FASTRACK E-2706 ER
Polymer Emulsion For Water-Based Traffic Marking Paints

Description

FASTRACK E-2706 ER is an all-acrylic binder designed specifically for use in water-based traffic marking paints, especially when application occurs under marginal conditions of temperature, humidity and air flow. Actual road trials have proven that traffic marking paints formulated with FASTRACK E-2706 ER are significantly faster drying in high humidity, low temperature and poor air flow conditions compared to conventional water-based traffic paints. This fast dry capability dramatically improves the resistance of markings to early rain showers.

The advantages of traffic marking paints based on FASTRACK E-2706 ER compared with conventional solvent based traffic paints include:

- Better glass bead retention giving extended retroreflectivity/night-time visibility
- Acrylic durability giving extended whiteness and daytime visibility
- Environmentally acceptable - can be formulated to VOCs <100g/l
- Increased worker safety - exposure to volatile organic solvents is greatly reduced
- Easier, safer cleanup using water and mild solvents or detergents
- Significantly reduced disposal costs - can be solidified and disposed of as non-hazardous waste

Typical Properties

These properties are typical but do not constitute specifications.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Milky white liquid</td>
</tr>
<tr>
<td>Solids content %</td>
<td>49.5 - 50.5</td>
</tr>
<tr>
<td>pH</td>
<td>10.0 – 10.6</td>
</tr>
<tr>
<td>Brookfield Viscosity at 25°(Spindle 2, 60 rpm)</td>
<td>&lt; 500 mPa.s</td>
</tr>
<tr>
<td>Specific gravity</td>
<td>1.05 – 1.07</td>
</tr>
<tr>
<td>Minimum Film Formation Temperature</td>
<td>16°C</td>
</tr>
</tbody>
</table>

FORMULATIONS

Performance Under Marginal Drying Conditions

Traffic marking paints based on FASTRACK E-2706 ER dry much faster than conventional waterborne traffic paints, even at high humidity with no air flow.

Dry-to-no-pick-up

“Dry-to-no-pick-up” is the drying time until a car can pass the fresh traffic marking, without picking up any paint from the road. In the following chart, ASTM Test Method D711, paints were drawn over clean cold rolled steel to a wet film thickness of 11 mils (280) and dried at 21°C and 50% to 55% relative humidity. The “dry-to-no-pick-up” times are compared for paints based on FASTRACK E-2706 ER versus three commercially available conventional waterborne traffic paints at two different air flows. All testing was done using a laboratory drying chamber developed by Rohm and Haas, in which humidity can be maintained at constant values and air flow can be minimized.
Early washout resistance

Paints based on FASTRACK E-2706 ER become more resistant to "laboratory rain" much faster than conventional waterborne traffic paints. The following chart demonstrates the improvement in "early washout" resistance.

**FORMULATIONS GUIDELINES**

Formulating waterborne traffic paints based on FASTRACK E-2706 ER is similar to formulating other common types of latex paints. No unusual techniques or equipment are required. However, as a result of the very fast drying characteristics of FASTRACK E-2706 ER, traffic paint manufacturers must adopt the following guidelines when formulating paints:
1. **pH**

Maintain a pH of 10.0 or above at all times during the manufacture and storage of paints based on FASTRACK E-2706 ER.

2. **Neutralizing Agent**

Use only ammonia to adjust the pH of the paint. Do not use less volatile amines or non-volatile base.

3. **Grinding**

Avoid excessive heating of the paint during manufacture. It is strongly recommended not to “grind” (disperse) at high speed (<1000 min⁻¹ is recommended) to adequately incorporate the pigment into FASTRACK E-2706 ER. Over-grinding will only aggravate skin and gel formation and foaming in the dispersing process.

4. **Volume Solids**

It is vital to formulate at maximum volume solids, with the constraints of viscosity and paint stability in order to minimize “dry-to-no-pick-up” times.

Our starting point formulations are formulated between 57 to 60% volume solids and can be applied without heating the paint.

5. **Pigment Volume Concentration**

High pigment/extender loads are necessary in traffic marking paints in order to achieve high solids and high durability on the road. Our road tests demonstrate that paints based on FASTRACK E-2706 ER formulated at 54 to 60% PVC provide a good balance of cost and dry speed, road adhesion and glass bead retention.

6. **Pigment**

All pigments used for traffic paints based on FASTRACK E-2706 ER must be suitable to disperse easily in waterborne paints. We recommend Tioxide TR-92¹ as an easy to disperse Titanium dioxide.

7. **Pigment Extenders**

The accelerated drying mechanism of FASTRACK E-2706 ER is initiated by the drop of pH, caused by the evaporation of ammonia. Therefore it is important that pigment extenders do not contain high levels of alkaline impurities, preventing the required pH-drop after application. Calcitec² V40S or Omyacarb³ 5 are recommended.

8. **Dispersants**

Phosphonate dispersants, such as AS-238⁴ are most suitable to give good paint stability, without affecting the early water resistance. Other dispersant based on ammonium salt of a polyelectrolyte might be used after evaluation. The optimum level of dispersant depends on the choice of pigments and extenders. To evaluate the optimum level of dispersant, we recommend to test levels of 0.4%, 0.5% and 0.6% solid dispersant calculated on dry pigment.

9. **Wetting Agent**

A surfactant is needed to facilitate wetting of the pigment particle surfaces. Triton™ X-405 or Surfynol® CT-136 have been found to be especially effective in reducing “puffiness” and high viscosity.
10. Defoamer

Excessive foam in the paint will increase the apparent viscosity and lead to problems with gel formation. Both Tego® 7825 and Nopco® 8034 are examples of effective defoamers. Alternatives should be evaluated for specific paint applications. It is important to avoid silicone based defoamers, since they may adversely affect the adhesion of the paint to the reflective glass beads.

11. Rheology Modifier

Although traffic marking paints based on FASTRACK E-2706 ER are less prone to pigment settling than conventional latex paints, a low level of rheology modifier can help to reduce pigment settling. Acrysol RM-12W, a highly pseudoplastic nonionic urethane rheology modifier, is recommended as it gives some structure to the paint, without negative effect on sprayability.

12. Alcohol

Ethanol is added to paints based on FASTRACK E-2706 ER to impart freeze-thaw stability, but also to optimize "dry-to- no-pick-up" times.

13. Coalescents

Waterborne traffic marking paints based on FASTRACK E-2706 ER require the addition of coalescing solvents to obtain good film formation, particularly at lower application temperatures.

We recommend 10% Texanol®, calculated on polymer solids, to coalesce traffic marking paints based on FASTRACK E-2706 ER down to 5°C.

Lower levels may compromise performance and durability, especially if the paints are applied at low road surface temperatures. Higher levels may compromise paint stability. The use of more water miscible solvents (like Butyl carbitol) as a sole coalescent is not recommended.

Discussion of Test Procedures

One difference between water and solvent borne traffic paints is the greater influence of relative humidity, air flow and temperature on the development of "dry-through" of waterborne paints. In order to identify a traffic paint that gives the best degree of satisfactory drying behavior, it is important to study drying under marginal conditions of high relative humidity and low air flow.

Studying the drying characteristics of waterborne traffic paints under optimum drying conditions can lead to the wrong conclusion, that one paint performs essentially the same as another paint, while in praxis under marginal drying conditions the drying of one paint is much slower than of another one. To allow a more praxis like evaluation of waterborne traffic paints in the laboratory, Rohm and Haas developed a specific laboratory drying chamber, in which relative humidity, temperature and airflow can be controlled while testing drying characteristics, such as early washout resistance and dry-through.

Blueprints for the construction of the drying chamber and details of our test methods can be obtained through our representatives.

Starting point formulation and manufacturer guide available on request at:

European Laboratories
Tel: 33 (0)4 93 95 54 08
Email: bpollet@rohmhaas.com
Fax: 33 (0)4 92 96 96 61
Storage and Handling

Most emulsions from Rohm and Haas have excellent storage stability, so agitation is not needed unless the products are held static for six weeks or more, which may occur in an extended shutdown. Though not absolutely necessary, intermittent agitation may be used when the tank is heated to hold the temperature constant, but take care to avoid excessive foam formation. It is highly desirable that the air space over the emulsion in the tank is humidified to limit skin formation. A regular injection of steam can efficiently maintain a water saturated or humid condition. A coarse filter (400 – 800 μm) positioned in the transfer line is also recommended to remove any skin or grit.

When tanks are located at sites (inside or outside), in which freezing temperatures may exist continuously for 12 hours, insulation and heating must be provided to prevent freezing of the emulsion. As a general rule, emulsions should always be stored at temperatures above 5°C and below 30°C. Most polymer emulsions cannot tolerate repeated freezing and thawing. Primarily, we recommend vertical tanks constructed from thin-walled, reinforced stainless steel.

Safety Information

Material Safety Data Sheets (MSDS) are available for all Rohm and Haas products. These sheets contain important information that you may need to protect your employees and customers against any known health and safety hazards associated with our products. We recommend that you obtain copies of our MSDS from your local Rohm and Haas technical representative before using our products in your facilities. We also suggest that you contact your suppliers of other materials recommended for use with our products for appropriate health and safety precautions before using them.

Suppliers
1. Huntsman Tioxide, London, UK
2. Pumex ltd, London, UK
3. Omya UK Ltd, Dorking, UK
4. CFPC Co, France
5. Dow Chemical Co ltd, West Drayton, UK
6. Air Products (Chemicals) plc, Clayton, UK
7. Tego Chemie Service GmbH, Essen, Germany
8. Cognis France, St Fargeau Ponthierry, France
9. Eastman Chemicals ltd, UK

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