



RayCore 9570 Technical Bulletin Polyurethane-Acrylic Core Shell Emulsion

RayCore 9570 is a polyurethane-acrylic core shell hybrid designed to provide outstanding chemical, scratch and UV resistance. It has excellent adhesion to a variety of surfaces.

Key Features

- Excellent chemical and water resistance
- Exceptional scratch resistance
- Excellent stain resistance – passes KCMA requirements
- Very good block resistance and hardness

RayCore 9570 Typical Physical Properties*

Polymer type	Urethane-acrylic core shell hybrid
Weight solids	37%
Viscosity (Brookfield Model RVT)	63 cps, #2/100 rpm
pH	9.4
Tg (DSC)	16°C
VOC (gm/L)	162
MFFT (ASTM D-2354)	<5°C
Particle size (Mean)	0.07 microns
Surfactant charge	Anionic
Weight per gallon	8.9 lbs/gal
Freeze thaw stability	Do Not Freeze

** These properties are typical, but do not constitute specifications*

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Suggested Formulation

RayCore 9570 – Acrylic Urethane Satin Cabinet Enamel

Suggested formulation GM102-189-1

Raw Materials	Weight (lbs)	Volume (gal)
Water	41.70	5.01
Byk 024	2.50	0.30
Proxel GXL	1.00	0.11
Nuosperse FX610	5.50	0.61
TiPure R706	175.00	5.25
Minex 10*	50.00	2.31
Water**	16.66	2.00
RayCore 9570	637.32	76.00
Texanol	5.00	0.63
Byk 346	1.50	0.18
Water	43.73	5.25
Tafigel PUR80***	17.00	1.98
Acrysol SCT275	1.00	0.12
Byk 024****	1.00	0.12
Ammonia (28%)	1.00	0.13
Total	1,035.90	100.00

* Add as needed for good dispersion

** Cowles grind for 20 minutes

*** Adjust viscosity to 110 KU

**** Add as needed to adjust pH to 9.0

Typical Physical Properties

Weight per gallon, lbs/gal	10.36	VOC, lbs/gal	1.20
Weight solids, %	46.70	PVC %	23.16
Volume solids, %	33.65	Coalescent, %	4.82
VOC, g/L	143		

Performance Properties of Acrylic Urethane Satin Cabinet Enamel

Property	RayCore 90370 Formulation GM102-189-1
Gloss @ 20°	17.7
Gloss @ 60°	48.8
Scrub - cycles to first break	800
Chemical Resistance 1 Hr Spot Test	
Heinz white vinegar spot	SI Softening
Welchs 100% grape juice spot	SI Softening
Pompeian olive oil spot	No effect
100 proof vodka spot	SI Softening
Metal Adhesion	
Dry Adhesion: Untreated Aluminum	5B
Wet Adhesion: Untreated Aluminum	4-5B
Dry Adhesion: Polished Cold Rolled Steel	4B
Wet Adhesion: Polished Cold Rolled Steel	3-4B
Dry Adhesion: Matte Cold Rolled Steel	5B
Wet Adhesion: Matte Cold Rolled Steel	2-3B
Pencil hardness	HB-F, F,B,B
Block Testing	
RT 1 day (1-10, 10 Best)	10
50C 1 day (1-10, 10 Best)	9
RT 1 week (1-10, 10 Best)	10
50C 1 week (1-10, 10 Best)	10
Stain Removal, Color Difference after 200 Cycles with 1% Tide	
Carbon Blk ΔE	0.74
Lipstick ΔE	0.97
Grape Juice ΔE	0.53
Coffee ΔE	0.5

Table 1. Performance Properties

Formulation Guidelines

Coalescent: Hydrophobic coalescents such as Dowanol DPnB and Texanol work well with the RayCore 9570. A coalescent level of 5% on binder solids is recommended for best coalescence at low temperatures. For more rapid hardness development, part of the hydrophobic coalescent can be replaced by Butyl Carbitol, however the total coalescent level may need to be raised since the hydrophilic coalescents are less efficient at reducing the film formation temperature. Lower VOC formulations can be achieved by replacing part of the coalescent with a plasticizer like Optifilm 400.

Dispersant: Hydrophobic dispersants such as Nuospense FX610 or Tamol 2002 give good gloss and stability with RayCore 9570 in HEUR thickened formulations. Other dispersants should be evaluated for gloss and heat age stability.

Rheology Modifiers: HEUR rheology modifiers like Acrysol SCT-275 or a combination of the Munsing Tafigel PUR40 and Acrysol RM-12W work well with the RayCore 9570 and to give good sag resistance in spray applications. For bushed or rolled applications, rheology modifiers such as the Tafigel PUR80 can be used in combination with the Tafigel PUR40 or Acrysol SCT-275 to build the high shear for higher brush applied film thicknesses.

Defoamers: Dispersible silicone defoamers like Tego Foamex 1488 or Byk 024 give good defoaming and high gloss in paints made with RayCore 9570. Some mineral oil defoamers can give lower gloss with RayCore 9570 and are not recommended in high gloss coatings.

Suggested Formulation

RayCore 9570 – Acrylic Urethane Satin Clear Wood Coating

Raw Materials	Weight (lbs)	Volume (gal)
Ceraflour 929	12.00	1.36
Water	52.50	6.30
DPnB	10.00	1.32
Kathon LX 1.5%	1.00	0.12
Tego Foamex 1488	0.75	0.08
Aquacer 539	40.00	4.85
>Premix above materials then add to polymer		
RayCore 9570	730.00	82.68
Dynol 360	5.00	0.61
Capstone FS-63	0.50	0.05
>Premix then add the following two materials		
Water	20.00	2.40
Acrysol RM-825	2.00	0.23
Totals	873.75	100.00

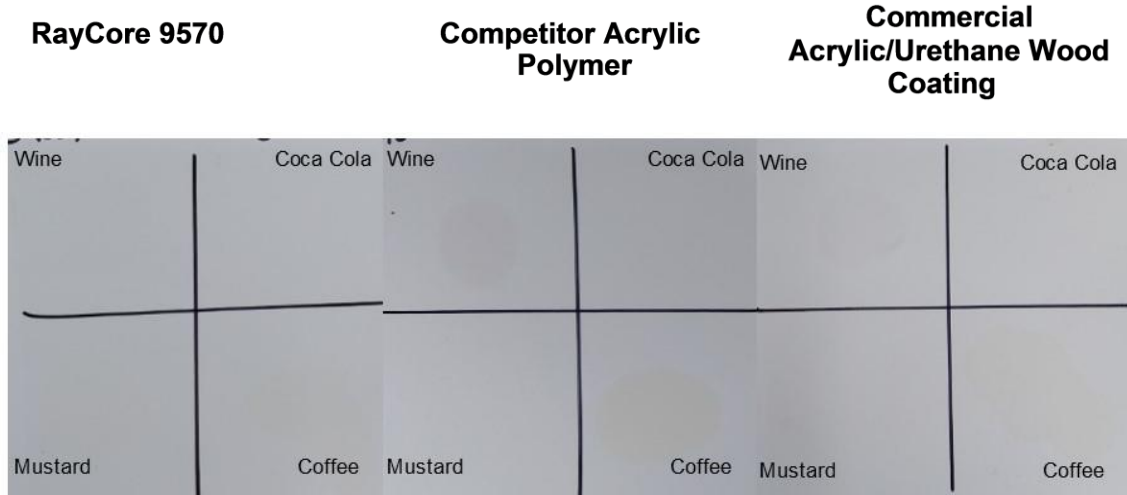
Typical Physical Properties

Weight solids, %	34.5	60° Gloss	40 - 50
pH	8.5 – 9.5		

Comparative Testing

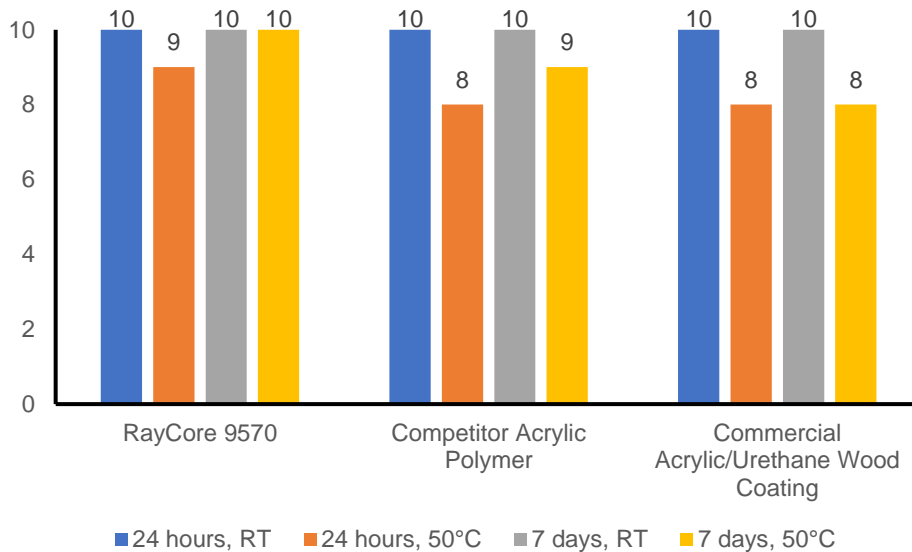
A satin clear wood coating formulated with RayCore 9570 was compared to a satin clear wood coating formulated with a competitor polymer and a commercially available acrylic/urethane wood coating.

Early stain resistance



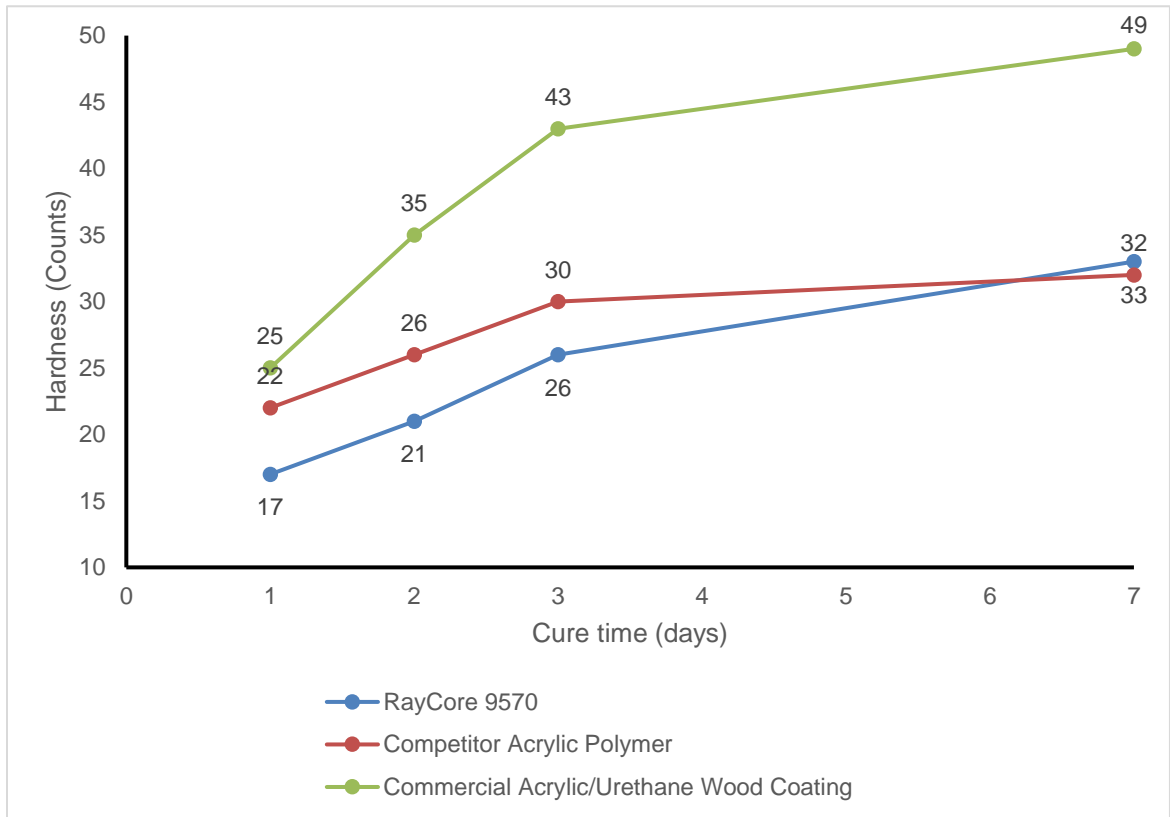
Picture 1. 10 mil wet drawdown cured 24 hours then exposed to chemicals for 1 hour before removing with a wet sponge

Block Resistance – ASTM D4946



Graph 1. 6 mil wet drawdown, cured at room temperature before 30-minute block resistance test at specified temperature

König Pendulum Hardness – ASTM D4366



Graph 2. 6 mil wet drawdown on aluminum

KCMA Stain Resistance Test

	RayCore 9570	Competitor Acrylic Polymer	Commercial Acrylic/Urethane Wood Coating
White Vinegar	5	5	5
Lemon Juice	5	5	5
Orange Juice	5	5	5
Grape Juice	5	5	5
Ketchup	5	5	5
Coffee	5	4.5	5
Olive Oil	5	5	5
100 Proof Vodka	5	4	5
Mustard (1 hour spot), 24 hour recovery	4*	4.5*	4.5*
Total	44	43	44.5

Table 2. 2 coats on oak, cured for 10 days at room temperature before 24-hour open spot test (with the exception of mustard which was left for 60 minutes). After exposure the panels are scrubbed under running water then rated.

*Recovered completely after 72 hours

Rating:

5 = no discoloration/no loss of gloss, no film defects

4 = slight staining/loss of gloss, no film defects

3 = dark staining/loss of gloss, no film defects

2 = film defects (swelling, blisters, lifting), no discoloration

1 = film defects (swelling, blisters, tacky/softening), discoloration, loss of gloss

0 = total destruction of the film

IMPORTANT INFORMATION

If any product is defective in workmanship or materials, Specialty Polymers, Inc. will replace the product. The information contained in this Technical Bulletin is intended to be a guideline. It is offered in good faith, but without guarantee. We recommend users of the product perform their own testing to determine the suitability of the product in their application.