

# ENCOR<sup>®</sup> DT 250

FOR TRAFFIC PAINT APPLICATIONS



## Product Description

ENCOR<sup>®</sup> DT 250 latex is a high performance second-generation fast dry latex binder designed for optimum performance in traffic paints applied at standard line thicknesses of 15 mils wet. This versatile binder can also be for low temperature application performing comparably to binders designed specifically for low temperature at standard line thickness. This dual purpose binder exhibits fast drying at high humidity providing superior early water resistance and wet abrasion resistance in a wide range of traffic paint formulations. Compared to all-acrylic first and second generation fast dry latexes, ENCOR<sup>®</sup> DT 250 latex features exceptional pigment binding efficiency which permits higher pigment loadings for formula cost reduction.

ENCOR<sup>®</sup> DT 250 latex exhibits superior durability and unsurpassed adhesion to concrete and asphalt surfaces. Volatile Organic Compounds (VOCs) can be minimized with its capability for methanol-free formulating and reduced coalescent demand.

## Polymer Design

- High performance Styrene Acrylic Polymer

## Performance Benefits

- Low temperature application capability
- Superior early water resistance – best wash-out resistance
- Highest wet abrasion resistance – highest scrubs
- Fast drying rates at high humidities
- Superior crack and wear resistance – can be used up to 20 mils wet
- Improved binder efficiency versus all-acrylic binders for formula cost reduction
- Methanol-free formulating capability for low VOC

## Typical Polymer Properties<sup>1</sup>

Appearance	White Liquid
Total Solids, % by weight	50.5
Weight per Gallon, lb	8.6
pH Value	10.6
Particle Size, μm	0.2
Viscosity, Brookfield, cP	300 max
Minimum Filming Temperature, °C	19
Glass Transition Temperature, °C	24

<sup>1</sup>The data provided for these properties are typical values, intended only as guides, and should not be construed as sales specifications.



**Binder Efficiency**

The binder efficiency of a latex has a direct bearing on paint film quality, especially at high pigment loadings found in traffic paints. Efficient binders, such as ENCOR® DT 250, permit higher pigment loadings without cracking or loss of film quality. The ability to produce thick paint films without cracking is especially important in traffic striping, as line thickness can vary depending on spraying and road surface conditions. Paint films up to 20 mils wet can be applied to prolong the life of the line.

**Figure 1** compares ENCOR® DT 250 with two commercial acrylic fast dry traffic latexes. The results show that while the commercial fast dry traffic latexes perform well at standard PVC, ENCOR® DT 250 traffic latex produces much better paint films at higher pigment loadings.

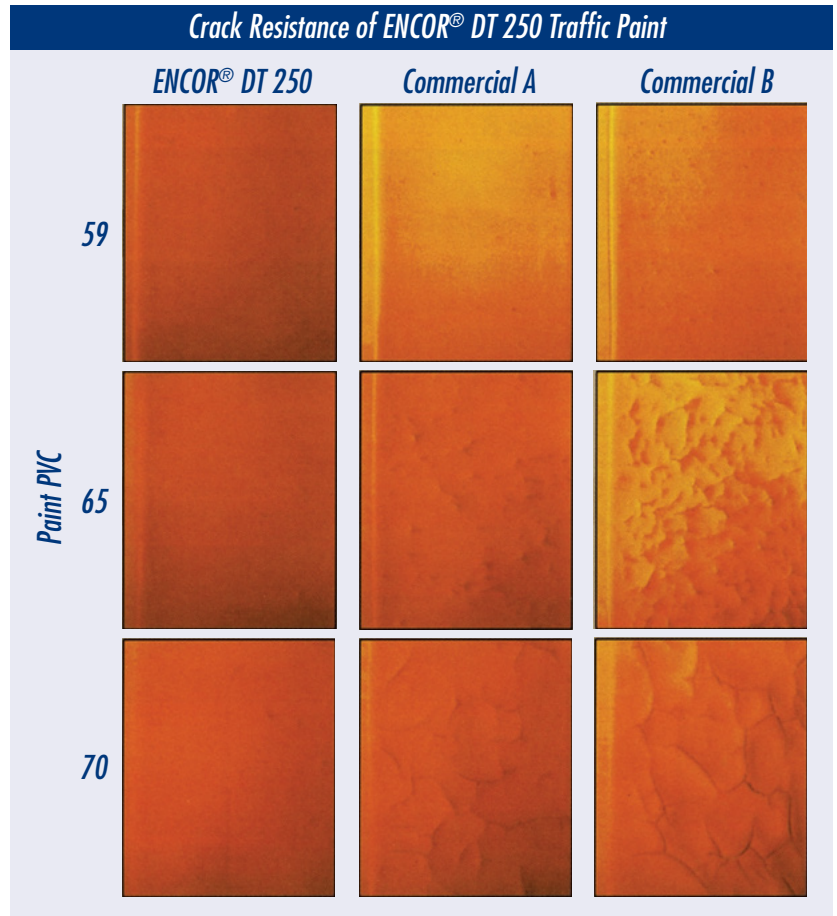


Figure 1

**Water Resistance**

Film Wash-Off on Leneta Charts—Methanol-Free Paints

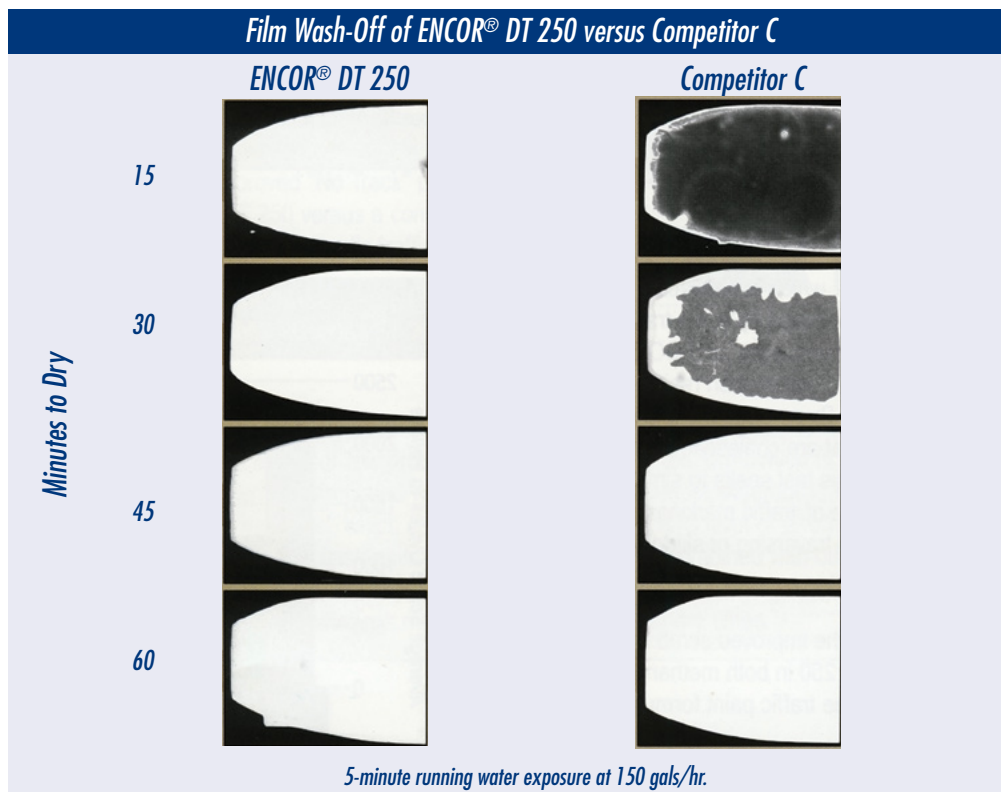


Figure 2

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## Film Wash-Off on Glass

Figure 3 provides the results of a film wash-off test simulating rain soon after paint application. Fifteen wet mil drawdowns on glass were air dried for 30 minutes and subjected to running water at a flow rate of 150 to 180 gallons per hour. ENCOR® DT 250 and the two leading commercial fast dry latexes were tested at three PVCs. The results show that films containing ENCOR® DT 250 remain intact at all three PVCs tested, improved compared to Commercial Latex A and significantly better than Commercial Latex B.

This data shows that ENCOR® DT 250 based traffic stripes develop early rain resistance as fast or faster than the leading competitive fast dry traffic paints used today.

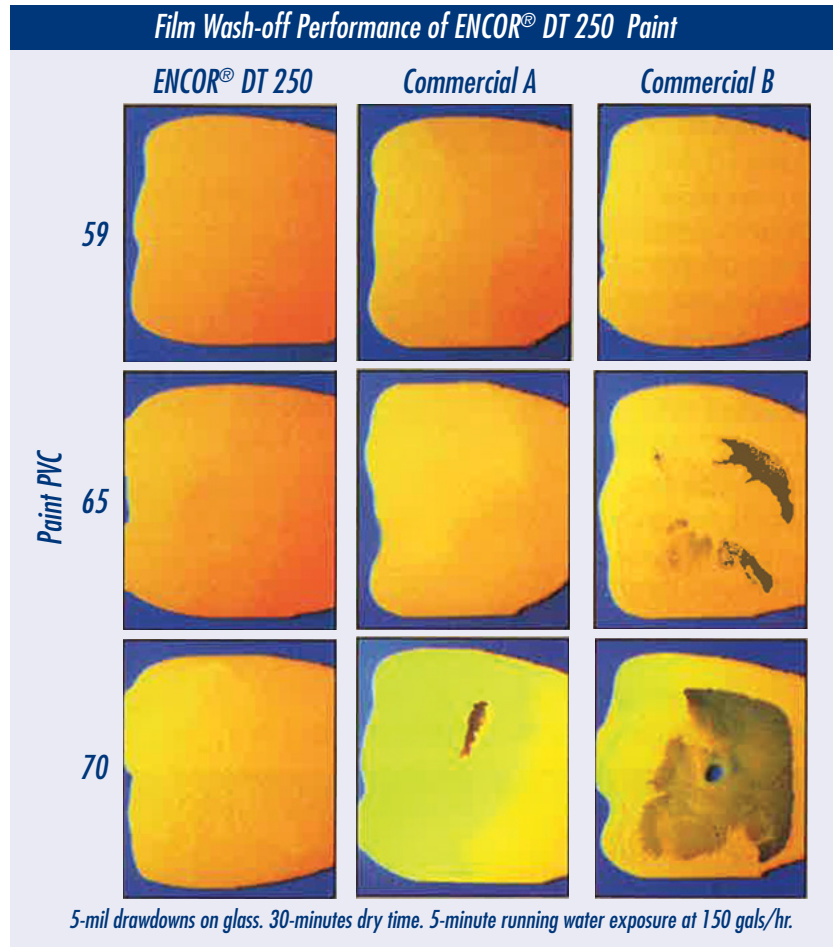


Figure 3

## Scrub Resistance

Scrub resistance, which is conducted using ASTM method D 2486, is used by some traffic latex suppliers, traffic paint companies, and DOTs to quantitatively evaluate the wet erosion resistance of traffic paints in the lab. By scrubbing traffic paints of similar film thickness that are coalesced under the same drying conditions, this test seeks to simulate and predict field performance of traffic markings on long-term exposure to tires traversing or skidding across line markings.

Figure 4 shows the improved scrub resistance of ENCOR® DT 250 in both methanol-containing and methanol-free traffic paint formulations.

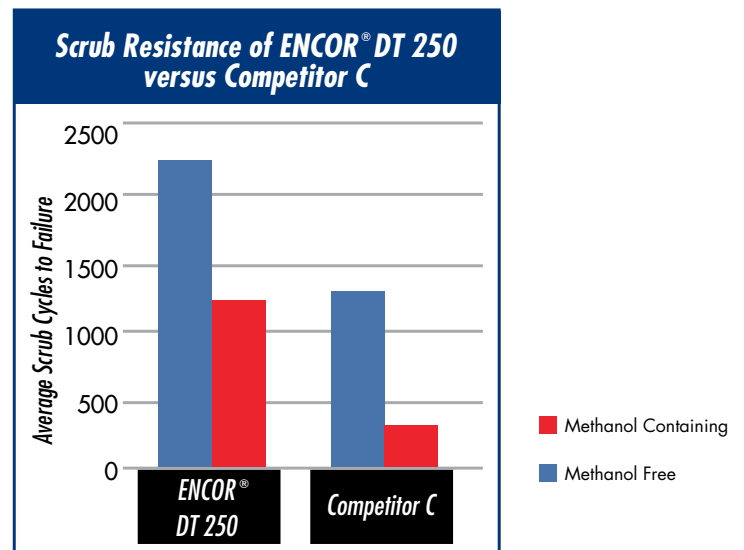


Figure 4

Wet Adhesion Water Soak

<i>Water Soak Test for ENCOR® DT 250</i>			
	% Film Intact		
	ENCOR® DT 250	Commercial A	Commercial B
<b>59 PVC</b>			
1-hr dry	100	100	0
6-hr dry	100	100	0
24-hr dry	100	100	100
<b>65 PVC</b>			
1-hr dry	100	100	0
6-hr dry	100	100	100
24-hr dry	100	100	90
<b>70 PVC</b>			
1-hr dry	100	90	0
6-hr dry	100	100	0
24-hr dry	100	100	0

*15 wet mil films, 24-hr immersion 100 = no blistering or loss of adhesion 0 = film completely delaminated from panel*

**Table 1** illustrates the results of a water soak test simulating the conditions of wet roads soon after the paint has dried. Fifteen wet mil films on glass panels were dried for various times, then placed in water for 24 hours. A rating of “100” indicates no blistering or loss of adhesion while a “0” indicates complete detachment from the glass plate. The results show that ENCOR® DT 250 films remain completely intact and unaffected under all conditions of test, similar to Commercial Latex A and substantially better than Commercial Latex B.

Table 1

**No-Track Performance**

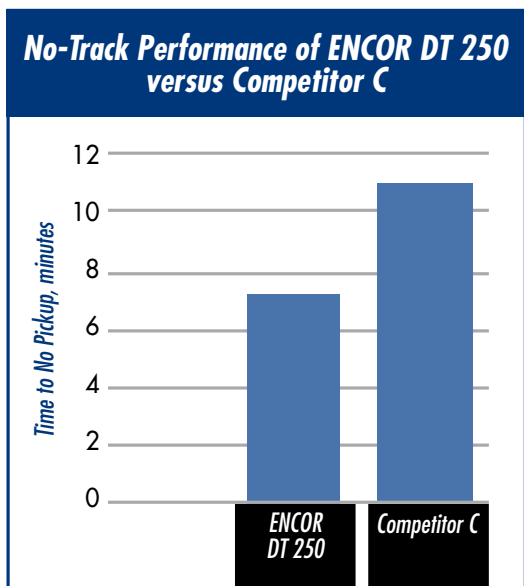


Figure 5

“No-Track Time,” often referred to as “No-Pick-Up Time,” (ASTM D 711) seeks to determine the drying time of traffic paints in the lab. A steel cylinder with rubber o-rings for “wheels” is rolled over a paint film draw down over a glass plate. The film thickness is typically 14-16 mils. The time at which no paint film is picked up by the o-ring wheels is considered passing. Federal and most state specifications have a 10-minute maximum that generally indicates a drying time in the field of one to two minutes.

**Figure 5** depicts the improved “No Track” performance of ENCOR® DT 250 versus a competitive second-generation fast dry all-acrylic traffic latex.

**A Methanol-Free Option**

ENCOR® DT 250 is one of the few products that allow alcohol-free formulation of waterborne traffic markings. It can be formulated with or without methanol. Most waterborne traffic paints contain 2-3 percent methanol, which contributes to the overall VOC level of a formulation and can generate a measurable flash point in finished paints. When combined with other volatile solvents; methanol can also contribute to excessive paint skinning and nozzle plugging during warm weather. Methanol-free formulations may result in slightly longer dry times.

**Road Performance**

While laboratory tests are useful tools in screening latex for waterborne traffic paints, they are not substitute for rigorous road performance testing. Arkema traffic latexes have been used in numerous traffic paints applied to AASHTO test decks and individual state test decks over the past several years.

**Retro-reflectivity and Durability**

Figure 6 illustrates the results of the 1995-96 AASHTO road trial conducted near Frankfort, Kentucky on Interstate 64. After 12 months' traffic exposure, the 4-paint retro-reflectivity and durability averages for white ENCOR® DT 250 based paints exceeded the averages for paints based on the leading commercial acrylic traffic binders.

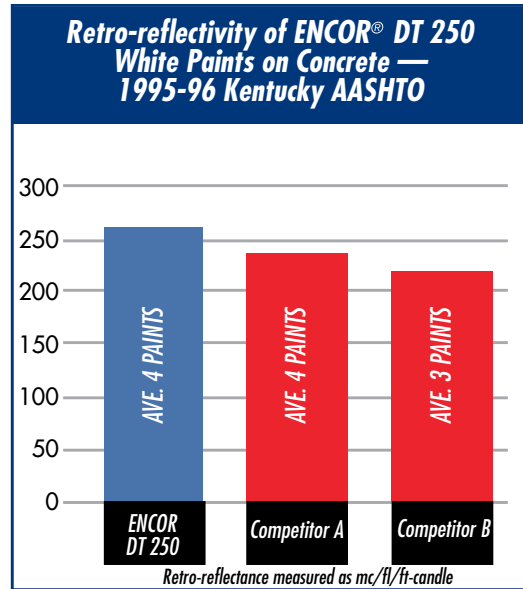


Figure 6

Wheeltrack durability tests also illustrates that ENCOR® DT 250 outperforms other commercial 100% and "premium" acrylic traffic paints. Pennsylvania DOT (PENNDOT) 2001 NTPEP data in Figures 7 and 8 show that ENCOR® DT 250 has better wheel track durability with greater line retention on both asphalt and concrete.

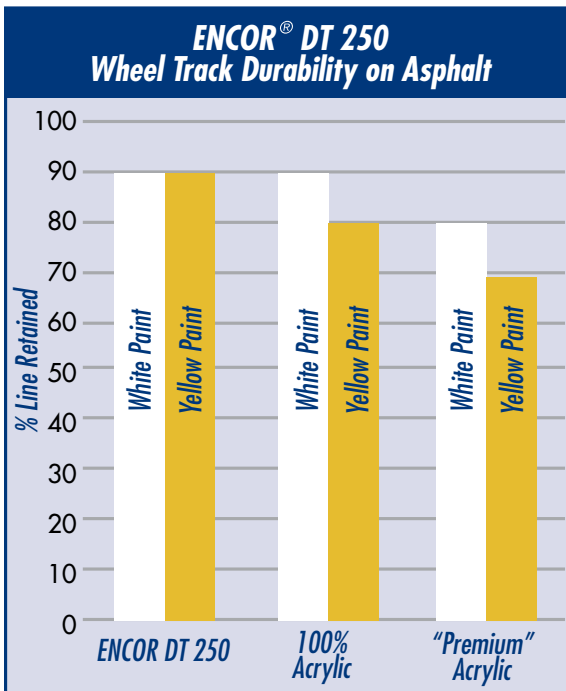


Figure 7

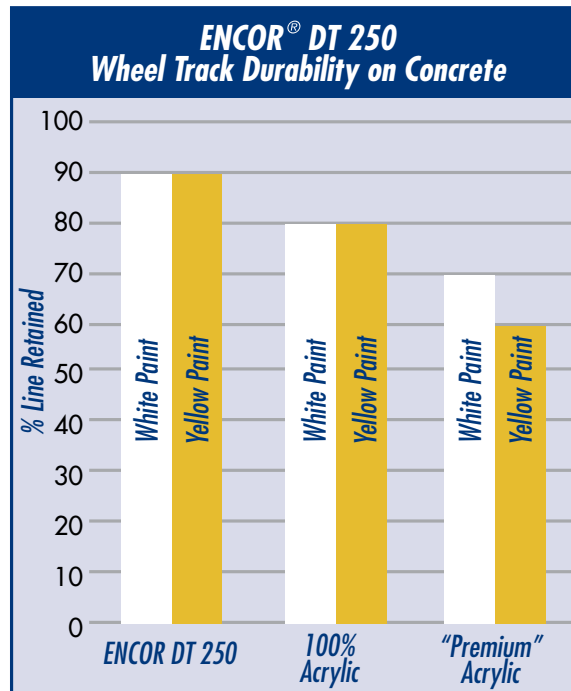


Figure 8



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Figures 9, 10 and 11 show durability results from the 2000/2001 National Transportation Product Evaluation Program (NTPEP) test deck on interstate 80 near Williamsport, Pennsylvania. Interstate 80 is a major east-west interstate with an average daily traffic rate (ADT) of 15,000. All three photos were taken after 10-months' exposure, including a winter season of snowplowing.

Figure 9 shows a ENCOR® DT 250 transverse paint line of concrete. The line was applied at 1.5 mils thickness using an AASHTO, Type 2 glass bead.

In contrast, the 1.5-mil paint lines in Figures 10 and 11 are based on 100% acrylic latex emulsions. Figure 10 depicts a first-generation, fast dry latex and Figure 11 shows a "premium" fast dry latex. The paint systems for all three figures were prepared using similar percent vehicle and pigment solids.

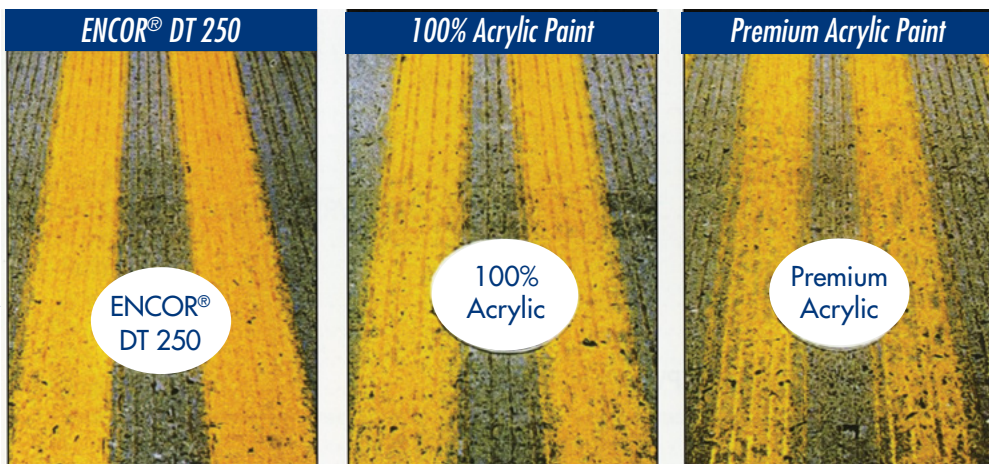


Figure 9

## Application Equipment

High-performance traffic paints, such as those based on ENCOR® DT 250, require that all equipment exposed to the paint, including tanks, lines, fittings and filters, be made of stainless steel or durable plastic to ensure trouble free operation. Equipment parts made of steel, black iron, galvanized or brass of any kind must be replaced for ease of operation.

<i>Comparative Performance Properties of ENCOR® DT 250 versus Two Leading Commercial Fast-Dry Traffic Latexes</i>						
Formulation Properties	Fast-Dry White Traffic Paint			Fast-Dry Yellow Traffic Paint		
	DT 250	Commercial A	Commercial B	DT 250	Commercial A	Commercial B
Stormer Viscosity, KU						
24-Hr	83	83	85	79	83	86
7-day, 60°C	93	91	94	83	87	91
Density, lb/gal	13.9	14.0	14.0	13.4	13.5	13.5
No-Tracking Time, min <sup>1</sup>						
50% R. H./72°F	7.2	7.5	7.0	7.1	8.0	6.5
Dry-Through Time, min <sup>1</sup>						
90% R. H./72°F	30.0	36.5	48.5	35.0	37.0	51.0
CIE Color <sup>1</sup>						
x (B)	0.316	0.318	0.317	0.483	0.482	0.484
y (B)	0.338	0.337	0.335	0.435	0.438	0.438
Contrast Ratio	0.97	0.98	0.98	0.93	0.94	0.94
Reflectance	90.9	87.0	86.9	47.5	50.0	49.3

*1=1.5-mil wet film*

Table II

# ENCOR® DT 250

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## Formulation Suggestions

### Fast Dry Wyoming White Traffic Paint

Ingredients	Lbs	Gallons
ENCOR® DT 250	453.5	51.19
DOWICIL* 75	0.5	0.04
Drewplus L-493	2.0	1.04
Rhodamine 226/35	7.2	0.68
Ti-Pure R-900	100.0	2.99
Natrosol 250 HBR	0.3	0.03
Water	24.0	2.88
Omyacarb 5	760.0	33.78
Drewplus L-493	1.8	0.23
Methanol	30.0	4.52
Drewplus L-493	1.8	0.23
Texanol	23.0	2.91
TOTAL	1404.1	100.52

### Typical Paint Properties

Total Solids, %	
by weight	78.3
by volume	62.6
Pigment Volume Concentration (PVC), %	58.3
Pigment by Weight, %	61.2
Pigment by Volume, %	36.5
VOC, g/L	115

## Formulation Suggestions

### Fast Dry White Traffic Paint with Methanol Formulation Suggestion V-2210

Ingredients	Lbs	Gallons
ENCOR®DT 250	460.0	52.87
DOWICIL* 75	0.5	0.04
Drewplus L-493	2.0	0.27
Rhodamine 226/35	7.4	0.70
Natrosol 250 HBR	0.3	0.03
Water	12.0	1.44
Ti-Pure R-900 <i>Mix for 3 minutes</i>	100.0	3.00
Omyacarb 5 <i>Mix for 4 minutes</i>	770.0	34.22
Methanol	30.0	4.52
Texanol	21.0	2.66
Drewplus L-493 <i>Mix for 3 minutes</i>	3.0	0.40
TOTAL	1406.2	100.15

### Typical Paint Properties

Total Solids, %	
by weight	79.0
by volume	63.5
Pigment Volume Concentration (PVC), %	58.5
Pigment by Weight, %	61.9
Pigment by Volume, %	37.2
VOC, g/L	86

The physical property data listed are considered to be typical properties, not specifications.

\*Note: DOWICIL 75 was omitted for general lab screening.

# ENCOR® DT 250

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## Formulation Suggestions

### Methanol-Free White Traffic Paint Formulation Suggestion V-2212

Ingredients	Lbs	Gallons
ENCOR®DT 250	460.0	52.87
DOWICIL* 75	0.5	0.04
Drewplus L-493	2.0	0.27
Rhodaline 226/35	7.6	0.72
Propylene Glycol	20.0	2.31
Natrosol 250 HBR	0.3	0.03
Water	30.0	3.60
Ti-Pure R-900 <i>Mix for 3 minutes</i>	100.0	3.00
Omyacarb 5 <i>Mix for 4 minutes</i>	795.0	35.33
Texanol	21.0	2.66
Drewplus L-493 <i>Mix for 3 minutes</i>	3.0	0.40
TOTAL	1439.4	101.23

### Typical Paint Properties

Total Solids, %	
by weight	78.9
by volume	63.9
Pigment Volume Concentration (PVC), %	59.2
Pigment by Weight, %	62.2
Pigment by Volume, %	37.9
VOC, g/L	70

## Formulation Suggestions

### Fast Dry Wyoming Yellow Traffic Paint

Ingredients	Lbs	Gallons
ENCOR® DT 250	453.5	51.19
DOWICIL* 75	0.5	0.04
Drewplus L-493	2.0	1.04
Rhodaline 226/35	7.2	0.68
Yellow 1250	32.0	2.58
Ti-Pure R-900	20.0	0.60
Natrosol 250 HBR	0.3	0.03
Water	25.0	3.00
Omyacarb 5	760.0	33.78
Drewplus L-493	1.8	0.23
Methanol	30.0	4.52
Drewplus L-493	1.8	0.23
Texanol	23.0	2.91
TOTAL	1357.1	100.83

### Typical Paint Properties

Total Solids, %	
by weight	77.5
by volume	62.6
Pigment Volume Concentration (PVC), %	58.4
Pigment by Weight, %	59.7
Pigment by Volume	36.6
VOC, g/L	115

*The physical property data listed are considered to be typical properties, not specifications.*

*\*Note: DOWICIL 75 was omitted for general lab screening.*



# ENCOR® DT 250

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## Formulation Suggestions

### Fast Dry Yellow Traffic Paint with Methanol Formulation Suggestion V-2211

Ingredients	Lbs	Gallons
ENCOR® DT 250	460.0	52.87
DOWICIL* 75	0.5	0.04
Drewplus L-493	2.0	0.27
Rhodamine 226/35	7.7	0.73
Natrosol 250 HBR	0.3	0.03
Water	13.0	1.56
1244 Sunglow Yellow	32.0	2.58
Ti-Pure R-900 <i>Mix for 3 minutes</i>	20.0	0.60
Omyacarb 5 <i>Mix for 4 minutes</i>	765.0	34.00
Methanol	30.0	4.52
Texanol	21.0	2.66
Drewplus L-493 <i>Mix for 3 minutes</i>	3.0	0.40
TOTAL	1354.5	100.26

### Typical Paint Properties

Total Solids, %	
by weight	78.1
by volume	63.4
Pigment Volume Concentration (PVC), %	54.4
Pigment by Weight, %	58.0
Pigment by Volume, %	34.5
VOC, g/L	86

## Formulation Suggestions

### Methanol-Free Yellow Traffic Paint Formulation Suggestion V-2213

Ingredients	Lbs	Gallons
ENCOR®DT 250	460.0	52.87
DOWICIL* 75	0.5	0.04
Drewplus L-493	2.0	0.27
Rhodamine 226/35	7.7	0.73
Propylene Glycol	20.0	2.31
Natrosol 250 HBR	0.3	0.03
Water	30.0	3.60
1244 Sunglow Yellow	32.0	2.58
Ti-Pure R-900 <i>Mix for 3 minutes</i>	20.0	0.60
Omyacarb 5 <i>Mix for 4 minutes</i>	790.0	35.11
Texanol	21.0	2.66
Drewplus L-493 <i>Mix for 3 minutes</i>	3.0	0.40
TOTAL	1386.5	101.21

### Typical Paint Properties

Total Solids, %	
by weight	78.1
by volume	63.9
Pigment Volume Concentration (PVC), %	55.2
Pigment by Weight, %	58.4
Pigment by Volume, %	35.3
VOC, g/L	70

The physical property data listed are considered to be typical properties, not specifications.

\*Note: DOWICIL 75 was omitted for general lab screening.

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## Product Safety

Before handling the materials listed in this bulletin, read and understand the product MSDS (Material Safety Data Sheet) for additional information on personal protective equipment and for safety, health and environmental information. For environmental, safety and toxicological information, contact our Customer Service Department at 1-866-837-5532 to find an MSDS, or visit our web site: [www.arkemacoatingresins.com](http://www.arkemacoatingresins.com)

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## Storage and Handling

Follow procedures typically recommended for polymer dispersions. Use corrosion-resistant storage tanks and piping. Air-operated diaphragm pumps are preferred. Avoid temperature extremes. Do not freeze; store between 4-40°C.

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