



Technical Data Sheet

RHOPLEX™ WL-96 Waterborne Acrylic Polymer For Low VOC Interior Clear Wood Finishes

Introduction

RHOPLEX™ WL-96 Waterborne Acrylic Polymer is a binder that can be used for low-VOC, brush-applied, interior clear wood finishes. It is well suited for finishing wood trim, doors, walls and floors.

Finishes formulated with RHOPLEX™ WL-96 Waterborne Acrylic Polymer or with a blend of RHOPLEX™ WL-96 Waterborne Acrylic Polymer and a polyurethane dispersion enhance hardness, stain and chemical resistance, and other performance characteristics. Overall, the properties make a clear wood finish based on RHOPLEX™ WL-96 Waterborne Acrylic Polymer a very viable alternative to solvent-based clear finishes.

Benefits

- VOC-compliant formulations
- Good clarity
- Good flow and leveling
- Excellent chemical and stain resistance
- Outstanding block resistance
- Excellent mar resistance
- Good wear properties

Typical Physical Properties¹

Property	Typical Values
Appearance	Light Yellow Liquid
Solids Content, Weight, %	42
pH	6.5 - 7.5
Viscosity, Brookfield, cps (25°C)	400 - 1,400
Density, 25°C, US lb/gal	
Wet	8.62
Dry	9.08
Specific Gravity	1.036
Minimum Film Formation Temperature, (MFFT), °C	26
T300, °C	60
Freeze/Thaw Stability	Protect from freezing
Mechanical Stability, 5 min. (Waring Blender)	Pass
Heat Stability (10 days/140°F)	Pass

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

Property Performance of RHOPLEX™ WL-96 Interior Water-Based Clear Wood Finish

Properties	RHOPLEX™ WL-96 Waterborne Acrylic Polymer Sanc 815 80/20	RHOPLEX™ WL-96 Waterborne Acrylic Polymer	Commercial Control Solvent Based
Gloss, 60°/20° ²			
White Pine Pre-stained with Water-Based Stain	85 / 43	79 / 42	90 / 47
White Pine Pre-stained with Solvent-Based Stain	86 / 46	81 / 43	91 / 50
Clarity	Good	Good	Very Good
Flow	Good	Good	Excellent
Alcohol/Water (3A Alcohol/Water 50/50) Wet, Whitening After 3 Hours 1 Hour Dry 3 Days Dry	Light Trace Trace	Light None None	Trace Trace Trace
Low Temp/High Humidity Film Formation (45°F/70% R.H.)	OK	OK	OK
Stain Resistance After 1.0 Hour:			
2% NaOH	OK	OK	OK
2% TSP	OK	OK	OK
2% HCL	OK	OK	OK
3A Alcohol	Stain	Stain	OK
Cold Water	OK	OK	OK
1% Coffee	OK	OK	OK
5% Acetic Acid	OK	OK	OK
2% H ₂ SO ₄	OK	OK	OK
10% Citric Acid	OK	OK	OK
1% Tide detergent	OK	OK	OK
3% NaOH	OK	OK	OK
Hot Water	OK	OK	OK
Tack Free Time, Hours	3	3	3.5
Hardness			
Tukon	4.3	4.6	6.7
Sward Rocker	33	32	34
Block Resistance			
1 Day A.D., 0.5 Hr/120°F	7	5	8
7 Days A.D., 0.5 Hr/120°F	8	8	8+
Taber Abrasion, Wear Index ³	16.5	20.0	10.0
Adhesion, %, Solvent-Based Stain	100	99	100
Viscosity, cP R.T.	530	1304	53
ICI, poise	0.5	0.6	0.4

2. Coat of stain plus 3 coats of clear. One day dry between each coat. Sanding was applied between coats.

3. Wear Index = Weight Loss (mg) x 1000 Number of Cycles

Formulating Recommendations

Polyurethane Dispersion (PUD)

PUDs are used mainly to enhance wear resistance of the finish. They also depress the low shear viscosity and enhance mar resistance. Testing has shown an 80/20 (by solids) blend to provide optimum performance. For certain applications other ratios might offer a better cost/performance balance.

Overall, Sancure 815 dispersion, an aliphatic water-borne PUD (35% solids) has shown excellent results in combination with RHOPLEX™ WL-96 Waterborne Acrylic Polymer. A satisfactory alternative would be Witcobond W-240 dispersion (30% solids).

Coalescents and Cosolvents

Coalescents play an important role in film formation of the finish under adverse conditions. It is very important to choose the right type and the right level.

Recommended coalescents for RHOPLEX™ WL-96 Waterborne Acrylic Polymer are Texanol ester alcohol in combination with Propasol B (Propylene glycol n-butyl ether).

Propasol B propylene glycol n-butyl ether is a fast evaporating coalescent which helps in shortening tack-free time. Texanol ester alcohol is a slower evaporating, water immiscible coalescent. It ensures good film formation in low-temperature/high-humidity situations.

Alternative coalescents would be Hexyl CARBITOL™ Solvent or DOWANOL™ Dipropylene Glycol Monobutyl Ether. Coalescents have a significant influence on the viscosity of the finish. Texanol ester alcohol tends to give higher viscosity compared to Hexyl CARBITOL™ Solvent or DOWANOL™ Dipropylene Glycol Monobutyl Ether.

Ethylene glycol is suggested to enhance freeze-thaw stability and wet edge properties. Propylene glycol is a satisfactory alternative.

Defoamers

We recommend the use of Patcote 519 defoamer, a silicone-type defoamer, along with mineral spirits. For optimum formulating, we suggested premixing Texanol ester alcohol, ethylene glycol, and Patcote 519 defoamer and adding them slowly to the formulation.

Mar Aids

Michem 39235 emulsion, a polyethylene wax emulsion, is recommended as the best aid to enhance mar resistance.

Rheology Modifiers

Nonionic associative rheology modifiers allow the formulator to achieve very good application properties while maintaining excellent flow and leveling. We recommend that ACRY SOL™ RM-1020 or ACRY SOL™ RM-825 Rheology Modifiers be used to get the desired rheology profiles.

Flattening

We suggest the addition of Degussa TS-100 matting agent, a flattening silica, or Syloid 169 silica to control gloss. Levels depend on the desired gloss level, e.g. 4% of Degussa TS-100 matting agent drops the 60 degree gloss by 50%.

pH Considerations

RHOPLEX™ WL-96 Waterborne Acrylic Polymer is a self-thickening emulsion. The higher the pH of the formulation, the higher the viscosity. The recommended pH for use in wood finishes is between 7 and 8 and should be adjusted using 14% ammonia. A nonionic associative rheology modifier should be used to increase viscosity above the level achieved in the recommended pH range.

Also, free ammonia may cause an acceleration of yellowing in an underlying light-colored oil-based stain. The formulator should check his recommended oil-based stains in this respect.

Appearance

Clear wood finishes formulated with RHOPLEX™ WL-96 Waterborne Acrylic Polymer enhance the warmth of the wood and exhibit good clarity over most stained substrates. When used over white or light pastel colored stains, however, the finish shows a slight yellow cast. If water-white clarity is required in a finish, RHOPLEX™ WL-81 Thermoplastic Waterborne Acrylic Polymer is recommended which provides similar performance with only a minimal decrease in resistance properties. (See [Bulletin 81A135](#)).

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RHOPLEX™ WL-96 Waterborne Acrylic Polymer

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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