



ZeeMail



Zeeospheres® Ceramics, LLC

129 Valentine Drive, Lockport, Louisiana 70374

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Starting Point Formulations

We have received a lot of requests lately for some starting point formulations containing Zeeospheres Ceramic Microspheres. Below you can find a waterborne red iron oxide primer, a waterborne anti-corrosive primer, and a Zero VOC High Corrosion Resistant Metal Primer. In all three formulations, the G-400 is being used for added abrasion resistance, corrosion resistance, and improved hardness.

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Red Iron Oxide Primer (WB419P1)

Material	Pounds	Gallons
A Side		
Epi- Rez 5522-WY55	383.67	42.00
Dowanol PM	4.53	0.59
Benzyl alcohol	8.79	1.01
De-Fo PI-4	3.51	0.42
DI Water	75.10	9.00
Mica-325	8.23	0.35
10ES Wollastekup	108.00	4.46
HALOX SW-111	98.23	4.13
Kroma Red RO-4097	73.10	1.82
Zeospheres G-400	73.10	3.65
Blanc Fix-N	73.10	1.99
<i>High speed disperse to a texture of ~5-7 N.S., then add:</i>		
Epi- Rez 5522-WY55	82.26	8.98
DI Water	13.34	1.60
Total A Side	1004.96	80.00
B Side		
Anquamine 419	61.30	6.80
Dowanol PM	18.00	2.35
Glacial acetic acid	0.37	0.05
DI Water	90.10	10.80
Total B Side	169.77	20.00

Physical Properties

Stoichiometry	1.9
Mix Ratio (A:B, volume)	4:1
PVC	34.9
VOC (lbs/gal)	1.45
VOC (g/l)	174.0
Wt Solids %	62.2
Vol Solids %	47.1
Pigment: Binder Ratio	1.48:1
Pot Life (hrs)	6
Tack Free Time (mins)	15
Hard Dry Time (hrs)	2
Cross Hatch Adhesion	5B
Pencil Hardness (overnight)	6B
Pencil Hardness (7 days)	HB
¼" Mandrel bend	Pass
Direct Impact Resistance (in lbs)	140
Reverse Impact Resistance (in lbs)	100

Corrosion Testing:

- 3-4 mil DFT (2 coats, 16-24 hour re-coat)
- 14 Day Cure at 25°C/50% Relative Humidity
- Salt Fog B117, Prohesion B84-94
- Cleveland Humidity (continuous exposure 43°C)
- Blister, Scribe Creep D1654 Rating
- Electrochemical Impedance Spectroscopy (EIS)

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Anquamine 419 Primer Corrosion Resistance		
Salt Fog	Field	Scribe
1000 hours	10	10
2000 hours	10	9
3000 hours	9	8
Prohesion		
500 hours	10	10
1000 hours	10	8
2000 hours	10	4
Cleveland Humidity		
1000 hours	10	10
1500 hours	9	10
2000 hours	8	10

Anticorrosive Primer for Metal Protection (<50 g/L) WBED-4001-01

Ingredients	Pounds	Gallons
Part A		
<i>On high-speed mixer, disperse following in order</i>		
Water	92.7	11.11
Disperbyk 190	10.5	1.19
Surfynol DF-62	2.2	0.27
Surfynol 440	6.7	0.82
Red iron oxide	56.4	1.32
Zeospheres G-400	48.8	2.44
Barytes	48.8	1.33
Calcium Silicate	48.8	5.62
Halox SW-111	75.1	3.15
Mica 325	7.5	0.32
<i>Reduce mixing speed and add</i>		
Bentone LT	11.3	0.59
OUDRASperse™ WB 4001 Epoxy Dispersion	323.3	34.72
ACRYSOL™ RM-12W	10.9	1.26
Part A subtotal	743.2	64.14
Part B		
AnqaminE 419	192.4	21.28
DOWANOL™ PM Glycol Ether	55.7	7.25
Water	61.2	7.33
Part B Subtotal	309.2	35.86
Totals	1052.4	100
PVC	23.3%	
Volume Solids	39.3%	
Weight Solids	52.0%	
Density (lb/gal)	10.52	
VOC (g/L)	209	
Stoichiometry (epoxy: amine)	1.4: 1	

Ancamide™ 2443 Curing Agent
ZERO-VOC Metal Primer Anti-Corrosive Starting Formulation

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A Side

	Pounds	Gallons	Supplier
Liquid Epoxy Resin	309.3	31.89	Dow, Resolution
Epodil® 759	<u>57.0</u>	<u>7.69</u>	Air Products
	366.3	39.58	

B Side

Ancamide 2443	154.9	19.55	Air Products
Cabosil TS720	9.2	0.58	Cabot
Wollastocoat 10ES	200.0	8.26	NYCO
Zeeospheres G-400	100.00	5.45	Zeeospheres
Halox SZP-391	50.0	1.99	Halox
Red Iron Oxide	50.0	1.20	Bayer
Byk 354	0.6	0.07	Byk Chemie
Epodil® L	<u>21.3</u>	<u>2.44</u>	Air Products
	586.0	39.57	

Formulation Properties

VOC (lb/gal)	0.03
Volume Solids (%)	99.9
Weight per Gallon (lb/gal)	12.03
Mix Ratio (A:B,vol)	1:1
PVC (%)	22.1
Pot Life (hr)	2.25
Initial Viscosity (cP)	1600
Dry to Touch (hr)	> 24

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Performance Attributes

Zero VOC

100% Solids

Moderate Pot Life

Moderate Flexibility

Slow Dry at Ambient

Good Corrosion Resistance

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