

## PolyFox™ Fluorosurfactants Additives For Solvent, Solvent-free and Aqueous Wood Coatings

### GENERAL INFORMATION:

PolyFox fluorosurfactants are environmentally preferred surfactants that have been found not to bioaccumulate, resulting in very low environmental impact as compared to certain telomer-based and other conventional fluorosurfactants. These surfactants are based on OMNOVA Solutions' platform of poly(oxetane) polymers and are tailored to provide wood coating formulators and technologists with environmentally friendly, high performance additives. For instance, PolyFox fluorosurfactants are available for solvent based, water based, and solvent free coating systems, including UV curable coatings. Addition of PolyFox fluorosurfactants to various wood coating systems has been found to improve such properties as flow and leveling, air release, de-entrainment of air, surface appearance, gloss, coefficient of friction, nickel mar resistance and adhesion, and stain resistance/cleanability. PolyFox fluorosurfactant additives can be added to coatings that are sprayed, rolled, brushed, or dipped. Specific examples of how coating appearance and performance can be improved by judicious use of PolyFox additives are given below.

### POLYFOX FLUROSURFACTANTS IN WOOD FLOOR COATINGS:

Addition of PolyFox fluorosurfactants to 100% solids UV coatings for wood flooring results in improved flow and leveling and air release. Nickel mar adhesion also is improved relative to control formulations. Improved surface lubricity without the slippery feel of silicone additives also is noted. The following typical 100% solids, matted, UV coating formulation displays excellent flow and leveling, nickel mar resistance, and improved surface lubricity compared to a formulation that does not utilize PolyFox fluorosurfactants.

### Formulation 1.

#### 100% Solids UV Wood Coating

Item	Weight %	Supplier
Laromer™ PE55F	17.58	BASF
Laromer™ PE44F	15.97	BASF
Ebecryl® 264	24.36	Cytec Surface Specialties
Laromer™ HDDA	12.12	BASF
Sartomer® SR344	16.17	Sartomer
Irgacure® 184	4.26	Ciba
Syloid® 7000	9.05	Grace-Davison
PolyFox™ PF-3320	0.30	OMNOVA
Tego® Airex 920	0.20	Tego-Degussa
<b>Total</b>	<b>100.01</b>	

Products (items) listed in the chart above are the trademarks or registered trademarks of the supplier indicated.



**POLYFOX FLUROSURFACTANTS IN AQUEOUS COATINGS FOR FURNITURE AND CABINETY:**

Addition of specialized PolyFox additives to aqueous coating formulations for furniture and cabinetry results in improved surface appearance resulting from de-aeration and improved air release. These formulations provide coatings with excellent flow, leveling, and appearance characteristics, improved coefficient of friction, and mar resistance properties. **Formulation 2** below is an example of a self-crosslinking coating based on RoShield E3188 from Rohm & Haas Company, containing an additive package consisting of PolyFox AT-1101, BYK-333, and Tego 805.

**Formulation 2.**

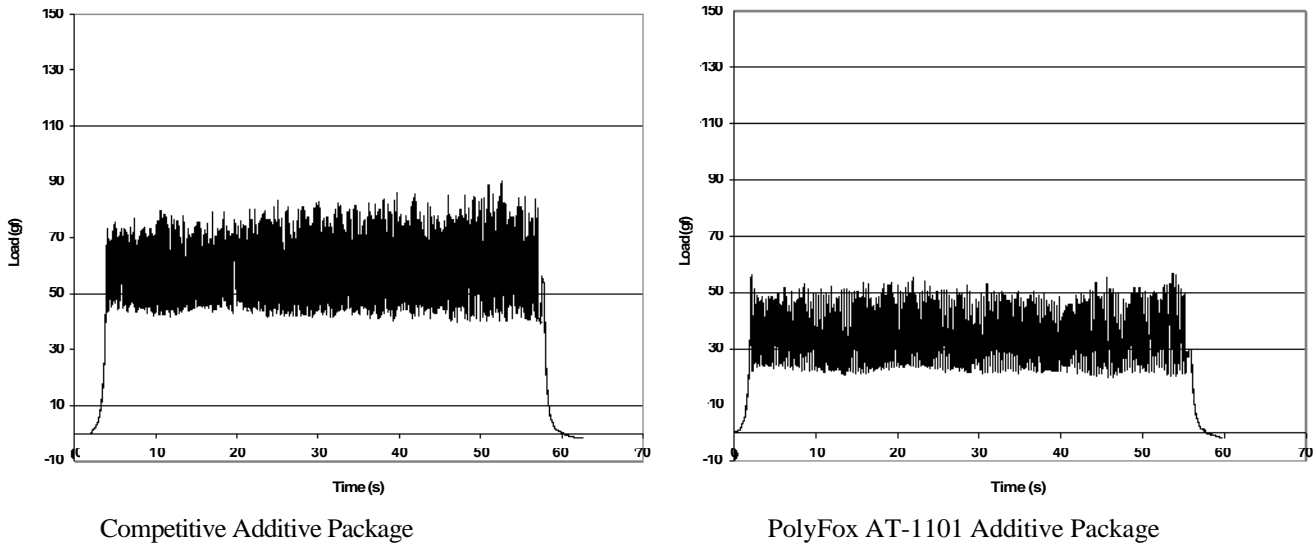
**Aqueous Self-Crosslinking Coating Containing PolyFox™ AT-1101**

Item	Weight %	Supplier
<b>Add in order listed under agitation</b>		
Rhoshield E3188	71.07	Rohm and Haas
Water	11.88	
28% ammonia	0.60	
<b>Premix the following 6 items and add</b>		
Water	1.74	
Dowanol® PNB	1.74	Dow
Dowanol® DPM	1.80	Dow
ArcoSolv® DPTB	1.17	Lyondell
PolyFox™AT-1101	0.31	OMNOVA
<b>Mix and add slowly</b>		
BYK® 333	0.80	BYK Chemie
Tego® Foamex 805	0.06	Degussa-Tego
ME39235	1.67	Michelman
<b>Mix and add</b>		
RM825	0.06	Rohm and Haas
Water	5.94	
<b>Total</b>	<b>100.01</b>	
pH	8.29	
Viscosity, #2Zahn, Sig. cup	27.8 sec	

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**Figure 3.**

**Comparison of Coefficient of Friction With PolyFox Additive Package vs Competitive Additive Package.**



**Formulation 3** (below) is an aqueous wood coating based on Rhoplex CL204 modified with PolyFox AT-1126. This coating results in impressive flow and leveling performance with good de-aeration and air release, especially when applied in a two coat application process.

### Formulation 3

#### Rhoplex CL204 Based Coating Containing PolyFox AT-1126

Item	Weight %	Supplier
<b>Add the following in order listed under agitation</b>		
Rhoplex® CL204	71.13	Rohm and Haas
<b>Premix the following, then add under excellent agitation</b>		
Ethylene glycol monobutyl ether	6.98	
Dipropylene glycol n-propyl ether	2.99	
Water	14.29	
RM825	0.51	Rohm and Haas
ME39235	2.49	Michelman
<b>Mix then add with agitation</b>		
PolyFox™ AT-1126	1.60	OMNOVA
<b>Totals</b>	<b>99.99</b>	

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**Figure 4** compares the de-aeration and flow and leveling performance of this coating modified with PolyFox AT-1126 versus the identical coating containing a competitive additive package.

**Figure 4.**

**Comparison of De-aeration and Air Release Results of PolyFox AT-1126 versus a Competitive Additive Package in a Rhoplex CL204 Coating Formulation 3 (above)**



CL-204 Topcoat with **competitive additive package** – Spray application – Double pass



CL-204 Topcoat with **PolyFox AT-1126 additive** – Spray application – Double pass

### SOLVENT BASED WOOD COATINGS MODIFIED WITH POLYFOX FLUROSURFACTANTS:

The performance of solvent based wood coatings also can be significantly improved by addition of PolyFox Fluorosurfactants. Improved surface appearance results from improved de-aeration, air release, and flow and leveling. Other benefits such as improved stain resistance can be achieved when 2K solvent based coatings are modified with PolyFox fluorosurfactants such as PF-6320 or PF-656.

**Formulation 4** (below) shows a typical 2K acrylic urethane coating modified with PolyFox PF-6320.

## Formulation 4.

### 2K Acrylic Urethane Wood Coating Modified With PolyFox PF-6320

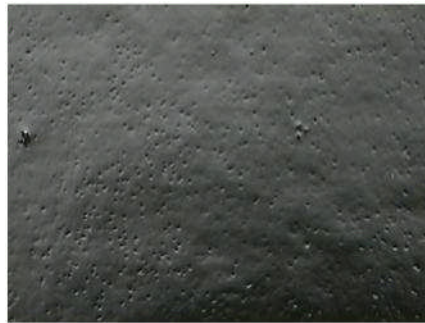
Item	Weight %	Supplier
<b>Add in order listed under agitation</b>		
<b>Part A</b>		
Methyl n-amyl Ketone	13.64	Eastman
MetaCure T-12 (10% in PM Acetate)		Air Products
Methyl Propyl ketone	16.81	Eastman
CAB 551.2	4.21	Eastman
Tinuvin® 328	2.04	Ciba
<b>Mix until dissolved, then add</b>		
Acrylamac® 232-1700	37.77	Resolution Technologies
AcryFlow® P-120	13.67	Lyondell
BYK® 320	0.51	BYK Chemie
PolyFox™ PF-6320 (50% in MPK)	0.10	OMNOVA
<b>Add and mix the following just before application</b>		
<b>Part B</b>		
Desmodur® N3300	11.21	Bayer Materials Science
<b>Total</b>	<b>100</b>	

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**Figure 5** contains close-up photographs exhibiting the improved surface appearance of this coating when PolyFox fluorosurfactants are included compared to the identical formulation without this additive package. Note the elimination of mottling effects, the much smoother coating surface, and the excellent performance achieved when PolyFox is used in combination with other effective flow additives, such as BYK-320.

**Figure 5.**

**Example Showing Improved Surface Appearance Effect of 2K Acrylic Coating With PolyFox PF-6320**



2K Acrylic Coating without additive

Add PolyFox



2K Acrylic Coating with 1060 PPM  
**PolyFox PF6320**



2K Acrylic Coating with 0.51%  
**BYK320/510 PPM PolyFox PF6320**

**Learn More**

Find out how PolyFox fluorosurfactants can improve appearance and performance in your coatings. Call customer service at **(803) 377-2298** or email [carolyn.orr@omnova.com](mailto:carolyn.orr@omnova.com) for samples, literature, or technical assistance or visit our website at [www.omnova.com](http://www.omnova.com)

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