



FASTRACK™ 3427A Emulsion

For Waterborne Traffic Marking Paints

Regional Product Availability

- Asia-Pacific

Description

FASTRACK™ 3427A Emulsion is a 100% acrylic polymer for fast-dry waterborne traffic marking paints with excellent durability. Traffic marking paints based on FASTRACK 3427A Emulsion feature fast dry over a broad range of application conditions, excellent durability in terms of retention of glass beads for night visibility and wear properties over asphalt, concrete and old markings.

Key Features

- Excellent Durability.
- Fast dry.
- Excellent Retention of Glass Beads.
- Facilitates the formulation of low VOC coatings (80 g/lit USA method).
- Easy to use.

Benefits

- Excellent wear properties over various bituminous and concrete road surfaces that offer improved long-term economics.
- Fast dry-to-no-pickup and resistance to early rain washout allowing a broad application window.
- Improved safety conditions due to excellent long-term night visibility.
- Non-flammable. Water clean-up.

Typical Properties

(These properties are typical but do not constitute specifications)

Property	Typical Values
Appearance	Opaque, white to off-white liquid
Solids, by weight, %	50.5
Density, wet, (g/ml)	1.05
Density, dry, (g/ml)	1.13
pH	10.2
Glass Transition Temperature, T _g (± 2°C)	28
Viscosity (Brookfield LV #1, 60 rpm, 25 °C), cps	< 100
Storage precautions	Protect from freezing

Drying Performance

Performance Advantages

The drying characteristics of waterborne traffic paints are different from solvent-borne paints. Low air flow and low road surface and air temperatures will slow the drying of both waterborne and solvent-borne paints. Waterborne paints, in particular, dry more slowly under high ambient humidity. Furthermore, the stages of dry of waterborne films are different from solvent-borne films.

Conventional waterborne films that exhibit enough surface dry to prevent the paint from being "picked-up" and tracked onto the road by traffic, may not be dry under the surface film. Waterborne traffic paints need to reach a surface dry and "dry-through" stage before they begin to withstand an early rain shower.

Traffic paints formulated properly with FASTRACK™ 3427A Emulsion, and its predecessor FASTRACK 2706 Emulsion, will dry faster to "no pick-up" and "dry through" than traffic paints made with conventional waterborne polymers. The faster dry is particularly evident when the drying conditions are poor (high humidity, and low air flow and temperatures). Furthermore, fast "dry-through" characteristics of waterborne traffic markings based on FASTRACK 3427A Emulsion will make them more resistant to damage from an early rain shower than those based on conventional waterborne polymers.

Dry to No Pick-up Time

A white paint based on FASTRACK™ 3427A Emulsion was compared to commercial solvent-borne traffic paint on the road for Auto-No-Track Time as specified in ASTM Method D-713. These paints were applied to a 375µm (15 mil) wet thickness and glass beads were dropped onto the paint at a rate of 275 grams/sq.m. of paint. The humidity was high (84% relative humidity) and there was only a slight breeze (3 to 6 km/hr). After only 35 seconds, a car passing over the waterborne marking based on FASTRACK 3427A Emulsion did not track paint on the road. Tracking was evident after 45 seconds with the fast-dry solvent-borne paint.

Dry-to-no Pick-up Road/Vehicle Test	
Road Temperature	16°C
Relative Humidity	84%
Air Speed	3–6 km/hr
Wet Film Thickness	375 microns (15 mils)
FASTRACK™ 3427A Emulsion	Commercial Solventborne
No tracking after 35 seconds	Tracked for 18m (60ft) after 45 seconds

Durability

The service life of traffic markings also depends on the marking having good wear properties. In road tests using transverse test lines to accelerate wear, waterborne markings based on FASTRACK™ 3427A Emulsion have shown excellent durability over both asphalt and concrete road surfaces in a variety of climates. FASTRACK 3427A Emulsion has improved wear characteristics compared to FASTRACK 2706 Emulsion.

Glass Bead Retention

The visibility of traffic markings at night requires retention of the glass beads applied to that marking. Night visibility can be monitored with a retroreflectometer that measures the low angle reflectance of light off the beaded marking.

The following data compare the loss of retroreflectivity of white waterborne traffic markings based on FASTRACK™ 3427A Emulsion with commercial solvent-borne markings based on alkyd resins (with and without chlorinated resin modification). Note that the waterborne fast dry markings based on FASTRACK 3427A Emulsion retain their retroreflectance (hold onto reflective glass beads) considerably longer than the commercial solvent-borne traffic markings.

Retroreflectance Retention of Traffic Markings based on FASTRACK™ 3427A Emulsion vs. Solvent-borne Alkyds

Retroreflectance in Millicandelas / m ² / lux with MiroLux 12			
	3 Months	15 Months	26 Months
Transverse Lines on a 6,000 ADT (average daily traffic) asphalt road:			
FASTRACK™ 3427A Emulsion	240	190	170
Solvent-borne Fast Dry Alkyd	280	110	70
		7 Months	16 Months
Transverse Lines on a 20,000 ADT concrete road:			
FASTRACK™ 3427A Emulsion		301	211
Solvent-borne Chlorinated Polyolefin Modified Alkyd		189	148
		12 Months	27 Months
Skip Lines on a 20,000 ADT asphalt road:			
FASTRACK™ 3427A Emulsion		267	167
Solvent-borne Fast Dry Alkyd		155	100

Formulating and Manufacturing Paints with FASTRACK™ 3427A Emulsion

Paint Manufacture

The fast-drying characteristics of FASTRACK™ 3427A Emulsion, and paints made from it, require the paint manufacturer to apply a significant level of thought and sophistication to ensure satisfactory production; further, some modification of production equipment may be required. The same formulating and manufacturing principles apply to FASTRACK 3427A Emulsion as did with its predecessor, FASTRACK 2706 Emulsion.

In contrast to the manufacture of conventional latex paints, there is no grinding or high speed dispersion operation in the manufacture of traffic paints. It is a low speed, low shear operation with a slight vortex. This procedure is required to avoid excessive heat build-up in the paint during the mixing stage, which otherwise may result in skinning of the paint due to the heat and loss of ammonia.

Due to the nature of the application and the high applied film thickness, dispersion of pigment and extender does not need to be above 3 on the Hegman gauge. (i.e. below 60-70 microns).

Other Considerations

- Maintain the paint pH at 10.0 to 10.2. This should be checked at the end of the “grind” stage and again at the end of manufacture.
- Add the alcohol before the 2,2,4-TMP monoisobutyrate* into the vortex and mix thoroughly. Do not pre-mix the alcohol and 2,2,4-TMP monoisobutyrate.
- Add the 2,2,4-TMP monoisobutyrate slowly into the vortex to avoid polymer flocculation. Pre-emulsification of the 2,2,4-TMP monoisobutyrate (separately under higher shear) may be beneficial to facilitate homogeneous incorporation.

* 2,2,4-Trimethylol-1,3-pentanediol monoisobutyrate (such as Filmer IBT Coalescent)

Formulation: Volume Solids

It is important to formulate fast-dry waterborne traffic paints at maximum volume solids, within the constraints of viscosity and stability, in order to minimize the dry to no pick-up time. The starting point formulation within these notes is formulated to 61% volume solids.

Dispersant

Because of the type of application, the level of water sensitive dispersant is kept to a minimum, (approximately 0.25% solid dispersant on total pigment/extender weight) in order to minimize the “softening back” which can occur when the traffic paint film becomes wet. OROTAN™ 901 Dispersant is the preferred dispersant for optimization of dry speed and paint stability. OROTAN 1850E Dispersant can be used but OROTAN 901 Dispersant exhibits distinct advantages in dry speed and early water resistance.

Extenders

Calcium Carbonate is the recommended extender because of its whiteness, low cost and low water demand (oil absorption) which allows high loadings without excessive viscosity build. Calcium Carbonate extenders with similar oil absorption and particle size should give similar results but oil absorption can vary between different grades and manufacturers even at the same average particle size due to different particle size distribution. Larger particle size may have lower oil absorption resulting in lower viscosity but may settle out faster on prolonged storage of paint.

Coarse (10-15 micron) crystalline silicas are also useful in traffic paint formulations to improve abrasion resistance. Even larger particle size crystalline silicas (50-100 micron) may be useful to improve skid resistance of traffic markings, particularly when glass beads are not used. However, these coarser particle size silicas are known to increase wear of spray equipment.

Wetting Agents

TRITON™ CF-10 Surfactant and Surfynol CT-136 surfactant have been found to be satisfactory wetting agents.

Alcohol

Methanol or Ethanol can be used. Industrial grades of ethanol, i.e. Industrial Methylated Spirits has been found to be satisfactory and is usually excise free or is an unregulated grade of ethanol. The recommended alcohol level is 2% w/w for optimization of dry speed and freeze-thaw stability where applicable.

**Suggested
Starting Point
Formulation**

**White Road Marking Paint
Based on FASTRACK™ 3427A Emulsion
Formulation Number : GTL-169-149**

Material Name	Kg	
Millbase (Low Shear):		
FASTRACK™ 3427A	Emulsion	570.0
Aqueous Ammonia (28%)	pH Control	1.0
OROTAN™ 901	Dispersant	6.2
TRITON™ CF-10	Surfactant	3.4
Rhodoline DF-642NI	Defoamer	2.0
Tiona 595	Titanium Dioxide	120.0
Omyacarb 10	Calcium Carbonate	885.0
(adjust pH to 10.0 – 10.2)		
	Sub-Total	1587.6
Letdown:		
Ethanol	Drying Aid	33.5
Rhodoline DF-642NI	Defoamer	3.0
CELLOSIZETM 30000H (2% solution)	Thickener	10.0
Water	Diluent	13.9
2,2, 4-TMP monoisobutyrate ⁽¹⁾	Coalescent	23.0
(adjust pH to 10.0 – 10.2)		
	Total	1671.0
	Volume	1000.0 lt
Expected Formulation Constants*		
pH		10.1
Viscosity, KU (equilibrated)		89
PVC, %		58.3
Volume solids, %		61.2
Weight solids, %		77.4
Density, wet, (g/ml)		1.67

(1) 2, 2,4-Trimethylol-1, 3-pentanediol monoisobutyrate (such as Filmer IBT coalescent)

*Properties are typical but do not constitute specifications

**Handling
Precautions**

Before using this product, consult the Material Safety Data Sheet (MSDS)/Safety Data Sheet (SDS) for details on product hazards, recommended handling precautions and product storage.

Storage

Store products in tightly closed original containers at temperatures recommended on the product label.

Disposal

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Dow Coating Materials Technical Representative for more information.

**Chemical
Registration**

Many countries within the Asia-Pacific require the registration of chemicals, either imported or produced locally, prior to their commercial use. Violation of these regulations may lead to substantial penalties imposed upon the user, the importer or manufacturer, and/or cessation of supply. It is in your interests to ensure that all chemicals used by you are registered. Dow does not supply unregistered products unless permitted under limited sampling procedures as a precursor to registration.

**Note on
Asia-Pacific
Product Line**

Product availability and grades vary throughout the countries in Asia-Pacific. Please contact your local Dow Coating Materials representative for further information and samples.

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Stewardship**

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