

EASTMAN

Eastman resins
for cosmetics and personal care



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Eastman produces several cosmetic-grade resins that provide adhesion in cosmetics and personal care applications. Color cosmetics and depilatory wax are two applications that benefit from the inherent adhesive properties of these resins. In addition, the resins contribute gloss, an important attribute for lipstick and other lip care products. The liquid resins are also used as plasticizers and fragrance fixatives.

Sucrose acetate isobutyrate

Eastman Sustane™ SAIB Food Grade (FG) and Eastman SAIB are sucrose-based adhesion promoters used in formulations to improve adhesion of products to fingernails, skin, and hair. Sustane SAIB FG can be used at concentrations up to 10% in lipstick formulations. In transfer-resistant lipsticks, SAIB can function as a plasticizer to soften the primary film former and improve its adhesion and flexibility. In traditional lipsticks, it can improve wear properties by reducing creeping, bleeding, and feathering. Eastman SAIB is also used as a fragrance fixative and provides adhesion in depilatory wax.

Eastman SAIB is a very viscous liquid in its 100% form; several low-viscosity blends are also available. For additional information about the range of Eastman SAIB products, see Eastman publication CB-37.



Hydrogenated rosins

Eastman rosin resins for cosmetics are based on gum rosin, a natural, renewable resource. These hydrogenated rosin esters have excellent oxidative stability. They offer a wide range of solubility and compatibility with other cosmetic ingredients. The liquid resin, Foralyn™ 5020-F CG, can provide a plasticizing effect in combination with the solid rosins.

- Foralyn 5020-F CG hydrogenated rosin, a cosmetic-grade resin, is the methyl ester of hydrogenated gum rosin. This liquid resin is given a special steam-sparging treatment to assure minimum odor. With its low odor and low vapor pressure, it is particularly useful as a fragrance fixative. It has excellent solubility and compatibility with nonpolar and many polar ingredients in cosmetic applications, contributing both adhesion and gloss.
- Foral™ 85-E CG hydrogenated rosin is a cosmetic-grade resin derived from the esterification of a highly stabilized gum rosin and glycerol. This thermoplastic resin has excellent resistance to oxidation and discoloration caused by heat and aging. Foral 85-E CG contributes adhesion to various cosmetics and depilatory wax formulations. It has a lower softening point than Foral 105-E CG.
- Foral™ 105-E CG hydrogenated rosin is a cosmetic-grade resin derived from the esterification of a highly stabilized gum rosin and pentaerythritol. Like Foral 85-E CG, it is a thermoplastic resin that has excellent resistance to discoloration caused by heat and aging. With its high softening point, Foral 105-E CG is the resin of choice when a harder resin is desired.

Hydrogenated hydrocarbon resin

Regalite™ R1100 CG hydrocarbon resin is a cosmetic-grade, thermoplastic resin derived from petroleum. This fully hydrogenated resin has excellent solubility and compatibility with nonpolar ingredients in cosmetic applications, contributing both adhesion and gloss.

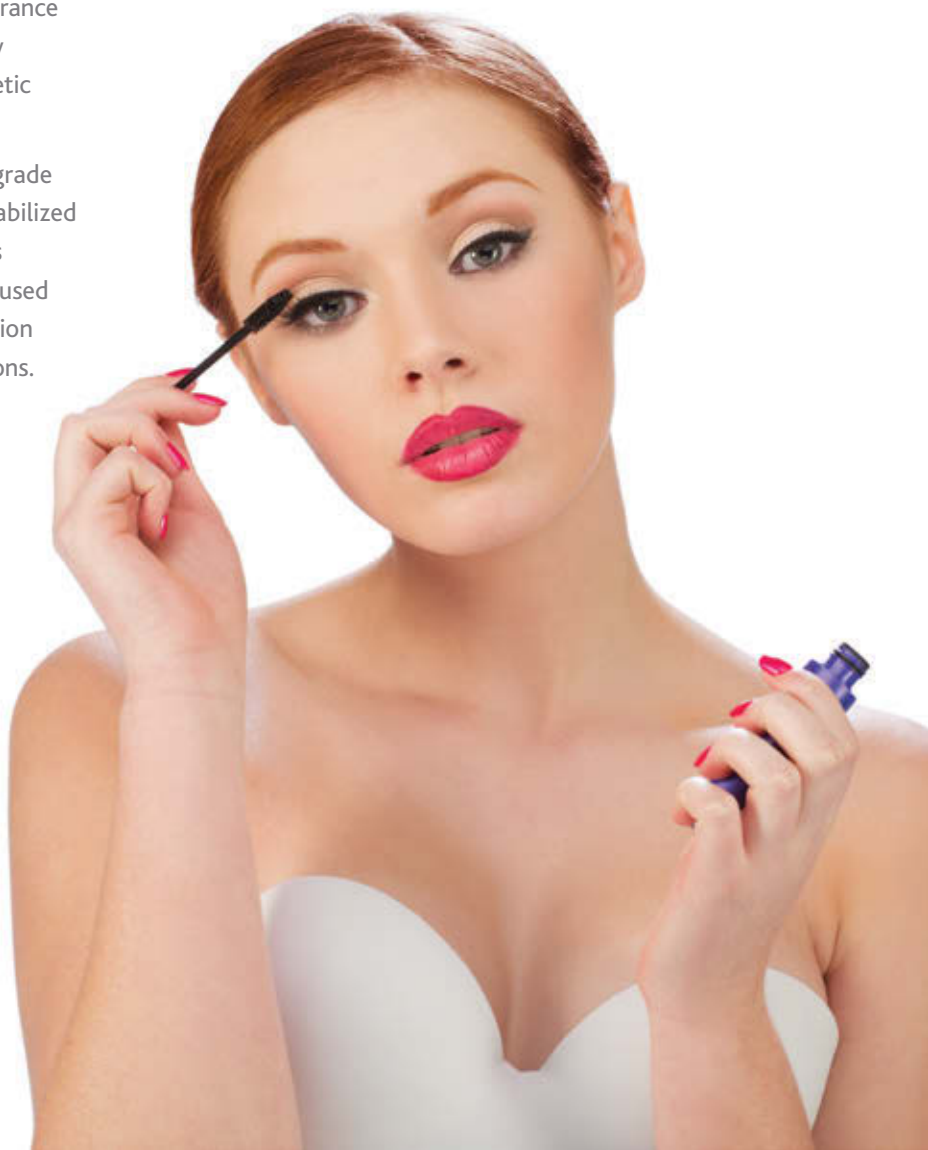


Table 1 Eastman resins

Liquid resins	INCI name	Typical applications	Key attributes
Eastman Sustane™ SAIB FG or Eastman SAIB	Sucrose acetate isobutyrate	Lipstick, lip gloss, nail enamel, depilatory wax, fragrance	Tacky; high specific gravity; water-white; fragrance fixative
Foralyn™ 5020-F CG hydrogenated rosin	Methyl hydrogenated rosin	Lipstick, lip gloss, depilatory wax, fragrance	High refractive index; plasticizer; fragrance fixative
Solid resins			
Foral™ 85-E CG hydrogenated rosin	Glyceryl hydrogenated rosin	Lipstick, eye makeup, depilatory wax	Oxidative and color stability
Foral 105-E CG hydrogenated rosin	Pentaerythritol hydrogenated rosin	Mascara, face makeup, lipstick, lip gloss	Oxidative and color stability; high softening point
Regalite™ R1100 CG hydrogenated hydrocarbon	Hydrogenated styrene/methyl styrene/indene copolymer	Lipstick, lip gloss	Colorless; oxidative and thermal stability; high refractive index; forms clear, glossy films

Table 2 Typical properties^a

Liquid resins	Viscosity, ^b cP	Product form	Color, Gardner ^c	Refractive index ^d	Acid number, mg KOH/g
Eastman Sustane™ SAIB FG or Eastman SAIB-100	100,000 @ 30°C	Water-white, viscous liquid	1	1.454	0.2 max.
Foralyn™ 5020-F CG	5,400 @ 25°C	Amber liquid	3	1.519	6
Solid resins		Softening Point, ^e °C			
Foral™ 85-E CG	85	Light amber pastilles	2	1.502	9
Foral 105-E CG	101	Amber pastilles	6	1.512	14
Regalite™ R1100 CG	100	Colorless pastilles	<1	1.530	N/A

^aThese properties are typical of average lots. Eastman makes no representation that the material in any particular shipment will conform exactly to the values given.

^bBrookfield

^c50% resin solids in toluene; Eastman Sustane™ SAIB FG and Foralyn™ 5020-F CG as neat resins

^dLiquid resins @ 20°C; solids resins @ 22°C

^eRing and ball method

Solubility

As shown in Table 3, Eastman cosmetic resins are soluble in a variety of solvents. Each resin was combined with the solvent (1:9 parts-by-weight resin to solvent) and gently agitated for one week at room temperature. Resins are likely to disperse quicker and more completely at higher temperatures.



Table 3 **Solubility^a of Eastman resins in various cosmetic solvents**
(1:9 resin:solvent)

Cosmetic solvent	Eastman Sustane SAIB FG	Foralyn 5020-F CG	Foral 85-E CG	Foral 105-E CG	Regalite R1100 CG
Mineral oil	U	C	C	C	C
Isododecane	<C	C	C	C	C
Vegetable oil	C	C	C	C	C
Ethylhexyl palmitate	C	C	C	H	C
Ethoxydiglycol	C	C	<C	PD	U
Ethanol	C	C	PD	PD	U
Dipropylene glycol	<C	C	U	U	U
Propylene glycol	PD	PD	U	U	U
Glycerin	U	U	U	U	U

°C = Completely dissolved and clear

H = Completely dispersed and hazy

<C = Almost completely dissolved and clear

<H = Almost completely dispersed and hazy

PD = Partially dispersed or partially dissolved

U = Undissolved or nearly unaffected

Compatibility

The compatibility of Eastman resins with various waxes is shown in Table 4. The mixtures are a 1:1 weight ratio of wax to resin. The waxes were combined with the resins and heated at 140°C. Compatibility was observed after the mixtures cooled.

The compatibility of Eastman resins with each other is shown in Table 5. The resins were mixed at a weight ratio of 1:1 and heated at 140°C. Compatibility of the resins was observed after the mixtures cooled to ambient temperature. Mixtures were considered compatible if they were homogeneous.

Table 4 **Compatibility^a of Eastman resins with selected waxes**
(1:1 wt ratio)

Liquid resins	Natural wax (carnauba)	Beeswax	Hydrocarbon wax (paraffin)
Eastman Sustane™ SAIB FG	PC	PC	PC
Foralyn™ 5020-F CG	C	C	C
Solid resins			
Foral™ 85-E CG	C	C	C
Foral 105-E CG	C	PC ^b	C
Regalite™ R1100 CG	C	C	C

^aC = Compatible PC = Partially compatible

^bCompatible at 60 wt% beeswax

Table 5 **Compatibility^a of Eastman resins**
(1:1 wt ratio)

Eastman resin	Foralyn 5020-F CG	Foral 85-E CG	Foral 105-E CG	Regalite R1100 CG
Eastman Sustane™ SAIB FG	C	C	C	PC
Foralyn™ 5020-F CG	—	C	C	C
Foral™ 85-E CG	—	—	PC ^b	I ^b
Foral 105-E CG	—	—	—	I

^aC = Compatible PC = Partially compatible I = Incompatible

^bCompatible at 60 wt% Foral 85-E CG

Plasticizing solid resins

The liquid resins, Sustane™ SAIB FG and Foralyn™ 5020-F CG, were dissolved with the solid resins (1:2 liquid resin:solid resin) in isododecane. A thin film (10-mil wet thickness) of each mixture was drawn down on a glass plate. After the isododecane evaporated, the appearance of the films was observed for resin compatibility—see Table 6. When compatible, the liquid resins were effective plasticizers and increased the tack of the solid resins.

Table 6 **Appearance^a of dried films**
(1:2 wt ratio of liquid resin to solid resin)

Eastman resin	Eastman Sustane SAIB FG	Foralyn 5020-F CG
Foral™ 85-E CG	C	C
Foral 105-E CG	H	C
Regalite™ R1100 CG	NE	C

^aC = Clear and glossy H = Hazy
NE = Not evaluated; not compatible

Health and safety

Consumer safety is the overriding objective for the manufacture and sale of cosmetics in most countries. Eastman supplies ingredients for cosmetic manufacturers, and Eastman experts can assist our cosmetic customers with safety assessments for our products used as cosmetic ingredients. A Raw Material Information Form in the format published by the Personal Care Product Council has been completed for our cosmetic ingredient products and is available on request. Further product information is also available for registered customers at www.eastman.com or on request to your Eastman representative.

The use of rosin esters in cosmetic applications has been reviewed by the Cosmetic Ingredient Review (CIR) expert panel [International Journal of Toxicology, 23(S2):55-94, 2004]. The CIR panel concluded that glyceryl rosinatate and glyceryl hydrogenated rosinatate were safe for use as cosmetic ingredients in the present practices of use and concentration. If you should need assistance in interpreting this review as it applies to Eastman products, contact Eastman's Product Safety and Health group.

The toxicology of sucrose acetate isobutyrate (SAIB) and Regalite™ R1100 CG is well understood and supports their use in cosmetic applications. Eastman has evaluated SAIB to be safe for use in developmental cosmetic products at concentrations up to 20%. In addition, SAIB is present in the European Commission's CosIng (ECC) database, which implies it is in commerce as a cosmetic ingredient in the EU. A substance, structurally equivalent to Regalite R1100 CG, is listed in the ECC database which implies a similar product is in commerce as a cosmetic ingredient in the EU.





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**Eastman Chemical Company
Corporate Headquarters**

P.O. Box 431
Kingsport, TN 37662-5280 U.S.A.

Telephone:
U.S.A. and Canada, 800-EASTMAN (800-327-8626)
Other Locations, (1) 423-229-2000
Fax: (1) 423-229-1193

Eastman Chemical Latin America

9155 South Dadeland Blvd.
Suite 1116
Miami, FL 33156 U.S.A.

Telephone: (1) 305-671-2800
Fax: (1) 305-671-2805

Eastman Chemical B.V.

Fascinatio Boulevard 602-614
2909 VA Capelle aan den IJssel
The Netherlands

Telephone: (31) 10 2402 111
Fax: (31) 10 2402 100

**Eastman (Shanghai) Chemical
Commercial Company, Ltd. Jingan Branch**

1206, CITIC Square
No. 1168 Nanjing Road (W)
Shanghai 200041, P.R. China

Telephone: (86) 21 6120-8700
Fax: (86) 21 5213-5255

Eastman Chemical Japan Ltd.

MetLife Aoyama Building 5F
2-11-16 Minami Aoyama
Minato-ku, Tokyo 107-0062 Japan

Telephone: (81) 3-3475-9510
Fax: (81) 3-3475-9515

Eastman Chemical Asia Pacific Pte. Ltd.

#05-04 Winsland House
3 Killiney Road
Singapore 239519

Telephone: (65) 6831-3100
Fax: (65) 6732-4930

www.eastman.com

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