Where beauty meets performance

Eastman solutions for industrial wood

Formulators of industrial wood coatings and finishes need to make them beautiful, durable and efficient to apply while also meeting market demands for higher performance, avoidance of materials of concern, and long-long lasting beauty. Eastman's broad product range for industrial wood coatings is designed to enable formulators to meet these needs, ensuring quality is never compromised.

We offer solutions for finishes on residential furniture, office and institutional furniture, cabinetry, building products, and wood-based composite applications.

Eastman product families for industrial wood coatings

Eastman Solus™ performance additives

- Robust and diverse resin portfolio
- Tested for safety and UV resistance

Eastek™ polymer dispersions

- Ready-to-use, water-based sulfopolyester dispersion
- Strong, durable and safe
- Very rapid drying time
- Preserves the natural color of wood

Solvents

- Ketones
- Esters
- Alcohols
- Glycol ethers and glycol ether esters

Adhesion promoters

For various wood-plastic composites

- Solventborne: chlorinated and unchlorinated
- Waterborne: chlorinated and unchlorinated
- Eastman Advantis™ adhesion promoter
- Eastman Advantex™ neutralizing amine additive

Additives

- Eastman SAIB (sucrose acetate isobutyrate)
- Eastman Optifilm™ enhancer 400
- Eastman plasticizers

Solutions with sustainable content

- Butyl acetate
- Select Solus™ performance additives

Created with
NC-free coating

Solus™ performance additives

Solus™ performance additives are cellulosic polymers that offer a wide range of performance-enhancing properties for wood coatings. They are supplied as 100% solid, free-flowing powders and can be dissolved in a variety of solvents and reactive diluents.

Cellulose esters have been used in wood-coating systems for many years thanks to their benefits in furniture and cabinetry, including smoothness and hardness, anti-yellowing, applicator efficiency and forgiveness, and the sense of warmth they impart to the final piece. They are widely used in high-quality 2K acrylic urethane systems and in the growing trend of radiation-curable systems. Besides these principal coatings applications, they are also used in thermoplastic and acid-curable coatings.

Specific grades of Solus™ can have improved compatibility with alkyd resins commonly used in wood coating formulations compared to other cellulose esters. Alkyd urethane wood coatings for furniture are typically formulated using nitrocellulose resins — particularly where low gloss is required. One of the main issues with this approach has been that the nitrocellulose binders can impart excessive yellowing in the coating, even more so than the short-oil alkyd and aromatic isocyanate co-binders.

Benefits of Solus™

Solus™ can offer wood-coating systems a variety of advantages:

- Fast dry-to-touch time and hardness development that allows early stacking and processing of coated products
- Nonyellowing under influence of UV light
- Excellent flow and leveling characteristics for defect reduction and improved coating appearance
- The correct balance of viscosity and solids content to allow excellent wetting, penetration and pore definition on open-pore wood species
- Superior control of silica matting aids for consistent gloss levels at a variety of film thicknesses
- Reduced variation of film thickness due to "picture framing"
- Improved atomization
- User-friendly application characteristics, such as reflowability
- Improved adhesion (UV systems)
- Resistance to plasticizer migration

The unique structure and composition of Solus™ allows formulators to modify key attributes of the products to alter solubility, compatibility, reactivity and viscosity. This provides a range of products that offers coatings formulators a wide variety of options. When doing an initial screening, contact an Eastman representative who can help select the best Solus™ grade for your project.

Industrial wood finishes using Solus™

For more than 40 years, Eastman cellulose esters have been used as co-resins or additive raw materials, providing several benefits to 2K polyurethane/acrylic, acid-cured, UV-cured and other wood coating technologies.

Additionally, the molecular structure of cellulose ester chains provides unique rheological properties. Solus™ solutions can demonstrate near-Newtonian flow behavior at certain shear domains and allow excellent atomization, flow and leveling very quickly after application. The elastic modulus predominates over viscous modulus, resulting in fast hardness development and excellent film properties.

Lacquers

Lacquers based on Solus™ resins are versatile wood finishes that can offer key advantages over nitrocellulose. They are nonyellowing and can have superior cold check resistance and lower flammability. Solus™ is the natural choice for those finishes where nonyellowing is required. Solus™ acrylic lacquers are also particularly suitable as topcoats for light-colored wood or light-shaded base coats.

Solus™/acrylic lacquers can maintain traditional lacquer qualities such as ease of repair, ease of handling, fast drying, clarity and superior appearance.

Polyurethane finishes

Polyurethane wood finishes can exhibit outstanding film properties and are commonly used in top-quality furniture with high demand for appearance and chemical resistance. Drying rates, flow out — in particular on open-pore wood species — and surface smoothness can be improved by incorporating Solus™ into polyurethane finishes. Many polyurethane formulations are composed of Solus™, polyisocyanate resins, and/or hydroxyl-functional acrylic or polyol resins. The Solus™ molecules can react with isocyanate to form tough, durable urethane networks in addition to the lacquer-like application properties that Solus™ provides these coatings. Existing pure polyurethane/acrylic systems may also be modified with low levels (1%–10%) of Solus™ to improve flow properties and drying rates.

Formulating tips for polyurethane finishes

- No alcohol or water should be present in the solvents; use only urethane-grade solvents.
- Aliphatic isocyanate resins are recommended for better compatibility. They can also provide better color stability and yellowing resistance.
- A slight molar excess of isocyanate to hydroxyl functionalities can help ensure superior chemical resistance.

Acid-cured alkyd/amino conversion varnishes

Conversion varnishes combine the fast-curing properties of a lacquer with the higher-performance resistance properties (alkali, solvent, water and heat) of a varnish.

The incorporation of Solus™ can impart lacquer-like handling to this type of coating. Acid-catalyzed Solus™ finishes may also be formulated with hydroxyl-functional acrylic resins in place of alkyds for nonyellowing applications.

Formulating tips for acid-cured alkyd/amino conversion varnishes

- Adjusting alcohol content in the solvent blend can stabilize the coating and impact catalyzed pot life.
- *p*-Toluenesulfonic acid (pTSA) is often used as a catalyst. Weaker catalysts, such as acid phosphates, will extend pot life but slow cure response.
- In many cases, 3% pTSA catalyst based on solids will provide maximum cure response. Additional catalyst will not improve coating properties and could cause hydrolysis of butyrate esters. The hydrolysis reaction forms butyric acid, which will have little effect on film properties but will cause an unpleasant odor.

Precatalyzed lacquers

Solus™/acrylic precatalyzed lacquers can be an excellent choice for applications where the discoloration of conventional nitrocellulose/alkyd precatalyzed lacquers is unacceptable. Technically, precatalyzed lacquers are not considered true lacquers. These coatings are one-package systems, usually containing hydroxyl-functional resins and amino resins. They contain weak catalysts that provide a pot life of four months to one year. Although slower to cure than two-part, pTSA-catalyzed systems, precatalyzed lacquers can be more convenient to use and perform adequately for many applications. Suggested starting point formulations for clear and white precatalyzed Solus™/acrylic lacquers are available on request.

UV-cured finishes

Solus™ can improve the flow and leveling, and drying rate of UV-cured finishes. Incorporating 1%–5% Solus™ may improve drying rate, adhesion and flow out. It has been observed that Solus™ in small amounts of less than 1% reduces penetration into porous substrates. Solus™ can also help formulators reduce film shrinkage which has been hypothesized to cause adhesion failures. Solus™ is soluble in styrene and many acrylate oligomers commonly used in UV-cure coatings. Solus™ has also shown excellent solubility.

Eastek™ polymer dispersion

Eastek products are colloidal dispersions with extremely small particle size (10–50 nm in diameter).

This unique polymer chemistry can offer several advantages in waterborne coating systems. However, there are a number of significant differences versus commonly used waterborne binders.

We recommend the use of Eastek products in primer/intermediate coat systems. Eastek 1200 polymer dispersion, the most alcohol-resistant dispersion in this family of products, may be resistant enough for topcoat applications. The solids content, ~30% w/w, of Eastek dispersion can be well suited to primer/intermediate coating layers.

Benefits

Benefits of Eastek polymer dispersions as binders in wood-coating primers include:

- 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
- Excellent flexibility and resistance to mechanical damage with and without topcoat systems
- Excellent lightfastness

Solvents

Eastman solvents are used in all stages of the wood-finishing process. Eastman is dedicated to being a reliable supplier of traditional lacquer solvents as well as specialty solvents useful in formulating wood coatings to meet changing environmental regulations. An important issue faced by the wood-finishing industry is compliance with hazardous air pollutant (HAP) regulations. Many of Eastman's solvents are non-HAPs.

For specific reformulations needs and information about product availability in your region, contact your Eastman representative.

The following are examples of solvents that are particularly useful in wood finishes.

Ketones

Eastman MAK (methyl *n*-amyl ketone) and Eastman MIAK (methyl isoamyl ketone) are non-HAP (HAP content < 1%), highly active retarder solvents for lacquers, polyurethanes and conversion varnishes.

Because of their strong solvency, low weight per volume and low density, MAK and MIAK are excellent choices for higher-solids systems. These ketones also work well in higher-solids lacquers applied by high-pressure or hot-spray techniques.

Eastman MPK (methyl *n*-propyl ketone)[1] is a highly active solvent that may be used to replace portions of commonly used solvents such as MEK (methyl ethyl ketone) and MIBK (methyl isobutyl ketone). It has an evaporation rate of 2.3 and provides excellent solvency for most wood-coating resins.

Esters

Eastman *n*-butyl acetate is a non-HAP, medium-evaporating, workhorse solvent for many lacquers, sealers and conversion varnishes. It is the most popular "middle" solvent and provides great flow properties.

Eastman IBIB (isobutyl isobutyrate) is a non-HAP, economical retarder solvent useful in lacquers and polyurethane coatings. It has very low surface tension and extremely low water miscibility. IBIB can be a useful solvent to improve flow in warm, dry or drafty application conditions.

Eastman *n*-butyl propionate is a non-HAP, slow-evaporating, urethane-grade ester with good solvency for most coating resins. It can be a useful retarder solvent in lacquers and ambient cure enamels. Its slow evaporation rate allows for flow and leveling but does not prevent the quick rubbing and sanding of the lacquer. *n*-Butyl propionate could be used as a replacement for xylene in coating applications such as high-solids thermoset enamels, processing solvents for high-solids acrylic resins and electrostatically applied coatings.

Eastman *n*-propyl propionate is a non-HAP, medium-evaporating, urethane-grade ester with good solvency for most coating resins. It could be used as a replacement for xylene in coating applications such as lacquers, enamels, processing solvents for high-solids acrylic resins, and electrostatically applied coatings.

Eastman EEP (ethyl-3-ethoxypropionate) is a non-HAP, high-performance ether-ester solvent that has utility in wood finishes. EEP's high electrical resistance makes it useful for electrostatic spray applications. EEP may be preferred over PM acetate because of its lower density and slower evaporation rate.

Eastman methyl acetate, high purity is a VOC-exempt (U.S.), non-HAP solvent useful in wood finishing that does not cause blushing. It has similar solvent strength and evaporation rate to acetone.

[1]*May contain up to 10% MIBK by weight. Various purities available on request.*

Alcohols

Eastman isobutanol (isobutyl alcohol) is a primary alcohol of high purity that has properties similar to those of *n*-butyl alcohol. This similarity has led to the use of isobutyl alcohol as a supplement or replacement for *n*-butyl alcohol in many applications. A relatively slow-evaporating latent solvent in lacquers, isobutyl alcohol is effective at reducing the viscosities of many formulations while simultaneously promoting flow and retarding blushing. In coatings cross-linked with melamine resins, alcohols such as isobutyl alcohol are commonly used to improve the coating's viscosity stability. In addition to its use as a solvent, isobutyl alcohol can be substituted for *n*-butyl alcohol as a diluent-reactant in the manufacture of certain urea-formaldehyde and melamine-formaldehyde resins.

Glycol ethers and glycol ether esters

Eastman EB solvent (ethylene glycol monobutyl ether) is a non-HAP, colorless liquid with a mild odor and high dilution ratio with petroleum hydrocarbons. It is soluble in alcohol and water. It is very useful in formulating lacquers with good blush resistance.

Eastman PM acetate (propylene glycol monomethyl ether acetate) is a non-HAP, colorless, slow-evaporating glycol ether ester. It is active for several commonly used coating polymers, including cellulose esters, acrylics, and epoxy and phenolic resins. The combination of slow evaporation rate and good solvent activity makes PM acetate an effective retarder solvent for use in lacquers and enamels as well as in thinners.

Adhesion promoters

The market for wood-filled polyolefin composites is currently growing in all regions of the world.

The main industrial application areas are door frames, decorative profiles, siding and furniture. The amount of wood fiber or flour added to polypropylene profiles typically varies between 30% and 85%, depending on the end use and the manufacturer. In many cases, a good balance of cost and performance is seen at levels of approximately 50% wood loadings.

Eastman has a range of adhesion promoters that allow such materials to be painted as natural wood building products. For formulators looking to align with or stay ahead of regulatory trends, our Advantis adhesion promoters minimize or remove materials of concern while mitigating costly reformulation efforts to ensure compliance without compromise.

Additives

To complete our full range of products available to the wood coatings industry, we offer several additives to enhance the performance properties of wood coating formulations. Contact your Eastman representative about product availability in your region.

Eastman SAIB (sucrose acetate isobutyrate)

SAIB is used as an extender resin in wood sealers and topcoats. It may serve to increase nonvolatile content by levels of 10%–15% solids with no significant increase in viscosity. While SAIB has some plasticizing effect at these levels, it does not cause appreciable film softening and often improves adhesion. SAIB has excellent solubility and compatibility with resins and other modifiers and has very good light stability. In nitrocellulose lacquers that also contain hard resins and plasticizers, SAIB can replace the nonoxidizing alkyd resins commonly used to produce a low-viscosity lacquer at a given solids level. Starting point formulas for SAIB are available on request.

Eastman Optifilm™ enhancer 400

Eastman Optifilm™ enhancer 400 is an excellent alternative to traditional phthalate plasticizers. It has been shown to be more efficient than *ortho*-phthalates in improving flexibility of lacquer films. Optifilm 400 product also has very good weathering stability.

Plasticizers

Eastman offers the following plasticizers that may be used in wood finishes:

- Eastman DOP plasticizer (dioctyl phthalate)
- Eastman 168™ non-phthalate plasticizer (dioctyl terephthalate)
- Eastman 425 plasticizer (blend of dioctyl terephthalate and diethylene glycol dibenzoate)
- Eastman DOA plasticizer (dioctyl adipate)
- Eastman TOTM plasticizer (trioctyl trimellitate)
- Eastman VersaMax™ Plus plasticizer
- Benzoflex™ LA-705 plasticizer
- Benzoflex™ 50 plasticizer
- Benzoflex™ 9-88 plasticizer
- Benzoflex™ 9-88SG plasticizer
- Eastman Optifilm™ enhancer 300
- Eastman Optifilm™ enhancer 400

Solutions with recycled content

Eastman's molecular recycling technologies and bio-sourced materials use plastic waste as feedstock, limiting use of virgin materials to create raw materials for coatings made with up to 85% sustainable content. These coating solutions are backed by third parties, helping meet formulator needs for reduced carbon footprint solutions in high-performing coating systems. It's about doing the right thing to conserve our natural resources and be part of a positive change.

We’re here to help.

Eastman technical service laboratories

Eastman has technical service laboratories around the world to assist with wood coatings development. If you have questions about formulating, regulations, products or other related areas, contact an Eastman technical service representative.

Whatever your formulation needs, Eastman offers solutions for industrial wood coating applications that can help you satisfy and exceed appearance, performance, unit cost and regulatory requirements.

Our chemistry and formulation experts or your authorized Eastman distributor can help you select the best products for your specific application needs.

Additional information on the properties and performance of Eastman products for industrial wood coatings is available at Eastman.com.

For nearly a century, Eastman has been the world leader in manufacturing specialty cellulose esters and has developed deep application expertise. Eastman Solus™ can help formulators achieve high performance, enduring beauty, sustainability and regulatory compliance. Because of the breadth of possibilities, this naturally derived cellulosic is ideal for many applications. It offers the consistency and quality that formulators require and brand owners rely on. Eastman Solus™ — the natural choice.

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