

Technical Update

Industrial Maintenance Coatings with Beckopox Epoxy Dispersions for High Performance and Low VOC

Coatings formulated with the Beckopox family of epoxy resin dispersions and water soluble hardeners can replace high VOC solvent borne systems in the protection of structures and equipment. Beckopox delivers the performance and value you need at a VOC under 250 g/l. For complete protection and low VOC, Beckopox containing primers complete the IM package.

Beckopox industrial maintenance coating formulations perform as good, or better than, traditional solvent borne epoxies in virtually every physical and mechanical property tested. For gloss, adhesion, chemical resistance, abrasion resistance and impact strength, Beckopox performance excels. In direct-to-metal, top coat applications, 2 mil Beckopox formulation provides over 1000 hours of salt fog and humidity resistance on phosphated steel.

- High Gloss
- Pot life of up to 9 hours
- Low temperature cure potential
- Excellent chemical and physical properties
- Economical
- Low odor

The technology advances of Beckopox epoxy dispersions provide significant performance advantages. Our improved performance is based on our proprietary dispersant system which produces a small particle size dispersion, less than 1 micron average, and does not migrate from the cured film. This controlled particle size produces a dispersion with exceptional stability, convenient viscosity and excellent performance attributes.

Beckopox based top coat and primer starting formulations

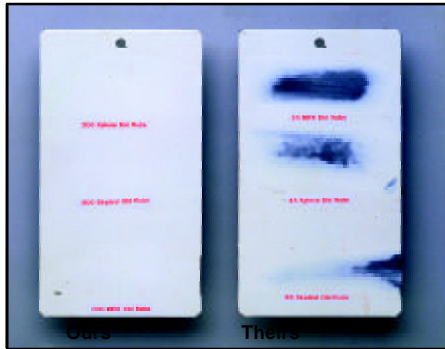
provide the 2000 hour salt fog and humidity performance you need in applications such as general industrial maintenance, auto refinish and shop primers. The speed of dry and cure are better than you expect from other epoxy dispersions. Direct to metal top coat formulations are also available with salt fog and humidity resistance over 1000 hours at 2 mils on phosphated steel.

Our Technical Service Lab can help you with your specific performance requirements. To request samples or discuss how Beckopox epoxy dispersions and hardeners can fill your needs, contact us at: 704-559-6714 or fax 704-559-6699 or visit our web site at www.vianova-resins.com.



Beckopox maintenance coatings provide high gloss chemical resistant finishes which meet or exceed the performance of solvent borne epoxies.

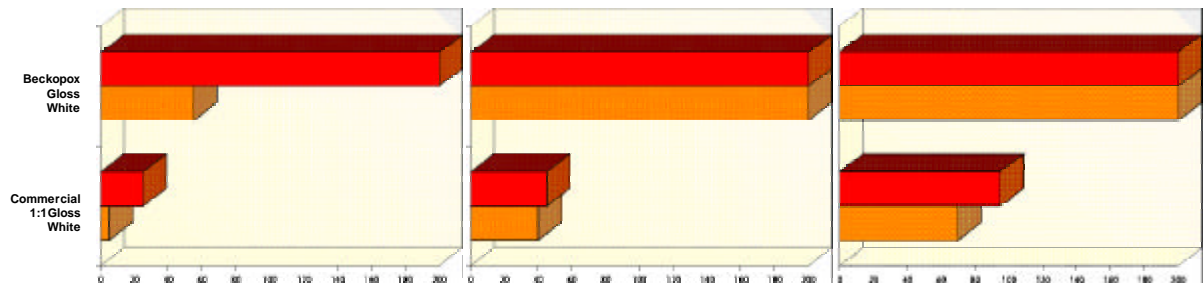
Chemical Resistance



Chemical resistance is a critical performance criteria for epoxy industrial maintenance coating. Measuring double rubs shows the excellent performance you can expect from Beckopox formulations. At left, our 1:1 gloss white formulation shows the superior resistance of the Beckopox formulation.

The charts below show the actual test values obtained on the panels to the left. Even after only 24 hours cure, the Beckopox formulation exhibits excellent chemical resistance, which is far superior to a competitive formulation, as shown below.

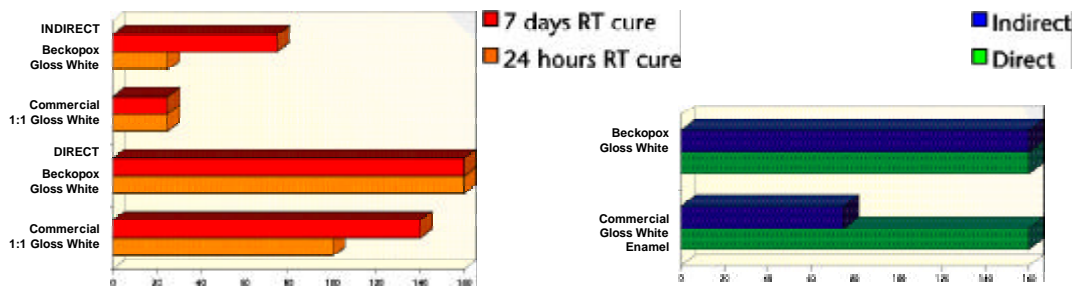
1:1 mix ratio Gloss White shows excellent performance versus a competitive formulation



Double rubs using, from left to right, MEK, Xylene and Skydrol. Dark shows 7 day RT cure results while the light color is 24 hour RT cure. The superior chemical performance of Beckopox versus a commercial water-based gloss topcoat is clearly seen.

Impact Strength

Beckopox gloss white industrial maintenance formulations show excellent flexibility and adhesion characteristics demonstrated by the superior direct and indirect impact results even after only 24 hours of cure. Beckopox epoxy dispersions release water from the film extremely well. This characteristic aids cure and development of physical properties without shortening pot life. This effect can be seen by drawing down a film of Beckopox emulsion alone and monitoring the short time required to film clarity. To accommodate your packaging needs, Beckopox starting formulations are available in mix ratios from 1:1 to 7:1.

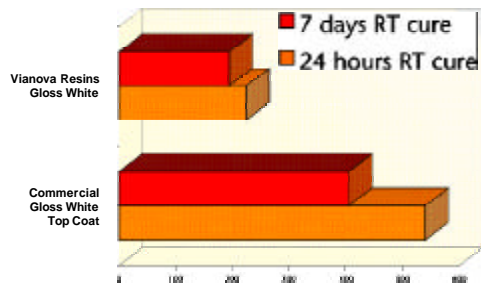


Indirect and Direct Impact of 1:1 White Paint Formulations

Indirect and Direct Impact of 7:1 Formulation Combinations

In both starting formulations, a clear advantage over a commercial water-based epoxy is seen with Beckopox formulations.

Abrasion Resistance



Abrasion tests show the ability of Beckopox to perform in demanding applications. Again, the quick development of physical properties and superior performance as compared to a competitive system, is apparant. Improvements in Taber abrasion can be made through incorporation of additives into the starting formulation.

Taber Abrasion Resistance of 1:1 White Paint Formulations [mg Loss (CS-17, 1000 gms, 1000 cycles)]

High Performance Primers

Beckopox primers offer exceptional performance and low VOC to complete the high performance industrial maintenance picture.

Red Anti Corrosion Primer based on Beckopox EP 384

Component A		
Grind	Pounds	Gallons
Anquamine 419	80.8	8.29
Deionized Water	153.54	18.43
Dowanol PM	7.9	0.95
Benzyl Alcohol	7.9	0.95
Dowanol PNP	13.8	1.81
BYK 024	3.2	0.39
Bayferrox 130	72.03	1.80
10ES Wollnstokup	107.66	4.45
Halox SW 111	102.30	4.30
Zeeospheres 400	72.03	3.60
Sierralite 603	72.02	3.92
Water Ground Mica 0.33		7.85
Glacial Acetic Acid 0.19		1.56

Component B		
BECKOPOX™ EP 384/53%	450.00	50.00
Total	1152.68	100.00

Physical properties		
Mix ratio, by volume	1 to 1	
Volatile Organic Content, lbs./gal.	1.51	
Pot life, hours	6.0	
Tack free drying time, minutes		30
Performance, 1000 hours RT cure 120 (2 mil DFT, Bonderite 1000)		
Gloss	6	
Pencil hardness	3H	
MEK double rubs to <6B Pencil hardness		35
Direct impact inch pounds	120	
Indirect impact, inch pounds		25
Salt fog, 1000 hours		Scribe-9, Field-10
Salt fog, 1200 hours		Scribe-9, Field-10
Salt fog, 1500 hours		Scribe-8, Field-10
Salt fog, 2000 hours		Scribe-7, Field-10
Humidity resistance, 1000 hours	10	
Humidity resistance, 1200 hours	10	
Humidity resistance 1500 hours	10	



Beckopox primers above, show 1500 hours salt fog results with 2 mils on phosphated steel. The formulation on the left contains 1.4% Benzyl Alcohol. Total VOC is 1.51 pounds per gallon.

2-Pack Water-Based Epoxy Systems

BECKOPOX™ EP 384w and BECKOPOX
Special Hardener EH 623w Gloss White
General Industrial Maintenance Topcoat
1:1 Mix Ratio by Volume

Component A		
Grind Stage:		
Ingredients	Pounds	Gallons
BECKOPOX™ Special Hardener EH 623w/80%	94.76	10.73
Deionized water	155.93	18.72
Ti-Pure® R-960 (Titanium dioxide) ¹	236.18	7.00
Sierrasperse (Mg-Al Silicate) ²	103.15	4.39
Arcosolv® PNP ³	28.31	3.82
Benzyl Alcohol	17.03	1.97
Hi Sol 10 ⁴	21.71	2.90
Then add:		
Troysol™ LAC ⁵ (Defoamer and Leveling Agent)	3.60	0.45
Total, Component A	657.07	49.98

Component B		
Ingredients	Pounds	Gallons
BECKOPOX™ EP 384w/53%	362.24	41.42
BECKOPOX™ VEP 2547w/100%	29.99	3.27
Water	44.38	5.33
Total, Component B	436.61	50.05

Formulation and Technical Information
 Mixing ratio A to B (by volume) 1.0:1.0
 Volatile Organic Content (VOC) 196 gms/liter
 Pot Life 6.0 hours
 Stoichiometry (epoxy:amine) 1.25:1.0

Suppliers

1. Dupont (Ti-Pure is a registered trademark)
2. Luzanac
3. Arco Chemical (Arcosolv is a registered trademark)
4. Ashland Chemical

BECKOPOX™ EP 384w and Anquamine™ 401
Gloss White General Industrial Maintenance Topcoat
7:1 Mix Ratio by Volume

5. Troy (Troysol is a trademark) Component A		
Ingredients	Pounds	Gallons
Deionized water	123.80	14.86
Ti-Pure® R-960 (Titanium dioxide) ¹	222.30	6.35
Disperbyk® 190 ²	1.19	0.14
BECKOPOX™ EP 384w/53%	172.90	18.87
Aerosil® 200 ³	0.49	0.03
Grind to a Hegman of 7 then add slowly		
Arcosolv PE ⁴	23.32	3.11
Benzyl Alcohol	14.03	1.53
Aromatic 100 ⁵	17.88	2.47
Troysol™ LAC ⁶ (Defoamer and Leveling Agent)	2.37	0.28
BYK™ 024 ⁷	2.37	0.28
Letdown with		
Bentone® RV ⁸	2.77	0.19
Water	98.71	11.85
Prehydrate Bentone then add to above and add		
BECKOPOX™ EP 384w/53%	252.34	27.54
Total, Component A	934.47	87.50

Component B		
Ingredients	Pounds	Gallons
Air Products Anquamine™ 401 ⁹	53.15	5.88
Water	55.18	6.62
Total, Component B	108.33	12.50

Formulation and Technical Information
 Mixing ratio A to B (by volume) 7.0:1.0
 Volatile Organic Content (VOC) <250 gms/liter
 Pot Life >6.5 hours

Performance Data After 7 Days RT Curing (1.75 mil DFT)
 Gloss 96
 Direct Impact 140
 Indirect Impact 140
 Pencil Hardness 5H
 MEK Resistance >500

Suppliers

1. Dupont (Ti-Pure is a registered trademark)
2. Byk Chemie (Disperbyk is a registered trademark)
3. DeGussa (Aerosil is a registered trademark)
4. Arco Chemical (Arcosolv is a registered trademark)
5. Exxon
6. Troy Chemical Co. (Troysol is a trademark)
7. Byk Chemie (BYK is a trademark)
8. Rheox (Bentone is a registered trademark)
9. Air Products (Anquamine is a trademark)

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