

Milliken®

Reactint®

Polymeric Colorants for Polyurethane



Milliken™

What are Reactint® Colorants?

Reactint Colorants are not pigment pastes or dyes

Reactint colorants, the most widely used coloring system in the world, are a proprietary technology developed by Milliken Chemical for coloring polyurethane and other thermoset resins for over 25 years.



Reactint Colorants are reactive polymeric colorants that consist of chromophores which are chemically bound to polyols. This allows the Reactint Colorant to react into the polyurethane polymer matrix.

Unlike pigment pastes, which are dispersions of solid particles in a liquid carrier, Reactint Colorants, as sold, are 100% homogenous liquids that and will not settle over time.

Because of this pure liquid nature, it is possible to blend Reactint colors in-line and on-the-fly while producing polyurethane foams and resins. With only five Reactint colors, polyurethane manufacturers worldwide can easily offer virtually any color to their customers.



Why Color Polyurethanes?

Color is a powerful tool in the marketing of products. At Milliken we believe color makes products better, and better colors make better products. In polyurethane applications color can be used to create value in various ways:



Associations

- Green = Fresh and natural
- Pink = Relaxing and inviting
- Purple = Exotic and energetic
- Blue = Lively and regal
- Orange = Optimistic and powerful



Functional benefits

- Mask stains, yellowing, & surface damage
- Coordinate packaging with products
- Enable visual detection of products
- Consumers associate color with value



Differentiation and customer appeal

- Color is a key differentiator in some markets
- Color adds consumer appeal



Property identification

- Grade Identification
- Density Identification



Branding

- Color can be tied to a brand and carry the brand image
- Most successful consumer products companies have a "signature" color

Why use Reactint® Colorants?

Better Colors...Better Cost Efficiency

- **Reduce color inventory**

Virtually any color desired can be produced from just a few (3 to 5) Reactint primary colors.

- **Reduce waste from color changeover**

Short color transitions because of the high polyol solubility of the colorants.

- **Eliminate obsolete inventory**

Make to order only what your customers need, when your customers need it.

- **Improve product quality**

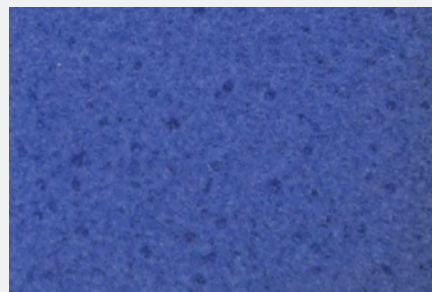
Eliminates problems (such as voids, cracks, and slow rise times) often seen with high dosage levels of pigments.

- **High color strength**

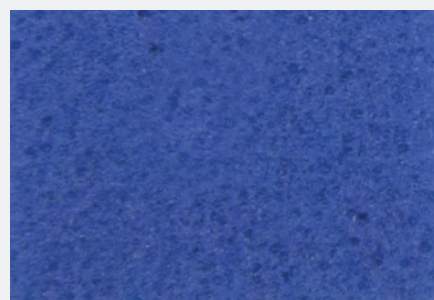
Typically 3 - 5 times stronger than pigments. (See photo at right)

- **Cost effective matches**

Our color matching experts can formulate the most economical blends of Reactint primary colors.



1.2 php
REACTINT BLUE



4.0 php
BLUE PIGMENT PASTE

Better Colors...Better Product Appearance and Quality

- **Deeper and brighter shades**

Dosage levels required to achieve very dark colors are possible without effecting the physical properties of the foam or resin system.

- **Non-migrating and non-extractable**

Color reacts into the polyurethane matrix regardless of color depth, and once locked in it will not extract.

- **Less streaking**

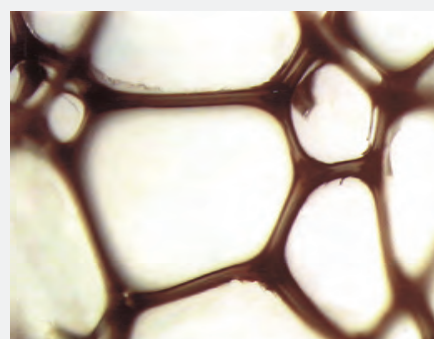
Proper introduction of these low viscosity, highly soluble colors will help reduce streaking problems in polyurethane applications.

- **Reduced scorch**

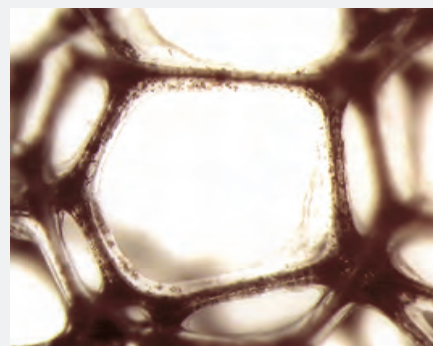
Reactint colorants are free of heavy metals (i.e. copper, iron, chromium, etc.) and will not promote scorch.

- **No effect on polyurethane system**

Reactint polymeric colorants become part of the urethane resin matrix. They are not solid particles and will not nucleate or cause voids, and they have little or no effect on catalyst loading or foam formation. (See photo at right)



Reactint Colorants



Pigment

Why use Reactint® Colorants?

Better Colors...Better Manufacturing and Ease of Use

- **Easy clean-up**

Cold water soluble.

- **No stirring or mixing necessary**

Homogeneous, polyol soluble liquids that will not settle. (See below)

- **Easy to pump and meter**

Low viscosity and high surface tension make Reactint Colorants easy to use in color systems at room temperature.

- **Reduced equipment wear**

Unlike pigments, these liquid colorants are non-abrasive and will not damage pumps, nozzles, tank linings, etc.

- **Versatile**

The same Reactint Colorants can be used in both polyether and polyester urethane systems.

- **Consistent product**

Milliken operates ISO 9001 and 14001 certified production facilities at the highest standards of operational excellence, to produce consistent, first quality products for each shipment to our customers.

- **Less space required**

Keep only 5 primary colors in inventory to produce all other colors.



REACTINT COLORANTS
DO NOT SETTLE



PIGMENTS SETTLE



Why use Reactint® Colorants?

Better Colors...Better Service and Support

- **Rapid delivery**

Worldwide inventory of primary colors.

- **Fast and efficient color matching**

Rapid matching and delivery of custom blends by Milliken's color labs allow you to respond quickly to your customers' unique color requests.

- **Web App**

Catalog of greater than 3000 color matches that is continuously updated.

- **Color delivery system expertise**

Milliken's personnel have years of experience implementing efficient Reactint color dosing systems, and are available to assist you.

- **Experienced global sales coverage**

Milliken's global sales force is comprised of experienced chemists and chemical engineers.

- **Global technical support**

- **Analytical capabilities**

A wide range of analytical capabilities to meet your needs including GC/MS; Headspace Analysis; GC Olfactory Analysis; and UV Exposure Testing.



Product Offering

Better Colors...Better Choices for You

- **Primary Colors**

Blue, Red, Yellow, Violet, Orange. Create virtually any shade with these five primary colors.

- **Custom blends**

Our in-house color matching service can provide a custom blend to meet your specific needs. Let us develop a color just for you.

- **Standard black blends**

Several different black options to meet your individual requirements.



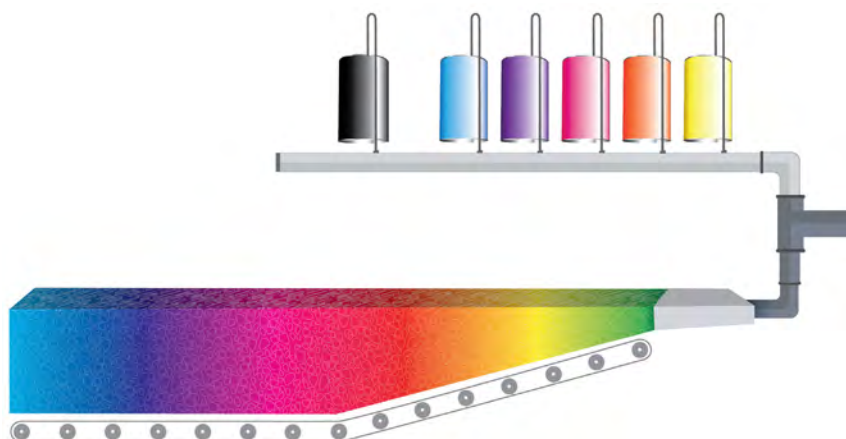
Color Dosing Options

Color Metering Systems

Reactint Colorants can be used in various types of color system designs to meet your needs.

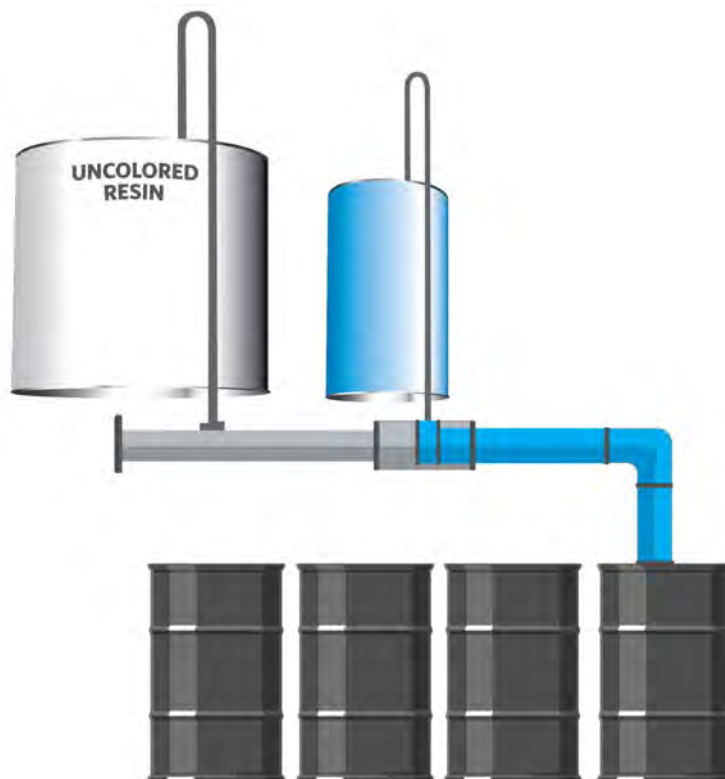
Reactint® Blend-on-the-Fly System

With only a few tanks of Reactint primary colors, a wide range of colors can be produced automatically while pouring slabstock foam.



Reactint In-Line Dosing System

Color can be introduced into the polyol side of a polyurethane system downstream in the manufacturing process.



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Polymeric Colorants for Polyurethane

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