



The Chemical Company

Acronal[®] PLUS 4800

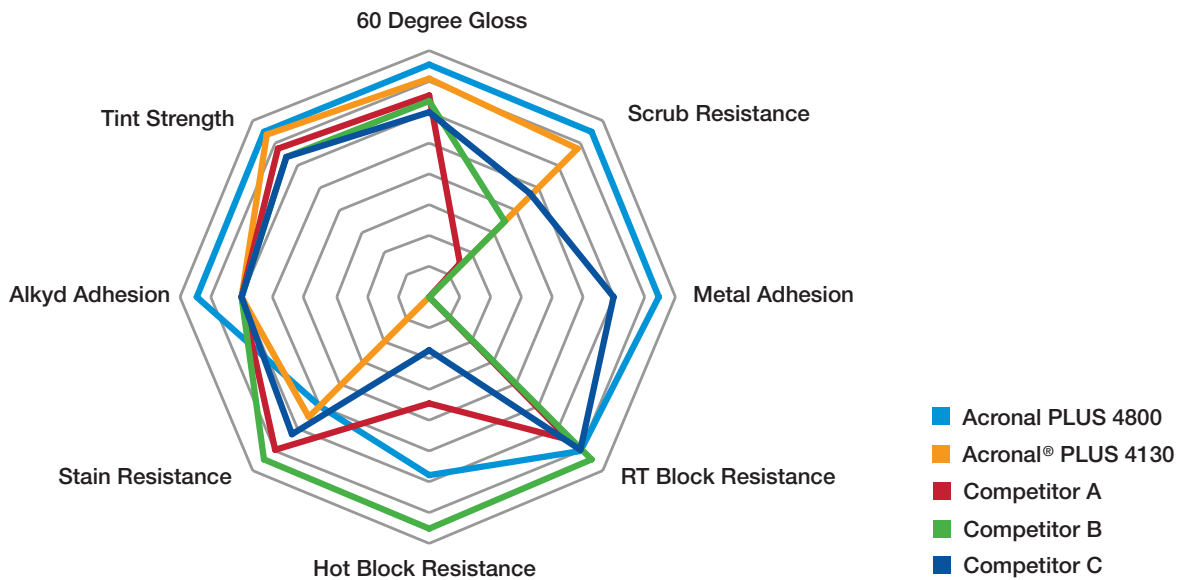
Achieving high performance with
value for interior architectural coatings

Acronal PLUS 4800

Achieving high performance with value for interior architectural coatings.

Acronal PLUS 4800 is an APEO-free, ammonia-free styrene acrylic latex for <50 g/L VOC coatings, intended for interior applications. It is intended for use in flat through semi-gloss formulations. Acronal PLUS 4800 is value engineered to achieve properties of a straight acrylic latex without sacrificing performance. It demonstrates competitive TiO₂ efficiency and superior gloss compared to straight acrylic alternatives. Acronal PLUS 4800 further shows comparable scrub, block and stain resistance to leading competitive acrylic latexes.

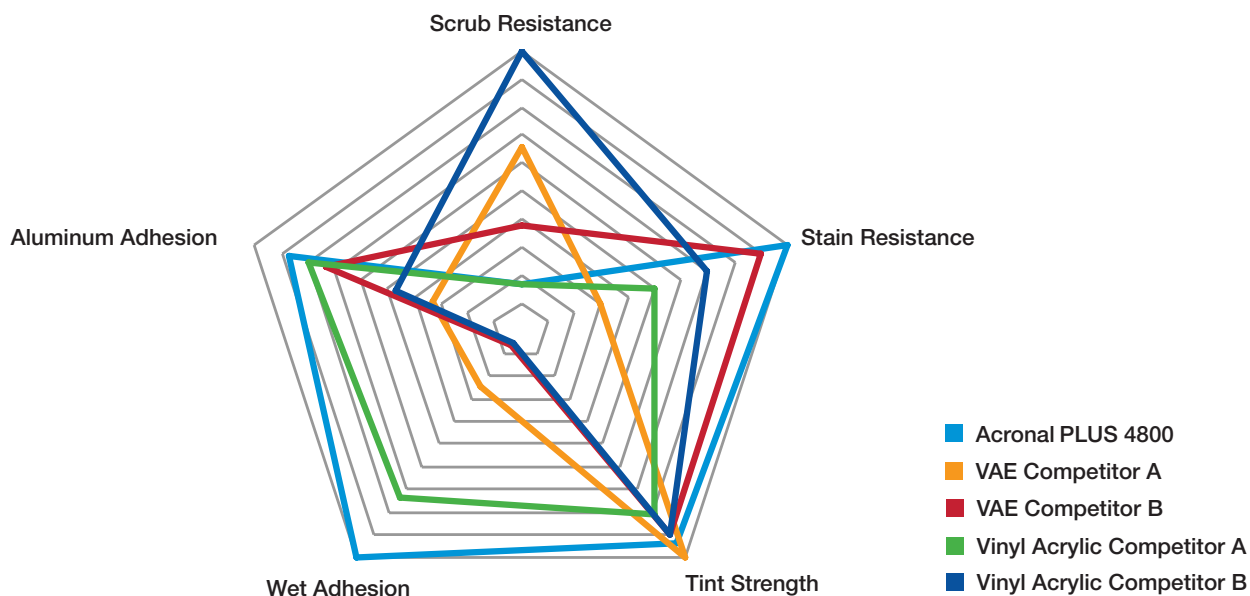
Performance of Acronal PLUS 4800 in a DIY Semi-Gloss Formulation



	Acronal PLUS 4800	Acronal PLUS 4130	Competitor A	Competitor B	Competitor C
Gloss 20°/60°/80°	26/64/85	22/60/84	16/55/83	15/53/83	12/51/83
Tint Strength	100	98	91	86	86
Scrub Resistance	2560	1945	563	1376	1263
Metal Adhesion	5	5	0	0	5
Room Temperature Block Resistance	7	0.1	6.5	7.8	7
Hot Block Resistance	5	0.1	3	6.5	1.5
Alkyd Adhesion	5	4	4	4	4

Acronal® PLUS 4800

Performance of Acronal PLUS 4800 in an Economy Grade Flat Formulation



	Acronal PLUS 4800	VAE Competitor A	VAE Competitor B	Vinyl Acrylic Competitor A	Vinyl Acrylic Competitor B
Scrub Resistance	392	1670	867	346	2155
Stain Resistance	10	3	9	5	7
Tint Strength	93.6	100	89.7	81.3	90.6
Wet Adhesion	>2000	499	118	1474	109
Aluminum Adhesion	4.4	1.7	3.7	4.0	2.3

TiO₂ Distribution

SEM images at 10,000x

The SEM images to the right show that Acronal PLUS 4800 has superior TiO₂ distribution to a typical straight acrylic. For formulators, this improved efficiency offers cost savings on TiO₂ in paint formulations.

Acronal PLUS 4800



Competitor A



Acronal® PLUS 4800

Formulation Guidelines

Acronal PLUS 4800 offers paint formulators superior tint strength and gloss along with great scrub resistance, block resistance and adhesion for interior architectural formulations. The tint strength capabilities allow formulators to easily reduce the amount of TiO₂ in their formulations through the use of Acronal PLUS 4800, leading to cost reduction and improved performance. Acronal PLUS 4800 can be added as the single resin in the coating or as a blended resin to improve tint strength of existing formulations.

Acronal PLUS 4800 can be formulated with outstanding performance at 0 VOC from flat through semi-gloss finishes. Formulations with content higher than 0 VOC also maintain the competitive advantages of Acronal PLUS 4800 in a higher VOC form in both economy and DIY grades.

Latex Properties

Acronal PLUS 4800

Styrene-Acrylic Latex Resin

Solids Content, Weight %	47 – 49
VOC Content, Weight %	<0.2
VOC Content, Volume %	<0.2
Brookfield Viscosity, cps	<1000
pH	7.5 – 9
MFFT	ca. 7°C
Particle Size, nm	ca. 136
Specific Gravity, g/cm ³	ca. 1.04
Density, lbs/gal	ca. 8.71

Rheology

Acronal PLUS 4800 has effective thickening response and compatibility with HASE, cellulosic, HMPE, and HEUR thickeners allowing the formulator a wide operating window. Use of associative thickeners with Acronal PLUS 4800 will result in a viscosity rise during equilibration. Generally, it has been found that an initial formulating KU of ~85 will result in equilibrated viscosities of 95-100 Stomper units. Rheovis® PE 1331 has been an efficient high shear thickener in DIY grade paints in combination with Rheovis® PU 1191 for low shear thickening. Rheovis® HS 1332, a HASE thickener, was proven effective in economy grade formulations.

Defoamers

It is suggested that FoamStar® family of defoamers be used with Acronal PLUS 4800. FoamStar® ST 2420 gives excellent defoaming capabilities in the formulations tested.

Dispersants

Both sodium and ammonium based polyacid dispersants have been used effectively with Acronal PLUS 4800. Recommended dispersants include those from the Dispex® line, specifically Dispex® CX 4320.

Coalescents

For complete coalescence at low temperature (4°C, 50% humidity) it is recommended that a loading of 1.5% by weight of coalescent to resin be added to the formulation. Both 0 VOC coalescents and evaporative coalescents can be used. Successful coalescence in 0 VOC formulations have been noted with the Loxanol® line of coalescents. Specifically, Loxanol® CA 5310 has been very effective.

Acronal® PLUS 4800

Storage: Do not freeze.

Suggested Formulations

Economy Grade Flat Formulation (25 VOC)

	lbs	gallons
Water	252.16	30.27
Natrosol™ 250 HBR	3.6	0.33
28% Ammonium Hydroxide	2.64	0.32
Dispex® CX 4320	5.05	0.49
KTPP	0.84	0.04
FoamStar® ST 2420	1.68	0.24
Satintone Mattex®	96.67	4.4
Duramite®	99.19	4.4
Kronos® 2310	168.1	4.93
Grind for 15 minutes		
Water	37.82	4.54
FoamStar® ST 2420	1.68	0.24
Hydropalat® WE 3320	1.68	0.19
Proxel™ BD 20	2.52	0.28
Acronal PLUS 4800	241.91	27.35
Water	167.47	20.1
Rheovis® HS 1332	13.51	1.54
Texanol™	2.7	0.34
Total	1099.2	100.00
Weight Solids %	45.61	
Volume Solids %	28.07	
Pigment Volume	50.36	
Concentration (PVC) %		
VOC g/L	11	

Economy Grade Semi-Gloss Formulation (25 VOC)

	lbs	gallons
Water	45.09	5.41
Dispex® CX 4320	4.59	0.45
FoamStar® ST 2420	0.68	0.1
28% Ammonium Hydroxide	2.3	0.28
Kronos® 2310	180.39	5.29
Natrosol™ Plus 330	2.44	0.23
Grind for 15 minutes		
Water	61.5	7.38
FoamStar® ST 2420	0.68	0.1
Opaque Polymer	68.05	7.94
Water	61.5	7.38
Hydropalat® WE 3320	1.64	0.19
Proxel™ BD 20	2.46	0.27
Water	184.49	22.15
Acronal PLUS 4800	360.77	40.78
Texanol™	5.75	0.73
Rheovis® HS 1332	11.74	1.34
Total	994.08	100.00
Weight Solids %	40.92	
Volume Solids %	30.83	
Pigment Volume	25.47	
Concentration (PVC) %		
VOC g/L	25	

Acronal® PLUS 4800

Suggested Formulations (continued)

DIY Grade Flat Formulation (0 VOC)

	lbs	gallons
Water	191.52	22.99
28% Ammonium Hydroxide	1.44	0.17
Natrosol™ 330 Plus	0.96	0.09
Dispex® CX 4320	7.18	0.7
FoamStar® ST 2420	1.92	0.27
Minex® 4	286.8	13.19
Attagel® 50	3.83	0.19
Kronos® 2310	146.51	4.29

Grind for 15 minutes

Water	103.04	12.37
FoamStar® ST 2420	1.92	0.27
Proxel™ BD 20	2.87	0.32
Polyphase® 678	5.75	0.59
Acronal PLUS 4800	355.27	40.16
Loxanol® CA 5320	4.98	0.66
Rheovis® PE 1331	28.73	3.34
Rheovis® PU 1191	3.35	0.39

Total	1146.07	100.00
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Weight Solids %	55.49
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Volume Solids %	38.13
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Pigment Volume	47.19
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Concentration (PVC) %	
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VOC g/L	0
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DIY Grade Semi-Gloss Formulation (0 VOC) 100% TiO₂

	lbs	gallons
Water	76.15	9.14
Kronos® 4311	259.15	13.24
Natrosol™ Plus 330	0.2	0.02
Ammonium Hydroxide (28%)	1.99	0.24
Dispex® CX 4320	3.99	0.39
FoamStar® ST 2420	0.7	0.1
Minex® 10	4.98	0.23
Attagel® 50	4.98	0.25

Grind for 15 minutes

Water	103.66	12.44
FoamStar® ST 2420	1.5	0.21
Opaque Polymer	54.8	6.39
Acronal PLUS 4800	439.7	49.7
Water	14	1.68
Loxanol® CA 5086	5.78	0.69
Polyphase® 678	3.59	0.37
Proxel™ BD 20	2.99	0.33
Rheovis® PE 1331	34.8	4.05
Rheovis® PU 1191	4.45	0.52

Total	1017.41	100.00
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Weight Solids %	46.57
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Volume Solids %	36.28
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Pigment Volume	22.22
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Concentration (PVC) %	
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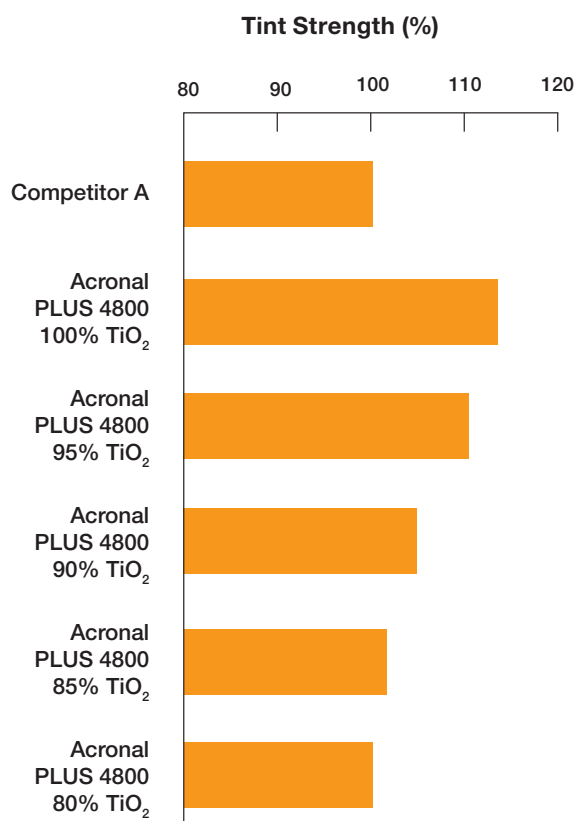
VOC g/L	0
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Acronal® PLUS 4800

Suggested Formulations (continued)

DIY Grade Semi-Gloss Formulation (0 VOC) 80% TiO₂

	lbs	gallons
Water	76.15	9.14
Kronos® 4311	207.31	13.24
Natrosol™ Plus 300	0.2	0.02
Ammonium Hydroxide (28%)	1.99	0.24
Dispex® CX 4320	3.99	0.39
FoamStar® ST 2420	0.7	0.1
ASP® G90	25.61	1.18
Minex® 10	4.98	0.23
Attagel® 50	4.98	0.25
Water	103.66	12.44
Grind for 15 minutes		
FoamStar® ST 2420	1.5	0.21
Opaque Polymer	54.8	6.39
Acronal PLUS 4800	439.7	49.7
Water	26.26	3.15
Loxanol® CA 5086	5.78	0.69
Polyphase® 678	3.59	0.37
Proxel™ BD 20	2.99	0.33
Rheovis® PE 1331	34.8	4.05
Rheovis® PU 1191	4.49	0.52
Total	1003.48	100.00
Weight Solids %	45.82	
Volume Solids %	36.29	
Pigment Volume	22.26	
Concentration (PVC) %		
VOC g/L	0	



Replacement of up to 20% TiO₂ with ASP® G90 Kaolin when using Acronal PLUS 4800 allows for competitive tint strength with reduction in formulation cost while maintaining gloss. Blending Acronal PLUS 4800 with other resins such as Competitor A at levels as low as 20% can increase tint strength of the formulation as well as gloss and block resistance. Stain resistance of Competitor A does not decrease with a 20% replacement by Acronal PLUS 4800.

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The Dispersions & Pigments Division in North America offers a comprehensive portfolio of resins, binders, latex, pigments and effect pigments, colorants, and systems to meet specific application needs for the coatings, construction, printing and packaging and plastics markets. Our innovative products also help manufacturers in the adhesives, nonwovens and fiber bonding industries meet functional and performance demands. Our formulation additives, rheology modifiers, light stabilizers, photoinitiators, and antioxidants significantly enhances the existing BASF product portfolio for these markets. For more information about BASF's Dispersions & Pigments Division, visit www.basf.us/dpsolutions.

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