Welcome to the 2014 ACR Webinar Series!!

Invest one hour with us and we’ll help you grow your business with products and technology from Arkema Coating Resins
Today's Topic: Traffic Markings
Speaker: Mike Kaufman
Title: Senior Application Development Leader - Technical Account Coordinator
Our training goal

Give you the knowledge necessary to answer your customer’s questions concerning traffic marking paint with confidence

- Outline the basics of traffic markings
- Describe some of the testing protocols
- Outline the characteristics of the different product classifications
- Highlight several Arkema products and describe their performance benefits
Agenda

- The Basics of Traffic paint
- Traffic Paint Market
- Paint formulating and Testing
- Product Review and Alternatives to Competitive offerings
- Recap
What are traffic markings and why are they used?
Traffic markings are used to enhance safety

Why are Traffic Markings Used?

“Safety for day and night visibility” by marking traffic lanes, separating opposite lanes of traffic, and marking parking stalls

Traffic Markings “Save Lives”

Where are Traffic Markings Used?

- Mainly on roadways (City, County, State and Federal)
- Airports
- Parking Lots (shopping centers and businesses)
- Warehouses and Garages
Traffic markings must meet numerous performance requirements

- **Dry Time – No Track**
- **Retro-Reflectivity – Bead Adhesion**

![Diagram of Glass Bead and Traffic Marking Film](attachment:image.png)

- **Durability** – film formation, crack resistance, water resistance, alkali resistance, abrasion resistance
- **Other** - opacity, color retention, viscosity, freeze thaw stability, heat age and RT storage stability
Numerous technologies are employed

<table>
<thead>
<tr>
<th>Marking Type</th>
<th>Advantages</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Epoxy</strong></td>
<td>adhesion, low temp application, abrasion resistance</td>
<td>cost, dry time, two component, only restripe over epoxy, concrete must be cleaned, yellowing, lane closure, special equipment</td>
</tr>
<tr>
<td><strong>Thermoplastic</strong></td>
<td>one component, no lane closure, fast dry time, high durability with thick lines, best for crosswalks, can spray thin-line</td>
<td>heating equipment, very sensitive to application variables, need clean dry pavement, temp hazard, snowplow damage, solvents for cleanup, bag handling</td>
</tr>
<tr>
<td><strong>Polyurea</strong></td>
<td>color stability, abrasion resistance, adhesion to all substrates, low temp application, fast dry time</td>
<td>cost, two component, special equipment</td>
</tr>
<tr>
<td><strong>Modified Urethane</strong></td>
<td>fast dry time, skid resistance, abrasion resistance</td>
<td>cost, two component</td>
</tr>
<tr>
<td><strong>Methylmethacrylate</strong></td>
<td>high durability with thick lines, transparent to UV, non-yellowing, resistant to oils, low temp application, concrete or asphalt, snowplowable, low to high film thickness</td>
<td>cost, special equipment, two component, peroxide hazard, monomer hazard,</td>
</tr>
<tr>
<td><strong>Polyester</strong></td>
<td>abrasion resistance</td>
<td>cost, two component, special equipment, peroxide hazard, monomer hazard</td>
</tr>
<tr>
<td><strong>Alkyds</strong></td>
<td>low cost, no special equipment, liquid handling</td>
<td>VOCs, poor durability, color stability, solvent hazard, solvent for cleanup</td>
</tr>
<tr>
<td><strong>Tape</strong></td>
<td>excellent wet night retro, consistent line thickness, temporary marking, removable</td>
<td>highest cost, requires and adhesive, variable adhesion, failed markers replaced individually</td>
</tr>
<tr>
<td>Durable Marking Type*</td>
<td>Typical Values</td>
<td></td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td></td>
<td>Applied Film Thickness</td>
<td>Dry Film Thickness</td>
</tr>
<tr>
<td></td>
<td>(mils)</td>
<td>(mils)</td>
</tr>
<tr>
<td>Methyl Methacrylate</td>
<td>40-120</td>
<td>same</td>
</tr>
<tr>
<td>Thermoplastic</td>
<td>40-120</td>
<td>same</td>
</tr>
<tr>
<td>Epoxy</td>
<td>30</td>
<td>same</td>
</tr>
<tr>
<td>Polyurea</td>
<td>20</td>
<td>same</td>
</tr>
<tr>
<td>Polyester</td>
<td>30</td>
<td>same</td>
</tr>
<tr>
<td>Durable Waterborne</td>
<td>20-35</td>
<td>12-20</td>
</tr>
</tbody>
</table>

* Markings with minimum 2 year durability
Waterborne traffic paint is utilized in all states

100% of States reported using some W-B Paint

- Water-Borne Paint
- Thermo (Thick Line)
- Epoxy (2 K)
- Solvent-Borne Paint
- Thermo (Thin Line)
- MMA (Catalyzed)
- Polyurea (2 K)
- Polyester (Catalyzed)
- Other (Tape etc.)
Waterborne traffic paint is the most preferred technology

- high preference for W-B on secondary roads
- significant amount of W-B used on primary roads

% of States Preferring Marking

<table>
<thead>
<tr>
<th>Material</th>
<th>Primary Roads</th>
<th>Secondary Roads</th>
</tr>
</thead>
<tbody>
<tr>
<td>W-B Paint</td>
<td>60%</td>
<td>70%</td>
</tr>
<tr>
<td>Thermo (Thick-L)</td>
<td>30%</td>
<td>40%</td>
</tr>
<tr>
<td>Epoxy (2K)</td>
<td>20%</td>
<td>30%</td>
</tr>
<tr>
<td>Other (Tape)</td>
<td>10%</td>
<td>20%</td>
</tr>
<tr>
<td>MMA</td>
<td>5%</td>
<td>10%</td>
</tr>
<tr>
<td>Thermo (Thin-L)</td>
<td>5%</td>
<td>5%</td>
</tr>
<tr>
<td>S-B Paint</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>Polyester</td>
<td>1%</td>
<td>2%</td>
</tr>
<tr>
<td>Polyurea (2K)</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>
Waterborne traffic paint is used to stripe the most miles of road.
Waterborne traffic paint offers a significant cost advantage.
North American Traffic Paint Market
Market has been growing since 2004

- ~3% AGR
- 2015 estimated latex demand 156 MM wet lbs

![Chart showing volume sold (million gallons) from 2001 to 2015](chart.png)
Traffic markings demand is highly seasonal.
Market is highly consolidated

- Ennis-Flint
- Sherwin-Williams
- Diamond Vogel
- Kansas Correctional Industries
- NC Corrections Enterprises
- FL Pride / Baker Paint
- Franklin Paint
- Others
Traffic paint is applied by both state DOTs and private contractors

- Latex Suppliers
  - Arkema
  - Dow

- Traffic Paint Companies
  - Ennis Paint
  - Sherwin-Williams
  - Diamond Vogel
  - Others

- 50% DOTs
- 50% Contractors

- State, County, City Roads
- Parking Lots, Airports
Various government agencies and private bodies are involved

**State and Provincial Departments of Transportation (DOTS)** – we work with DOTs to get our latexes qualified - our customers bid for striping contracts

**American Traffic Safety Services Association (ATSSA)** - annual convention (traffic paint show) for traffic marking industry

**National Transportation Product Evaluation Program (NTPEP)** – organization that tests and approves traffic markings

**Transportation Research Board (TRB)** – research papers presented on traffic markings

**ASTM D01.44 Traffic Markings & Materials** – standard methods and practices for traffic markings and materials
Market is highly regulated

- Specification driven
  - Federal spec. TT-P-1952E
  - Most states have their own specifications which may or may not be tied to the federal specification
  - Dictate composition, performance or both

- Products must be qualified
  - Laboratory testing and NTPEP test deck evaluation

- Business is won by competitive bid
  - Low cost wins, little or no consideration of life cycle cost
**TT-P-1952E defines three Fast Dry categories**

- **Type I** - For use under normal conditions
  - 55°F, 50% RH

- **Type II** - For use under adverse conditions
  - 50°F, >80% RH, low air movement

- **Type III** - For increased durability
  - Higher film thicknesses

**Binder Compositional Requirements**

The non-volatile portion of the vehicle for all types shall be composed of a 100% acrylic polymer as determined by infrared spectral analysis. The acrylic resin used for Type III shall be a 100% cross-linking acrylic as evidenced by infrared peaks at wavelengths 1568, 1624, and 1672 cm⁻¹ with intensities equal to those produced by an acrylic resin known to be 100% cross-linking.
Cost is the primary market driver

- Lower Cost
- Improved Road Safety
- Ease of Use
- Certainty of Supply
- Environmental Regulations
Latex is the largest contributor to RMC

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Quantity</th>
<th>Unit Price</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latex @ 60%</td>
<td>387.0</td>
<td>$0.91</td>
<td>$351.78</td>
</tr>
<tr>
<td>Biocide</td>
<td>0.5</td>
<td>$4.00</td>
<td>$2.00</td>
</tr>
<tr>
<td>Dispersant</td>
<td>7.4</td>
<td>$0.80</td>
<td>$5.92</td>
</tr>
<tr>
<td>HEC</td>
<td>0.3</td>
<td>$3.50</td>
<td>$1.05</td>
</tr>
<tr>
<td>Water</td>
<td>85.0</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>TiO2</td>
<td>100.0</td>
<td>$1.50</td>
<td>$150.00</td>
</tr>
<tr>
<td>CaCO3</td>
<td>777.0</td>
<td>$0.10</td>
<td>$77.70</td>
</tr>
<tr>
<td>Methanol</td>
<td>30.0</td>
<td>$0.50</td>
<td>$15.00</td>
</tr>
<tr>
<td>Texanol</td>
<td>21.0</td>
<td>$1.50</td>
<td>$31.50</td>
</tr>
<tr>
<td>Defoamer</td>
<td>5.0</td>
<td>$2.00</td>
<td>$10.00</td>
</tr>
<tr>
<td>Raw Material</td>
<td>1413.2</td>
<td></td>
<td>$644.95</td>
</tr>
<tr>
<td>Packaging</td>
<td></td>
<td></td>
<td>$52.00</td>
</tr>
<tr>
<td>Freight</td>
<td></td>
<td></td>
<td>$42.00</td>
</tr>
<tr>
<td>Variable Cost per gallon</td>
<td></td>
<td></td>
<td>$7.39</td>
</tr>
<tr>
<td>Unit Price per gallon</td>
<td></td>
<td></td>
<td>$9.50</td>
</tr>
<tr>
<td>Unit Margin per gallon</td>
<td></td>
<td></td>
<td>$2.11</td>
</tr>
<tr>
<td>Variable Margin</td>
<td></td>
<td></td>
<td>22.2%</td>
</tr>
</tbody>
</table>
Formulating and Testing
Primary Components of Waterborne Traffic Paint

- **Latex Binder** - binds pigment, bead & substrate adhesion
- **Water** - most comes from binder, makes paint liquid
- **Coalescing Solvent** - improves binder film formation
- **Dispersant** - improves grinding of pigment and aids in stability
- **Titanium Dioxide Pigment** - opacity & whiteness
- **Extender Pigment** - usually calcium carbonate for gloss reduction and skid resistance
- **Yellow Pigments** - yellow paints only: lead chromate, iron oxide, organic yellows
- **Methanol** - optional for improved dry time
- **Drop-On Glass Beads** - for Nighttime Visibility (Retroreflectivity)
Components of Waterborne Traffic Paint

- Methanol (4.6%)
- Water (30.5%)
- Coalescing Solvent (2.9%)
- Calcium Carbonate (34.2%)
- Titanium Dioxide (3.0%)
- Latex Solids (24.7%)

15 mils wet

% by Volume
Components of Waterborne Traffic Paint

- Water
- Methanol
- Coalescing Solvent

Leave Film by Evaporation

Dry Components by Volume:
- Calcium Carbonate
- Titanium Dioxide
- Latex Solids

9 mils dry
Arkema Coating Resins Fast-Dry Traffic Latex Technology

- Arkema traffic latexes contain patented “fast-dry technology”
- Traffic paints made with these latexes dry many times faster than conventional paints
- A high percentage of our nations roadways are striped with traffic paint containing the ACR traffic latexes
Fast Dry Latex Film Formation proceeds in four stages

Stage 1 – ammonia loss, pH drop, solidification

Stage 2 – water and solvent evaporation resulting concentration of latex particles

Stage 3 – further water loss and particle packing

Stage 4 – diffusion of latex particles into a continuous film
Fast Dry Mechanism requires loss of ammonia

- Fast-dry latexes contain special fast-dry technology
- The latexes are stabilized for storage with high ammonia levels (pH > 10)
- Upon application of traffic paint, ammonia rapidly leaves the paint film and the coating pH drops below 10
- As the pH drops, the latex is destabilized
- The wet latex film solidifies (typically first surface immobilization and then film immobilization from top to bottom)
- Ammonia, methanol, water, and coalescing solvent evaporate from the film over time
# Typical White Fast Dry Traffic Paint Formulation

<table>
<thead>
<tr>
<th>Component &amp; Addition Order</th>
<th>Trade Name</th>
<th>Formula Lbs</th>
<th>Formula Gal</th>
<th>Solids Lbs</th>
<th>Solids Gal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latex</td>
<td><strong>ENCOR DT-211</strong></td>
<td>460.1</td>
<td>51.99</td>
<td>230.1</td>
<td>24.37</td>
</tr>
<tr>
<td>Defoamer 1</td>
<td>Drew L-493</td>
<td>4.5</td>
<td>0.60</td>
<td>4.5</td>
<td>0.60</td>
</tr>
<tr>
<td>Dispersant</td>
<td>Colloid 226/35</td>
<td>7.0</td>
<td>0.66</td>
<td>2.5</td>
<td>0.12</td>
</tr>
<tr>
<td>Water 2</td>
<td>Water</td>
<td>20.8</td>
<td>2.50</td>
<td>0.0</td>
<td>0.00</td>
</tr>
<tr>
<td>Thickener</td>
<td>Natrosol 250 HBR</td>
<td>0.3</td>
<td>0.03</td>
<td>0.3</td>
<td>0.03</td>
</tr>
<tr>
<td>Titanium Dioxide</td>
<td>Ti-Pure R-900</td>
<td>100.0</td>
<td>3.00</td>
<td>100.0</td>
<td>3.00</td>
</tr>
<tr>
<td>Calcium Carbonate</td>
<td>Omyacarb 5</td>
<td>760.0</td>
<td>33.78</td>
<td>760.0</td>
<td>33.78</td>
</tr>
<tr>
<td>Alcohol 3</td>
<td>Methanol</td>
<td>30.0</td>
<td>4.52</td>
<td>0.0</td>
<td>0.00</td>
</tr>
<tr>
<td>Coalescing Aid</td>
<td>Texanol</td>
<td>23.0</td>
<td>2.91</td>
<td>0.0</td>
<td>0.00</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>1405.7</td>
<td>100.00</td>
<td>1097.3</td>
<td>61.90</td>
</tr>
</tbody>
</table>

1) Defoamer is split (part in grind and part at end)

2) ~ 75% of the water is used to hydrate the thickener. The rest is held for final volume solids adjustment.

3) for dry time reduction and freeze-thaw stability

PVC = 59.4  
NVV = 61.9
Glass bead quality has a major impact on retro-reflectivity

Good Beads

Bad Beads
Formulating Tips

• pH is critical! Adjust to a pH > 10.5 (with ammonia) - when paint is sprayed, some of the base must volatilize (dropping pH) to trigger the fast dry mechanism
• Avoid strong bases like NaOH or KOH - they are not volatile and therefore, fast dry will not occur
• The ammonia should be added up front in grind rather than post added
• Keep grind temperature to a minimum - most traffic paint grinds we have made are in the 120-130°F range - we have seen stability issues or setting up on the mill on occasions when temp exceeds 135°F - note, this guideline is for paints made at pH 10.2-10.8 - for a lower pH formulation, the mill temp typically should be reduced to maintain stability in the grind - formulation dependent of course
• Choice of dispersant is important for best stability on mill and during heat-age - hydrophilic Na+ dispersants are generally best - we often recommend Rhodoline 226/35, and recent studies with Coatex dispersants show Ecodis P30 to be a good choice
Formulating Tips

• The addition of a high HLB nonionic surfactant (such as Triton X-405) is one of the best ways to improve stability - provide steric stabilization - use 0.5 to 3 lb / 100 gal - this can slow down drytime some so use lowest amount possible
• Coalescents can affect stability - in one study with DT211, the order of decreasing stability (increasing KU off mill) for various coalescents was: DPM (best) / PM / PnP / DPnP = Texanol / Exxate 800 / DB / DPnB / PPH / EPh (worst)
• Some grades of TiO₂ are better than others for stability - for traffic we recommend TiPure R-900
Predicting Binder Performance: 2nd and 3rd Gen Fast-Dry All Acrylic vs. Styrene-Acrylic

Relative performance predictions based on laboratory evaluations:

• **Water Resistance**
  - Water Wash-Off Resistance
  - Water Immersion and Water Vapor Sorption
  - Water Spot Test
  - Water Permeability

• **Abrasion Resistance** – Wet Scrub Test

• **Adhesion** – Cross Hatch / Tape Pull Test

• **Low Temperature Coalescence** – LTC Test

• **Exterior Exposure** – Color Stability / Crack Resistance
Water Resistance
Water Resistance: Why is it Important?

Traffic markings absorb moisture when they are wet or in high humidity environments.

- They **swell** and become **softer**
- More susceptible to tire erosion
- Can reduce adhesion to pavement substrate
- Can reduce adhesion to the reflective beads

Impact: Durability and Retention of Retroreflectivity!
**Water Spot Test**

Measures **Water Resistance** – whitening indicates absorption of water, film softens and may lose adhesion.

Unpigmented latex films, 1 hr dry @ 120°F, 10 drops distilled water, after 1 hr.

- **DT250 Styrene-Acrylic**
- **2nd Gen All Acrylic**
Water Immersion Test – Standard Waterborne

Water Absorption (%)

- DT250 Styrene-Acrylic
- 2nd Gen All Acrylic

14 Day Immersion
Water Immersion Test - Durable Waterborne

- **14 Day Immersion**
  - DT400 Styrene-Acrylic
  - 3rd Gen All Acrylic

Water Sorption (%)
**Water Vapor Transmission Test**

Measures **Water Resistance** – transmission of moisture through the paint film can increase water sensitivity and reduce substrate adhesion.
Water Vapor Sorption - Latex Films

Y Axis = Grams
Water Vapor Uptake (Low Best)
Water Vapor Transmission Test Results – Acrylic vs. Styrene Acrylic Traffic Latexes

* Average of 1st, 2nd, and 3rd Gen All Acrylic Traffic Latexes
** Average of 2nd and 3rd Gen Styrene-Acrylic Latexes
Water Wash Off Test Method

1. Prepare four 15 mil wet drawdowns of traffic paint on glass or Lenetta test panels
2. Let the first panel dry 15 min, the second 30 min, the third 45 min, and the fourth 60 min
3. Place a lab jack in sink with platform 12 in. from a cold water faucet outlet
4. After the 15 min dry time, place the first panel on the platform and begin water flow in the middle of drawdown adjusted to rate of 150-180 gal / hr
5. After 5 min. water flow remove the panel and allow it to air dry
6. Repeat the procedure with remaining three test panels at the appropriate time intervals
7. Rate the panels for water wash off or take a pictures for relative comparison
Water Wash Off Test: Standard 2nd Gen WB - Methanol Containing

DT250 Styrene-Acrylic Latex

Dry Time = 60 min  45 min  30 min  15 min

2nd Gen All Acrylic Latex
Water Wash Off Test: Standard 2nd Gen WB - Methanol Free

DT250 Styrene-Acrylic Latex

Dry Time = 60 min  45 min  30 min  15 min

2nd Gen All Acrylic Latex
Water Wash Off Test: Durable WB - Methanol Containing

DT400 Styrene-Acrylic Latex

Dry Time = 60 min  45 min  30 min  15 min

3rd Gen All Acrylic Latex
Water Wash Off Test: Durable WB - Methanol Free

DT400 Styrene-Acrylic Latex

Dry Time = 60 min  45 min  30 min  15 min

3rd Gen All Acrylic Latex
Abrasion Resistance
**Scrub Abrasion Test**

Measures *Wet Abrasion Resistance* - which is related to film integrity and durability

Abrasives scrub media used with shim under the scrub panel
Scrub Test Results - average of methanol containing and methanol free traffic paints

DT250 ST/A

2nd Gen Acrylic

DT400 ST/A

3nd Gen Acrylic

% of Control
Adhesion
Cross Hatch / Tape Pull Test

Measures wet and/or dry Adhesion of traffic paint to difficult gloss alkyd substrate

Paint is cross-hatched with film cutting tool
Cross Hatch Tape Pull Results – for Durable Waterborne Paints

<table>
<thead>
<tr>
<th>Wet Adhesion</th>
<th>Dry Adhesion</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd Gen DT400 Styrene Acrylic</td>
<td>3rd Gen All Acrylic</td>
</tr>
</tbody>
</table>

% of Film Remaining

- Wet Adhesion: 95%
- Dry Adhesion: 100%
Low Temperature Coalescence
Low Temperature Coalescence (LTC) - cold crack resistance at 40 F, average over sealed and unsealed Lenetta substrates

Wet Film Thickness

DT400 DWB Paint
Competitive DWB Paint

LTC Crack Rating (Low Best)

15 mils 20 mils 30 mils

Wet Film Thickness
Test Fence Exposure
Test Fence Exposure of Traffic Paints

- All 1\textsuperscript{st}, 2\textsuperscript{nd}, and 3\textsuperscript{rd} gen fast-dry latexes tested
- In both methanol and methanol free paints
- Applied on transite (cementitious substrate)
- 25 mil wet and 50 mil wet application
- Exposed at AES, Cary NC
- Exposure angle = 90\textdegree from horizontal
- Exposure time = 18 months
Comparison of Non-Durable and Durable WB Traffic Paints - at equal durable film thickness
Durable Waterborne Striping Trials
Durable Waterborne Long Line Trial - Kansas 03

Chip Seal, 30 mil application, double drop
Durable WB Long Line Trial – Kansas 03

District 1, US 24 & 40 East of Tonganoxie, KS
Durable Waterborne Long Line Trial – Iowa 03

I-65, Des Moines Interstate Loop, East and South Sections

Arkema ENCOR Latex DT400 and Dow HD-21A Binders
Durable Waterborne Long Line Trial – Nebraska 04

Interstate 80 east of Lincoln, NE

Arkema ENCOR Latex DT400 and Dow HD-21A Binders
Durable Waterborne Long Line Trial – North Carolina 03

NC 87 “Old Graham Road”, North of Pittsboro, NC

Arkema ENCOR Latex DT400 and Dow HD-21A Binders
Durable Waterborne Long Line Trial - Arkansas 05

Base Line Rd, Little Rock, AR

Arkema ENCOR Latex DT400 and Dow HD-21A Binders
NTPEP PennDot Deck 2000
Product Overview and Alternatives to Competitive Offerings
<table>
<thead>
<tr>
<th>Coating/Latex Type</th>
<th>Application Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional *</td>
<td>15 mil wet (typical)</td>
</tr>
<tr>
<td>1\textsuperscript{st} &amp; 2\textsuperscript{nd} Gen Fast-Dry</td>
<td>15 mil wet (standard line)</td>
</tr>
<tr>
<td>3\textsuperscript{rd} Gen Fast-Dry</td>
<td>20-35 mil wet (durable)</td>
</tr>
<tr>
<td>Low-Temp</td>
<td>15 mil (typical)</td>
</tr>
</tbody>
</table>

* For Zone Marking Traffic Paints
# Latex Binders for Waterborne Traffic Markings

<table>
<thead>
<tr>
<th>Gen</th>
<th>Type</th>
<th>Arkema ENCOR™ LATEX</th>
<th>Dow FASTRACK™™</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Conventional Dry</td>
<td>DT-100 Acrylic</td>
<td>TP-257 Acrylic</td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>Standard Fast-Dry</td>
<td>DT 211 Acrylic</td>
<td>2706 Acrylic</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>Standard Fast-Dry</td>
<td>DT 250 St / A</td>
<td>3427 Acrylic</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>Durable Fast-Dry</td>
<td>DT 400 St / A</td>
<td>HD-21A Acrylic</td>
</tr>
<tr>
<td>LTA</td>
<td>Standard Fast-Dry</td>
<td>DT250 or DT400 St / A</td>
<td>XSR St / A</td>
</tr>
</tbody>
</table>
# Arkema Traffic Latex Typical Properties

<table>
<thead>
<tr>
<th>Latex</th>
<th>Type</th>
<th>NV</th>
<th>Tg *</th>
<th>Visc</th>
<th>PS</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td>DT 100</td>
<td>Acrylic</td>
<td>60</td>
<td>19</td>
<td>1000</td>
<td>0.23</td>
<td>9.0</td>
</tr>
<tr>
<td>DT 211</td>
<td>Acrylic</td>
<td>50</td>
<td>18</td>
<td>200</td>
<td>0.20</td>
<td>10.3</td>
</tr>
<tr>
<td>DT 250</td>
<td>St / A</td>
<td>50</td>
<td>18</td>
<td>200</td>
<td>0.18</td>
<td>10.4</td>
</tr>
<tr>
<td>DT 400</td>
<td>ST / A</td>
<td>50</td>
<td>18</td>
<td>200</td>
<td>0.19</td>
<td>10.4</td>
</tr>
</tbody>
</table>

* Onset Tg ~ = MFT, Midpoint Tg ~ 7°C higher
Arkema Traffic Latex for Standard Lines
Conventional Dry

DT 100

All Acrylic

Conventional dry

High Scrub and Adhesion

Excellent for Zone Marking paints
Arkema Fast Dry Latexes for Standard Lines

**DT 211**  
All Acrylic  
High Retro-reflectivity & Opacity  
High Scrub and Adhesion

**DT 250**  
Styrene-Acrylic  
Improved Water Resistance (more hydrophobic)  
*Highest Scrub Resistance*  
*Improved Water Wash Off*  
*Better alkali resistance on concrete*

Higher Pigment Binding Capacity  
Excellent Durability - Crack / Wear Resistance  
MeOH free & Ultra Low VOC Capability
ENCOR DT400 – The Standard in Performance for Durable WB Lines

- High Durability Product for 20-30 wet mil thickness lines
  - For greatly extended marking lifetime
  - For Outstanding wet night visibility with large beads
- Meets or exceeds Federal Spec TT-P1952D
- Meets many state specs and is qualified in several states
- Superior dry time
- Superior early water resistance
- Superior binding capacity with outstanding adhesion
- Internal “Marker” for quantitative identification
Arkema Traffic Latexes – Performance Leaders

*Excel in:*

- **Dry Time**
  for early field no-track
- **Water Resistance**
  for early rain resistance and water repellency
- **Abrasion Resistance**
  for line durability
- **Adhesion**
  for bead retention and substrate adhesion
- **Flexibility**
  for crack resistance
- **Film Formation**
  for low temperature coalescence
Recap

- Today’s session was intended to provide you with a technical grounding in traffic paint formulation and product selection.
- Arkema is one of only two producers of fast dry traffic latex.
- Arkema has products for both conventional and fast dry applications at standard and high build line thicknesses.
Questions?  Please contact the Account Team

Commercial Questions
Latin America

Marlene Hernandez
marlene.hernandez@arkema.com

Commercial Questions
USA & Canada

Mark Piggott
mark.piggott@arkema.com

Technical Questions

Mary Chervenak
mary.chervenak@arkema.com
Arkema Coating Resins

Thank You for Joining Us!!