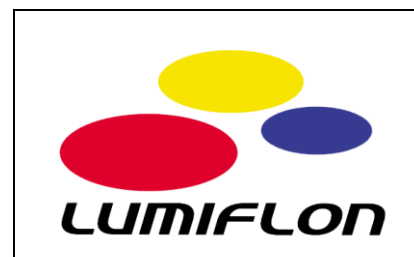


# LUMIFLON® Product Data Sheet

## LUMIFLON FE-4300



LUMIFLON fluoropolymer resins were developed in 1982 as the first solvent-soluble fluoropolymers in the world. LUMIFLON polymers consist of alternating fluoroethylene and alkyl vinyl ether segments (FEVE). The fluorinated segments provide outstanding UV stability, weather resistance, and chemical resistance, while the vinyl ether segments provide solvent compatibility and cross-linking sites. LUMIFLON resins are used to make ultra-weatherable coatings for architectural, aerospace, automotive, and industrial maintenance markets.

LUMIFLON FE-4300 is a water emulsion product that was developed to enable formulators to meet VOC and HAPS regulations on many types of coatings in the U. S. market. LUMIFLON FE-4300 has low hydroxyl functionality, so it is designed only for use in single component coatings. Like other LUMIFLON resins, FE-4300 is used to produce coatings with high gloss and excellent weatherability. FE-4300 is meant to be used in blends with standard acrylic resins to substantially improve weathering of these conventional products.

### Product Characteristics

- Outstanding weatherability
- Used for field applied architectural, concrete, and direct-to-metal coatings
- Good compatibility with a wide variety of commercial acrylic emulsions
- Supplied as a zero VOC emulsion resin; capable of inclusion in 50 g/liter formulations

### Typical Physical Properties

#### LUMIFLON FE-4300

Physical Property	Value
Appearance	Milky White Liquid
Solids, wt. %	50%
pH	7-9
Ionic Character	Anionic
Particle Diameter, $\mu\text{m}$	0.1-0.2
Specific Gravity, 25° C	1.13
Minimum Film Forming Temperature, °C	35

The data given in this product bulletin is for information purposes only. It is given in good faith and based on the best knowledge and experience of the company. This product should be used only in applications for which it was intended. This product is not designed for special applications such as pharmaceutical or other medical use. The company makes no warranties and undertakes no responsibilities regarding this product except as stated in contract documents for its supply.



## Standard Formulation for Direct-to-Metal White Coating using LUMIFLON FE-4300

### Pigment Dispersion Phase

Ingredient	Ingredient Function	Quantity	Percent by Weight
Water	Diluent	20.0 g	7.4
BYK-156	Dispersant	0.6	0.22
AMP-95	pH adjustment	0.3	0.11
Carbowet DC01	Wetting Agent	0.7	0.25
BYK-022	Defoamer	0.3	0.11
Nuosept 95	Preservative	0.3	0.11
Ti-Pure R-706	Pigment	65.1	24.1
	<b>TOTAL</b>	<b>87.0 g</b>	<b>32.3</b>

Disperse on high speed disperser to grind of 7 Hegman

### Let Down Phase

Ingredient	Ingredient Function	Quantity	Percent By Weight
Pigment Dispersion from above	*****	87.0	32.3
Acrylic Emulsion	Binder	85.3	31.6
LUMIFLON FE-4300	Binder	86.0	31.8
Dowanol DPM	Coalescing Solvent	7.7	2.8
Texanol	Coalescing Solvent	3.5	1.3
DSX-3515	Thickener	0.5	0.2
	<b>TOTAL</b>	<b>270.3 g</b>	<b>100.0%</b>

Mix on medium speed until complete

### Physical Properties

<i>% Weight Solids</i>	50.5
<i>Stormer Viscosity</i>	87 KU
<i>Weight/Gallon</i>	10.59#
<i>20°/60° Gloss</i>	49 / 69
<i>pH</i>	9.0
<i>VOC (grams/liter)</i>	106



## Standard Formulation for Direct-to-Metal Black Coating with LUMIFLON FE-4300

Manufacturing instructions: Add each ingredient slowly; mix at medium speed

<b>Ingredient</b>	<b>Ingredient Function</b>	<b>Quantity</b>	<b>Percent by Weight</b>
Water	Diluent	17.0 g	7.5
Acrylic Emulsion	Binder	94.3	41.5
FE4300	Binder	82.0	36.1
AMP-95	pH adjustment	0.5	0.2
Carbowet DC01	Wetting Agent	1.4	0.6
BYK-022	Defoamer	1.1	0.5
Nuosept 95	Preservative	0.3	0.1
Dowanol DPnB	Coalescing Solvent	11.7	5.1
Tint-Ayd CW5331 Masstone Black	Black Pigment Dispersion	12	5.3
DSX-3515	Thickener	7.0	3.1
	<b>TOTAL</b>	<b>227.3 g</b>	<b>100.0</b>

<b>Physical Properties</b>	
<i>% Weight Solids</i>	41.1
<i>Stormer Viscosity</i>	94 KU
<i>Weight/Gallon (#)</i>	8.96
<i>20°/60° Gloss</i>	33 / 73
<i>pH</i>	9.0
<i>VOC (grams/liter)</i>	150



## *Adhesion Properties*

The FEVE family of water-based emulsions are compromised in the property of adhesion when coatings that contain them are applied directly to metal substrates. It is for this reason that acrylic emulsions are blended in with the FE4300 emulsion in the DTM formulations presented in this technical data sheet. The chart shown below indicates the level of improvement in adhesion when the DTM formulations utilize a combination of acrylic emulsion and FEVE emulsion:

<b>Resin Blend in Formulation</b>	<b>Metal Substrate</b>	<b>Crosshatch Adhesion (ASTM D3363)</b>
100% FE-4300	Chromate-treated Al	0B
50% Avanse MV-100* 50% FE-4300	Chromate-treated Al	5B
50% Avanse MV-100 50% FE-4300	Bare Aluminum	2B
50% Avanse MV-100 50% FE-4300	Bare CR Steel	5B
50% Avanse MV-100 50% FE-4300	Hot-Dipped Galvanized	3B
80% Avanse MV-100 20% FE-4300	Hot-Dipped Galvanized	4B

\* Avanse MV100 is an acrylic emulsion manufactured by the Dow Chemical Co.

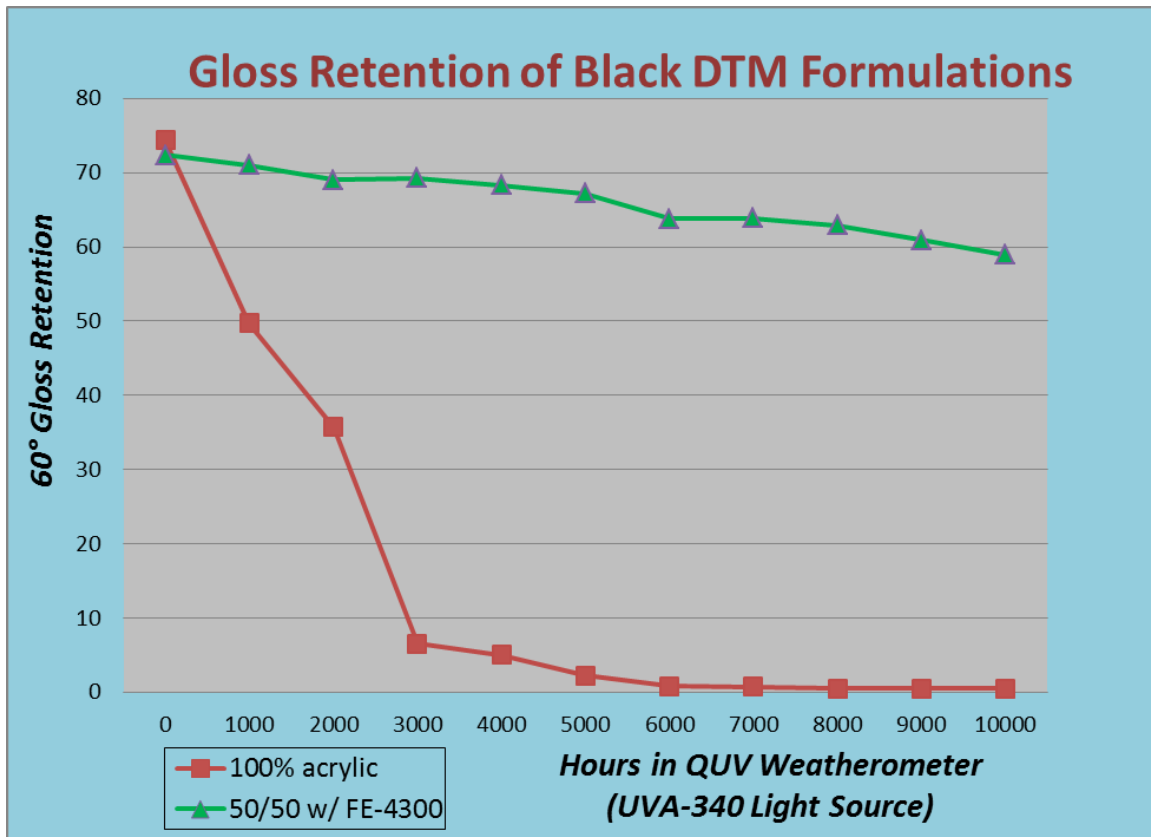
## *Choice of Associative Thickeners for FE4300 Formulations*

<b>Thickener Added (1.5% by wt.)</b>	<b>Stormer Viscosity (KU)</b>
NONE	92.5
Acrysol RM-2020	93.4
Rheolate 350	93.7
Rheolate 278	100.3
Rheolate 310	106.6
DSX 3515	105.8
Rheolate 216	116.4
Rheolate 266	117.2



## Gloss Retention Properties

The graph shown below is a comparison of two formulations. The first formulation is the DTM Black Formulation listed on this data sheet, which includes FE4300 as 50% of the binder. The second formulation is identical to the first formulation, except for the binder choice. It contains 100% of the acrylic emulsion as its binder portion. The graph charts the loss of 60° Gloss during the 10,000 hours of QUV Weatherometer exposure. The QUV cycle employed was 8 hours light exposure (UVA-340 bulbs) @ 60° C. followed by 4 hours condensation @ 50° C.:



## *Formulation for Water-based Clear Exterior Deck Stain*

Manufacturing instructions: Add each ingredient slowly; mix at medium speed

<b>Ingredient</b>	<b>Ingredient Function</b>	<b>Quantity</b>	<b>Percent by Weight</b>
Beckosol AQ 101	Binder	90.0	27.9
Water	Diluent	37.6	11.6
Borchi Oxy Coat 1101	Drier	0.9	0.3
<i>Mix for 5 minutes</i>	*****	*****	*****
FE4300	Binder	66.0	20.4
Propylene Glycol	Coalescing Solvent	13.0	4.0
Texanol	Coalescing Solvent	5.0	1.5
20% PUR2150 Solution	Thickener	12.5	3.8
Surfynol 104BC	Wetting Agent	3.2	1.0
BYK-024	Defoamer	3.2	1.0
<i>Premix slowly before adding to batch</i>	*****	*****	*****
Water	Diluent	88.0	27.2
Tinuvin 292	Hindered Amine Light Stabilizer	1.6	0.5
Tinuvin 1130	UV Absorber	2.4	0.7
AMP-95	pH adjuster	0.4	0.1
	<b>TOTAL</b>	<b>324.5</b>	<b>100.0</b>

<b>Physical Properties</b>	
<i>% Weight Solids</i>	28.5
<i>Viscosity (#2 Zahn Cup)</i>	17 seconds
<i>Weight/Gallon (#)</i>	8.62
<i>pH</i>	9.2
<i>VOC (grams/liter)</i>	240

