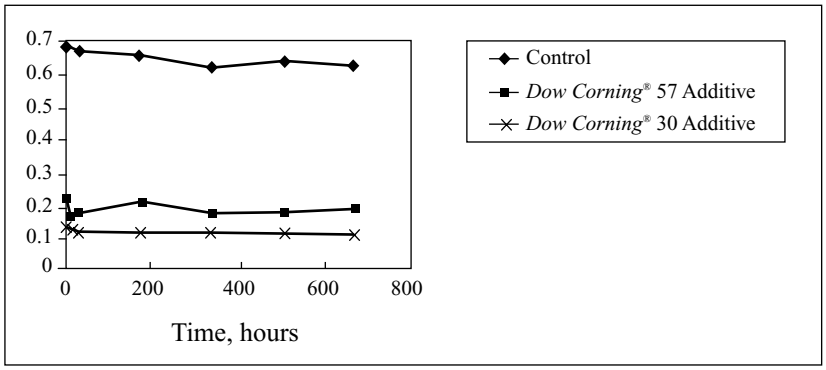
HOW TO USE

Dow Corning® 30 Additive is recommended at addition levels from 0.2 to 5.0 weight percent.

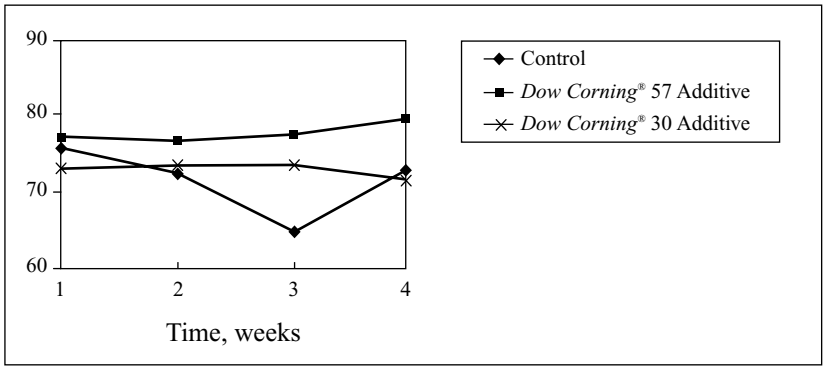
HANDLING PRECAUTIONS

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED. BEFORE HANDLING, READ PRODUCT AND MATERIAL SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE MATERIAL SAFETY DATA SHEET IS AVAILABLE FROM YOUR DOW CORNING REPRESENTATIVE, OR DISTRIBUTOR, OR BY WRITING TO DOW CORNING CUSTOMER SERVICE.

Graph 3: 60• Dynamic Coefficient of Friction versus Additive



Graph 4: Contact Angle of Water on Cured Film



USABLE LIFE AND STORAGE

Dow Corning® 30 Additive has a shelf life of 24 months from date of manufacture.

PACKAGING INFORMATION

Dow Corning® 30 Additive is available in 500 ml samples, 44-lb (20-kg) pails and 396-lb (180-kg) drums.

LIMITATIONS

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

Shipping Limitations

None.

WARRANTY INFORMATION – PLEASE READ CAREFULLY

Dow Corning believes that the information in this publication is an accurate description of the typical characteristics and/or uses of the product or products, but it is your responsibility to thoroughly test the product in your specific application to determine its performance, efficacy and safety. Suggestions of uses should not be taken as inducements to infringe any particular patent.

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1 Abstract from Butler, D. W., "Low Coefficient of Friction Additives for Overprint Varnishes," proceedings of SURFEX 96 – U.K

2 Hedsorboard white folding box board, lick on reverse, double coated; ale/blade; 200 g/m^2.

3 Coefficient of friction tested via Davenport Instrument according to ASTM D 1894.

4 Gloss at 60˚ according to ASTM D 2457.

5 Contact angle against distilled water according to SCAN-P 18:66.

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