

Table 3. Starting Point Formulation No. 1700, Waterborne White Epoxy Primer			
Material	Supplier	Pounds	Gallons
Part A			
EPI-REZ 6520-WH-53	Momentive Specialty Chemicals	300.0	33.33
Dowanol PPH	Dow Chemical Co.	30.6	3.47
EFKA 2526 Defoamer	Elementis	3.0	0.35
Ti-Pure R-960	DuPont	100.0	3.10
10 ES Wollastocoat	NYCO Minerals Inc.	100.0	4.12
Sparmite A Barytes	Elementis Pigments Inc.	67.0	1.83
Halox SW-111	HALOX Pigments	94.7	3.98
Wet Ground Mica, 325 mesh	Franklin Industrial Minerals	7.0	0.30
<i>High speed disperse to 5-6 Hegman. Reduce speed and add:</i>			
EPI-REZ 6520-WH-53	Momentive Specialty Chemicals	147.8	16.42
CoatOSil® 1770	Momentive	8.6	0.98
DI Water		101.2	12.12
Total Part A		959.9	80.0
Part B			
EPIKURE 6870-W-53	Momentive Specialty Chemicals	180.0	19.78
Raybo 60	Raybo Chemical Co.	2.0	0.22
Total Part B		182.0	20.00
Total Parts A & B		1,142.5	100.00

Table 4. Characteristics of Starting Point Formulation No. 1700	
Mix ratio by volume	4:1
Total weight solids (%)	62.7
Total volume solids (%)	48.9
PVC (%)	27.2
VOC (lb./gal.)	0.82
VOC (g/l)	98.0
Induction time	None
Pot life (hours)	5-6

High-performance Waterborne Epoxy Example

Table 5 compares the performance of a Type 5 waterborne epoxy enamel with that of a conventional solvent borne epoxy-polyamide enamel based on a solid epoxy and a polyamide.

The Type 5 waterborne epoxy gives faster dry, faster hardness development, better salt spray and lower VOC than the solvent based control. Other characteristics, such as impact performance, water immersion resistance, and MEK double rubs are equivalent.

The problem with many waterborne epoxy coatings is that they do not have a detectable end of pot life. They stay fluid, so the painter may continue to use the mixed paint beyond the useful pot life. The gloss and other performance properties are significantly degraded if it is used beyond the pot life. The Type 5 waterborne epoxy has a visible end of pot life. The viscosity rises dramatically, and the painter should stop application at that point. The gloss remains level throughout the pot life, and does not drop until the viscosity begins to rise. Figure 1 shows these results, after reduction to spray viscosity.

Table 5. Performance Comparison of White Enamels		
Characteristic	Type 5 Waterborne Epoxy	Solvent Based Epoxy
VOC (lb./gal.)	1.02	3.7
Dry time (hr., cotton free)	4	8.5
24 hr. pencil hardness	2B	4B
14 day pencil hardness	H	F
Impact (dir./rev., in-lb)	140/140	160/160
1000 hr. salt spray	8F-6F	6F
Water immersion (days @ 25°C)	>250	>250
MEK double rubs	>300	>300

Figure 1. Discernible End of Pot Life

