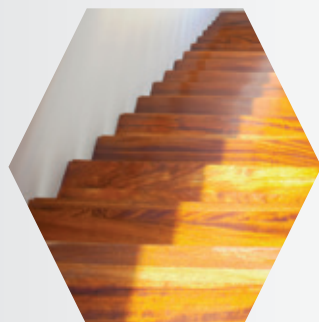
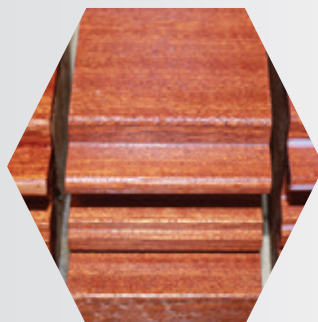


EASTMAN

Wood made beautiful

Eastek™ polymer dispersions at a glance



Wood made beautiful

Eastek™ polymer dispersions at a glance

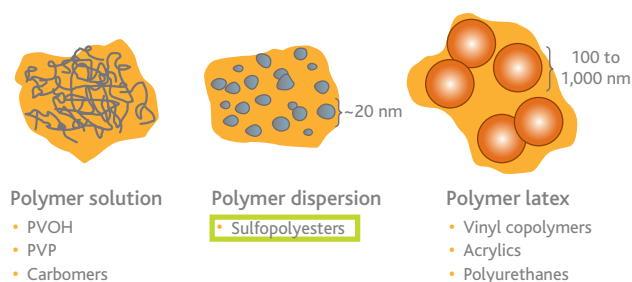
Consumers value the aesthetic and lasting beauty of wood. We have recently demonstrated that Eastman™ water-dispersible sulfopolyesters, which have historically been used in inks, cosmetics, and textile sizing, can greatly improve application and appearance characteristics of waterborne wood primer systems. Consequently, a growing number of wood product companies in Europe are adopting Eastek™ sulfopolyester dispersions in primer systems for joinery, furniture, and parquet flooring.

Sulfopolyester building blocks comprise glycols, aromatic acids, and 5-sodiosulphoisophthalic acid (SSIPA). The glycol ratio influences hydrophobicity and stiffness; the SSIPA content dictates dispersibility in water. On dispersing, sulfopolyesters spontaneously form small micellar aggregates. Eastek products are colloidal dispersions (Figure 1) with extremely small particle size, 10–50 nm in diameter.

Figure 1

Comparison to other waterborne polymers

This unique polymer chemistry offers several advantages



in waterborne coating systems. However, there are a number of significant differences versus commonly-used waterborne binders. This brochure provides some insights that will allow you to better understand and formulate with Eastek™ products.

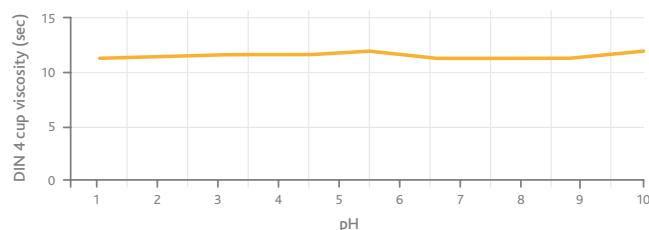
Eastek™ 1200 polymer dispersion, the most alcohol-resistant dispersion in this family of products, may be resistant enough for top-coat applications. Therefore, we recommend the use of Eastek products in primer/intermediate coat systems. The solids content, ~30% w/w, of Eastek dispersion suits these coating layers better.

Eastek™ polymer dispersions have good compatibility with most ingredients commonly used in wood-coating formulations. However, one cannot assume that they are a drop-in replacement for acrylic or polyurethane dispersions. Because of the different binder chemistry, formulators may encounter problems due to incompatibility of the additives in existing formulations. We have looked at various acrylic dispersions typically used in wood applications and found reasonable compatibility with mix ratios up to 1:1 replacement. However, when blending Eastek dispersions with co-resins, specific advantages, e.g., outstanding Anfeuerung (wet look, clarity, warmth) on a variety of wood species, will be diminished.

The dispersed sulfopolyester is electrostatically stabilized in water without the need for potentially color-forming amine neutralizing additives or surfactants. As a result, the viscosity is independent of pH value (Figure 2) and adjustments of viscosity during the coating process are not needed, therefore the reaction with tannic acid or other naturally occurring substances in wood, that may cause colour change, is reduced.

Figure 2

Viscosity under varying pH



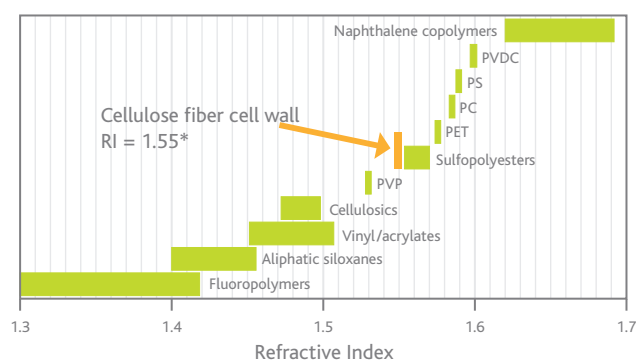
Most Eastek™ products will form film without the use of coalescents. However, if desired, film plasticization is easily achieved with a variety of compounds, e.g. glycols and esters, but one of the best ways of plasticizing is by blending a softer, i.e., lower T_g Eastek product with a harder grade. Suitable co-solvents such as butyl glycol can promote film formation for some grades, particularly Eastek 1200. Butyl glycol acetate is also an excellent coalescing aid.

Dry sulfopolyester films have high gloss, ~95 gloss units at 60 degrees angle of incidence, by virtue of being very smooth and having a high refractive index, $n \sim 1.55$. Coincidentally, this value is close to the refractive index of cellulose fibers (Figure 3). This match of refractive index minimizes scatter off the surface of cellulose fibers in the pore structure of wood, providing great clarity. Thus, the appearance of sulfopolyesters on cellulosic substrates such as wood is seen to be exceptional for a waterborne coating system.

Figure 3

Aromatic sulfopolyesters have high refractive index Pigmentation of Eastek™ polymer dispersions

Eastek™ polymer dispersions can be tinted using conventional pigment dispersions for wood such as transparent iron oxides and carbon blacks. Generally



*Cornell University ACM Transactions on Graphics (SIGGRAPH 2005 Proceedings)

surfactant stabilized (resin-free) pigment dispersions give the best compatibility.

Benefits

The benefits of Eastek™ polymer dispersions as binders in wood-coating primers include the following:

- Outstanding Anfeuerung (wet look, clarity, warmth) on a variety of wood types
- Harmonizing effect: improved penetration into wood of nonuniform density, ensuring uniform color and colored stain acceptance
- Low odor
- Non-skinning
- Fast drying and hardness development
- Excellent crosscut adhesion
- Very high gloss and clarity
- Easy to formulate
- Excellent flexibility and resistance to mechanical damage with and without top-coat systems
- Excellent lightfastness

Summary table

Eastek™ polymer dispersions for the wood-coating industry

Properties	Sulfopolyester polymers				
	1000	1100	1200	1300	1400
Water dispersibility	++	+++	+	++	++
Glass transition temperature, T_g (°C)	38	55	63	36	29
Minimum film-forming temperature (°C)	<5	5	27	12	<5
Hydroxyl number	5.0	5.3	<10	<10	5.0
Solids (wt%)	30	33	30	30	30
pH	6.0	6.2	6.6	6.0	6.0
Viscosity (cP)	60	89	99	14	15

+ Good ++ Better +++ Best

Eastek™ polymer dispersions deliver superior appearance, application, and performance. For more technical advice, contact your sales representative or local distributor. Email to: eastek@eastman.com or visit us at www.eastman.com/eastek.

EASTMAN

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