



Technical Data Sheet

RHOPLEX™ MV-23LO Emulsion Copolymer

For Wood Primers and Stain Blocking Sealers

Introduction

RHOPLEX™ MV-23LO Emulsion Copolymer is an aqueous, all-acrylic binder designed for interior and exterior wood primers and stain-blocking sealers. It is a versatile vehicle that can be used in both the formulation of primers that upgrade difficult substrates into sound repaint surfaces, and stain-blocking sealers that minimize the "bleed through" of wood tannins and common household stains.

Benefits

- Low ammonia
- Low odor
- Formaldehyde-free
- Low VOC
- Excellent stain-blocking
- Good adhesion to weathered unpainted wood and typical repaint substrates
- Excellent holdout of topcoats
- Nail head rust resistance
- Corrosion resistance
- Good zinc oxide stability
- Good flow and film build

Exterior Performance

The all-acrylic composition and the high molecular weight of RHOPLEX™ MV-23LO Emulsion Copolymer provide excellent outdoor durability which has been confirmed by exposure tests on various substrates. Table 1 on page 2 demonstrates the tannin stain-blocking ability and the nail-head rust-resistance of this versatile binder.

Typical Physical Properties¹

Property	Typical Values
Appearance	Milky White Liquid
Ionic Character	Anionic
Solids Content, %	43
Viscosity, Brookfield, cps (25°C) (#3 spindle, 60 rpm)	200 - 1800
pH	8.5
Minimum Film Formation Temperature, (MFFT), °C	8
Specific Gravity	1.054
Density, US lb/gal	8.8
Bulking Value, US lb/gal	
Dry Solids	0.105
Wet	0.114

1. These properties are typical but do not constitute specifications.

Table 1: Tannin Stain Blocking and Nail Head Rust Resistance

Primer	Tannin Staining	Nail Head Rusting
Formulation P-23LO-22	6 to 10	8 to 10
Self-primed topcoat	2 to 5	2 to 4
Alkyd	5 to 10	NA

1. Scale: 1 = very heavy; 10 = none; NA = not available

Tannin Stain Blocking

Redwood and cedar boards were painted with one coat of primer and air-dried for 4 hours. One coat of topcoat was then applied and immediately placed face up in a high-humidity cabinet.

Nail-Head Rust Resistance

Boards were painted with one coat of primer and one coat of topcoat. They were exposed at a north vertical angle and evaluated after 6 months.

Note

Topcoat formulation was an exterior gloss based on RHOPLEX™ AC-507 Acrylic Emulsion in a 23PVC/35 VS formulation.

Interior Performance

RHOPLEX™ MV-23LO Emulsion Copolymer acts as a stain-blocking sealer when applied over troublesome stains such as lipstick, ball point and felt pens.

A comparison of the stain blocking performance of a commercial shellac sealer, a commercial latex-based sealer and Formulation P-23LO-22 based on RHOPLEX™ MV-23LO Emulsion Copolymer is given in Table 2. A high-quality interior flat paint is included as a control.

The RHOPLEX™ MV-23LO Emulsion Copolymer formulation provides the best performance of the latex sealers with much better resistance to ball point pen than the commercial latex-based product. If zinc oxide is removed from the RHOPLEX™ MV-23LO Emulsion Copolymer formulation, there will be a substantial decrease in stain blocking performance.

Formulating Regulations

Starting point formulations for RHOPLEX™ MV-23LO Emulsion Copolymer are separate from this bulletin. These formulations are intended to serve as guidelines for developing interior and exterior primers and stain-blocking sealers that use the outstanding properties of RHOPLEX™ MV-23LO Emulsion Copolymer to the fullest. RHOPLEX™ MV-23LO Emulsion Copolymer is the primary factor in obtaining the stain-blocking performance of these formulations. However, to achieve the full potential of RHOPLEX™ MV-23LO Emulsion Copolymer, a number of other formulation variables must be considered to realize the desired stain-blocking performance.

Table 2: Stain Blocking Performance

Primer	Lipstick	Red Ball Point Pen	Blue Ball Point Pen	Felt Pen
Formulation P-23LO-22	10	9	9	8
Commercial shellac-based sealer	10	10	10	9
Commercial latex-based sealer	7	4	3	6
High-quality interior flat paint	3	3	3	3

1. Scale: 1 = very heavy; 10 = none

Test Conditions

Upson boards were painted with one coat of high quality interior flat latex and air-dried at 140°F for 16 hours. The stains were then applied and allowed to dry overnight. The test paints and controls (primers) were applied over the panels at right angles to the stains. After allowing the first coat to air dry at room temperature for 4 hours, the panels were topcoated. Panels were then allowed to air dry at room temperature for 24 hours. After conditioning, panels were rated.

Rheology Modifiers

A combination of ACRY SOL™ RM-825 and ACRY SOL™ RM-2020 NPR Rheology Modifiers is recommended for use with RHOPLEX™ MV-23LO Emulsion Copolymer to achieve the desired balance between low and high shear viscosities. This combination will impart good application properties along with good flow and film build. In some formulations, adding ACRY SOL™ RM-2020 NPR Rheology Modifier to the grind will act as a grinding aid and reduce the potential for grit formation.

ACRY SOL™ RM-2020 NPR Rheology Modifier will contribute a small decrease in VOC since it is 100% waterborne and will impart a slightly higher low-shear viscosity.

A low level of ACRY SOL™ TT-615 Rheology Modifier (2 pounds per 100 gallons) can be used to increase low shear viscosity and reduce in-can settling. ACRY SOL™ TT-615 Rheology Modifier should be premixed with water to reduce the potential for grit formation.

Conventional thickeners such as HEC will not permit RHOPLEX™ MV-23LO Emulsion Copolymer to achieve its full tannin stain blocking potential and will minimize flow and film build.

Dispersants

A combination of TAMOL™ 681 and TAMOL™ 960 Dispersants is recommended for use with RHOPLEX™ MV-23LO Emulsion Copolymer. TAMOL™ 681 Dispersant was designed to be compatible with RHOPLEX™ MV-23LO Emulsion Copolymer and contributes to higher film integrity. This dispersant, recommended at 1.5% solids on pigment solids, is a key ingredient in achieving maximum corrosion resistance and stability with reactive pigments such as zinc oxide. TAMOL™ 960 Dispersant is recommended as an auxiliary dispersant at a low level (0.3% solids on pigment solids) to add thixotropy and inhibit pigment settling. Use at higher levels will reduce corrosion resistance. If TAMOL™ 681 Dispersant is used alone, a level of 2.0% (solids on pigment solids) is recommended.

Coalescents

A low volatility coalescent such as Texanol ester alcohol is recommended to ensure the formation of a tight film needed for toughness and stain blocking with RHOPLEX™ MV-23LO Emulsion Copolymer. A more volatile, water-soluble coalescent such as Butyl Carbitol can be used if faster dry time is required. Butyl Carbitol will reduce high shear viscosity when used with nonionic urethane rheology modifiers such as ACRY SOL™ RM-825 Dispersant and ACRY SOL™ RM-1020 Dispersant resulting in the need for increased levels of thickener.

Pigments and Extenders

Zinc oxide at a level of 12 pounds per 100 gallons is critical for maximizing the stain blocking and corrosion resistance of RHOPLEX™ MV-23LO Emulsion Copolymer. A small particle size, French process, zinc oxide such as Kadox 915 zinc oxide is recommended. RHOPLEX™ MV-23LO Emulsion Copolymer was specifically designed to be used with zinc oxide and as a result, stable paints are produced when formulated with zinc oxide. Zinc oxide should be added as the last step in the grind to reduce the potential for grit formation.

Atomite, a wet ground calcium carbonate extender pigment with an average particle size of 2 to 5 microns, is suggested if corrosion resistance along with tannin stain blocking is important. Improved tannin stain blocking can be achieved if a platy pigment such as talc or mica is chosen; however, corrosion resistance may be comprised.

ROPAQUE™ OP-96 Opaque Polymer is a non-film forming pigment engineered to optimize hiding in architectural coatings. In addition to inherent hiding properties, it enables the formulator to improve properties and realize cost savings. ROPAQUE™ OP-96 Opaque Polymer is performance proven for interior and exterior applications and can be effectively used in wood primer and stain-blocking sealer formulations based on RHOPLEX™ MV-23LO Emulsion Copolymer.

Early Rust Resistance

Sodium nitrite is recommended at a level of 1.0 to 1.5 pounds per 100 gallons to ensure flash rust and early rust resistance under severe conditions. It should be added to the letdown as a 15% aqueous solution. Raybo No Rust is an effective alternative for flash and early rust resistance.

Pigment Volume Concentration (PVC)

In general, high quality primer/sealers are formulated around 20 PVC. This low PVC contributes to film tightness and cohesion and, therefore, very good stain blocking. At PVC's above 30, stain blocking and early rust resistance may be sacrificed.

Material Safety Data Sheets

The Dow Chemical Company Material Safety Data Sheets (MSDS) contain pertinent information that you may need to protect your employees and customers against any known health or safety hazards associated with our products.

Under the OSHA Hazard Communication Standard, workers must have access to and understand MSDS on all hazardous substances to which they are exposed. Thus, it is important that you provide appropriate training and information to your employees and make sure they have available to them MSDS on any hazardous products in their workplace.

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Updated MSDS are sent upon revision to all customers of record. In addition, MSDS are sent annually to all customers receiving products deemed hazardous under the Superfund Amendments and Reauthorization Act.

MSDS should be obtained from your suppliers of other materials recommended in this bulletin.

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Handling Precautions

Before using this product, consult the Material Safety Data Sheet (MSDS)/Safety Data Sheet (SDS) for details on product hazards, recommended handling precautions and product storage.

CAUTION! Keep combustible and/or flammable products and their vapors away from heat, sparks, flames and other sources of ignition including static discharge. Processing or operating at temperatures near or above product flashpoint may pose a fire hazard. Use appropriate grounding and bonding techniques to manage static discharge hazards.

CAUTION! Failure to maintain proper volume level when using immersion heaters can expose tank and solution to excessive heat resulting in a possible combustion hazard, particularly when plastic tanks are used.

Storage

Store products in tightly closed original containers at temperatures recommended on the product label.

Disposal Considerations

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

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