



Making it Greener With Myrifilm®
Zero-VOC Coalescing Solvent

A paint roller with a green handle and a metal frame is shown from a side profile. The roller is covered in a thick, vibrant green paint. The paint is being applied to a surface, creating a smooth, even layer. The background is white, and the roller casts a soft shadow on the surface below it.

HIGH EFFICIENCY
ZERO VOC
LOW ODOR

“More for Less”

Myrifilm is a bio-based, ultra low odor, broad spectrum coalescing solvent. This high-efficiency coalescing solvent is zero-VOC, low odor, non-HAPS. Myrifilm can be applied at substantially lower dosages compared to other coalescing solvents in some formulations and can be used in a wide range of coatings and adhesive formulations.

Applications

Myrifilm can replace conventional coalescing solvents in a wide variety of waterborne coating systems, especially acrylic, styrene-acrylic and ethylene-vinyl acetate copolymers. Because it is zero-VOC, Myrifilm allows the formulation flexibility that is needed to meet increasingly stringent environmental compliance regulations, without compromising performance.

Coatings formulated with Myrifilm display good hardness, tint strength and scrub resistance, without the need for substantial reformulation. As with any product, the performance of Myrifilm must be verified by the end user.

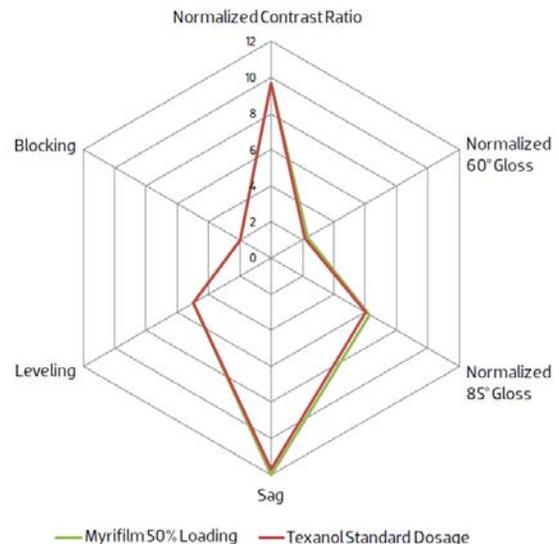
| Myrifilm Properties | |
|---------------------|------------------------------------|
| Purity | 99.5 wt% |
| Moisture | < 500 ppm |
| Color | < 10 Pt-Co |
| Acid Number | 0.01 mg KOH/g |
| Visual | Clear and free of suspended matter |
| Boiling Point | 331.2°C |
| Odor | ultralow |

Lower Dosage of Myrifilm Yields Equal Performance

To compare coalescing solvents, Myrifilm and Texanol were added to separate laboratory semi-gloss formulation samples. Myrifilm's efficiency was highlighted in producing identical film properties at half the concentration of Texanol with very low odor and zero-VOC based on ASTM D-6886.

| Semi-Gloss Formulation | |
|------------------------------------|---------------|
| Raw Material | Weight (lb.) |
| Grind | |
| Water | 29.00 |
| Tamol™ 731A | 8.00 |
| Delonic LF 80MOD | 2.00 |
| DEE FO® 3010A | 0.50 |
| Tafigel® PUR 80 | 17.00 |
| Minex® 10 | 50.00 |
| Attagel® 50 | 3.00 |
| Myrifilm®/Texanol™ | 10.00/20.00 |
| Disperse 30 minutes to a 6-7 grind | |
| Water | 81.00 |
| Letdown | |
| TiO2 Slurry | 280.00 |
| Water | 80.00 |
| Tafigel® PUR 80 | 12.00 |
| Ropaque™ Ultra | 60.00 |
| Orgal* P850RR | 410.00 |
| DEE FO® 3010A | 1.50 |
| Tafigel® PUR 61 | 10.00 |
| Total | 1054.0/1064.0 |
| Equilibrate 24 hours | |

| Physical Properties | |
|---------------------|-------|
| Total VOC g/L | 4 |
| Density, lb/gal | 10.54 |
| Vol % Solids | 36.84 |
| Wt% Solids | 48.79 |
| PVC | 34.09 |



*Orgal P850RR is an all acrylic resin from Organik Kimya with a T_g of 22 °C and a Minimum Film Formation Temperature (MFFT) of 18 °C, similar to BASF Acronal Optive 220 or Dow Rhoplex AC 261.

Formulation Guide

Myrifilm can be used identically as other coalescing solvents. However to optimize Myrifilm usage and maximize properties, it is recommended to use the following procedure.



Surfactant

Myrifilm works well with surfactants with high oil emulsifying property, such as alcohol ethoxylate, nonylphenol ethoxylate types.

Recommended Dosage Level

Determining an optimum dosage level of Myrifilm is an iterative process. A good starting point is to try Myrifilm at half the recommended level of Texanol, and then conduct tests, such as low temperature coalescing (LTC). If it passes the LTC test and other properties are satisfactory, further reduction in the amount of coalescent can be tried next. If not, an increase level should be tested. In all tests, it is important to make sure that Myrifilm should be added prior to the resin and the required equilibration time is minimum 24h.

Performance Compared to Conventional Coalescing Solvents

Myrifilm was evaluated in a typical semi-gloss formulation using Dow Rhoplex SG-30 all acrylic resin. The properties of both the paint and the finished film were evaluated. The coalescing solvents used for comparison were Texanol™ (Eastman), TXIB (Eastman), Optifilm 400™ (Eastman) and dipropylene glycol monobutyl ether (DPnB) (Dow). Using identical coalescent dosage, standard formulation procedure, 24 hour equilibration time, Myrifilm performed equal or better than the other coalescing solvents in all tests.

| Property | Property Comparison of Typical Coalescing Solvents | | | | |
|---|--|----------------|----------------|----------------|----------------|
| | Myrifilm® | Texanol™ | TXIB | Optifilm 400™ | DPnB |
| KU Viscosity (Initial/24 h) (ASTM D-562) | 87.9/104.2 | 90.7/107.8 | 99.3/115.7 | 94.7/112.3 | 83.8/95.4 |
| Sag (ASTM D-4400) | 10.7 | 10 | 11.3 | 10.7 | 7.3 |
| Leveling (ASTM D-4062) | 4 | 4 | 4 | 4 | 3.8 |
| Contrast Ratio (Air-dry, 24h) (ASTM D-2805) | 96.24 | 96.25 | 96.43 | 96.98 | 96.4 |
| Gloss 20°/60°/85° (ASTM D-523) | 44.4/74.4/97.9 | 39.8/75.3/97.8 | 39.8/75.1/97.6 | 45.5/78.0/98.2 | 37.4/73.3/96.2 |
| Block Resistance (120 °F, 24h) (ASTM D-4946) | 5 | 6 | 5.33 | 5.67 | 6 |
| Scrub Resistance (2,400 cycles) | 8 | 8 | 9 | 9 | 8 |
| LTC (40 °F, 10 mil) (ASTM D-7306) | 5 | 5 | 5 | 5 | 5 |
| Tint Strength (Red) %TSUC | 103.3 | 99.8 | 104.3 | 100.8 | 97.1 |
| Tint Strength (Yellow) %TSUC | 83.5 | 99.4 | 80.1 | 74.3 | 90.1 |
| Tint Strength (Blue) %TSUC | 101.4 | 100 | 105.8 | 99.7 | 80.5 |

Performance in Various Resin Types

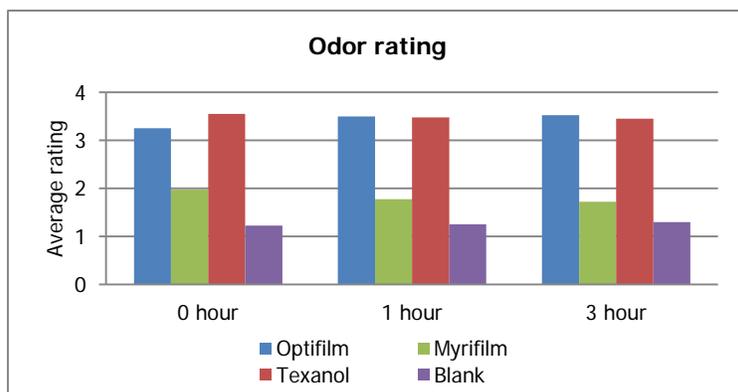
In order to evaluate Myrifilm's performance in other resin systems, the same semi-gloss formulation was used. The resin was replaced as indicated in the following table, and low temperature coalescing (LTC) characteristics were evaluated based on ASTM D-7306, where 5 indicated no cracking and 0 indicated film chipping off completely. These results show that Myrifilm is an effective coalescent in a broad range of typical resins used for both coatings and adhesives.

| | Low Temperature Coalescing (10 mil/250 Micron Film) | Low Temperature Coalescing (5 mil/125 Micron Film) |
|---|--|---|
| Rhoplex SG-30 (Acrylic) with Myrifilm® | 4 | 3 |
| Rhoplex SG-30 (Acrylic) with Texanol™ | 3 | 1 |
| Styofan ND 593 (Styrene/Butadiene) with Myrifilm® | 5 | 4 |
| Styofan ND 593 (Styrene/Butadiene) with Texanol™ | 5 | 5 |
| Acronal S504 (Acrylic) with Myrifilm® | 5 | 5 |
| Acronal S504 (Acrylic) with Texanol™ | 5 | 5 |
| Acronal 296D (Styrene/Acrylic) with Myrifilm® | 5 | 5 |
| Acronal 296D (Styrene/Acrylic) with Texanol™ | 5 | 5 |

Ultra Low Odor Compared to Other Coalescing Solvents

A blind study was conducted to compare odors of commercial waterborne interior flat wall paint formulated with Myrifilm, Texanol ester alcohol (Eastman), Optifilm enhancer 400 (Eastman) and one with no coalescent as the control.

The paints were evaluated for their odor characteristic at three intervals under controlled ambient conditions. The test results data from the average odor response of twenty panelists illustrated a much lower odor characteristic in the paint containing Myrifilm. In addition the residual odor of the paints after air dry at room temperature for 1 and 3 hours also indicated that the paint containing Myrifilm has a very low odor comparable to paint containing no coalescing solvent and much lower than the paint containing Texanol ester alcohol or Optifilm enhancer 400.



Safety and Regulatory

Myrifilm is listed on the U.S. TSCA inventory, the Canadian DSL, the Korean ECL, the Australian AICS and is registered under REACH (01-2119985662-25-0000).

When using this product, the information and advice given in the Material Safety Data Sheet should be observed. Normal precautions for the handling of chemicals, including wearing proper personal protective equipment, should be followed at all times. The Material Safety Data Sheet is available on request.

Handling and Storage

Store in a tightly closed container in a cool, well-ventilated area away from sources of heat or ignition.

Packaging

Samples are available in 1-liter or 1-gallon bottles. Product is available in steel drums, totes or in bulk.

SAMPLES AVAILABLE! Order today by calling
+ 1 855.MYRIANT or visiting www.myriant.com.

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