Eastman Tackifier Introduction

Content

- *General Information about Resin*
- *Eastman Hydrogenated Hydrocarbon Resins*
- *Eastman C5 and C9 modified C5 Resins*
- *Eastman Pure Monomer Resins*
- *Eastman Rosin Ester Resins*

A leader in attractive markets

EASTMAN

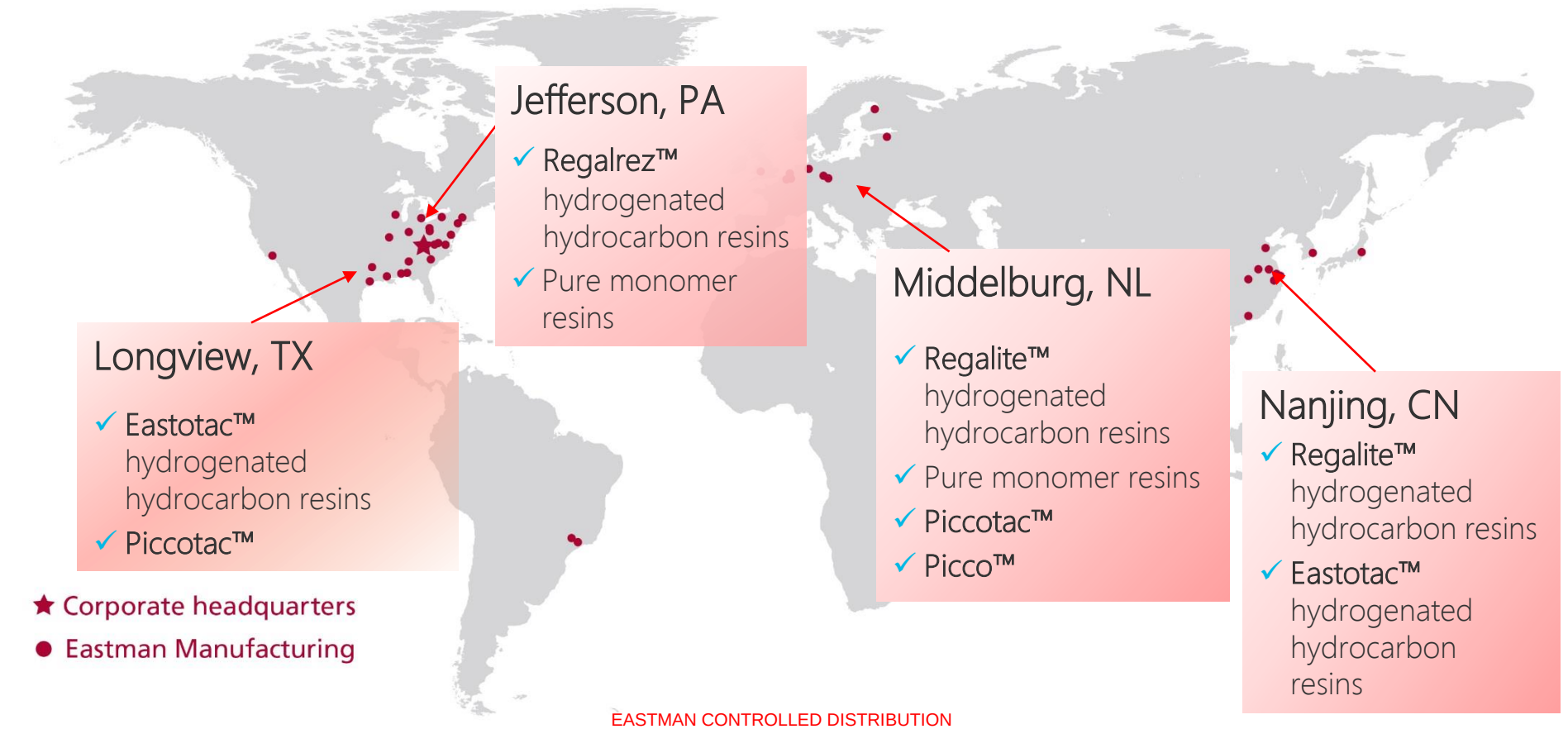
2/3 of our sales revenue is from product lines in

leading market POSITIONS

Additives & Functional Products	Advanced Materials	Fibers	Chemical Intermediates
			
#1	#1	#1 or #2	#1 or #2
• Cellulosic polymers • Insoluble sulfur • Aldehyde derivatives/ ketones • Heat transfer and aviation hydraulic fluids • Adhesives - Hydrocarbon resins	• Copolyester • PVB sheet • Branded window film • Cellulosic polymers	• Acetate tow • Acetate yarn	• Oxo alcohols in Americas • Non-phthalate plasticizers

Global Footprint *Eastman tackifier*

EASTMAN



Jefferson, PA

- ✓ Regalrez™ hydrogenated hydrocarbon resins
- ✓ Pure monomer resins

Middelburg, NL

- ✓ Regalite™ hydrogenated hydrocarbon resins
- ✓ Pure monomer resins
- ✓ Piccotac™
- ✓ Picco™

Longview, TX

- ✓ Eastotac™ hydrogenated hydrocarbon resins
- ✓ Piccotac™

Nanjing, CN

- ✓ Regalite™ hydrogenated hydrocarbon resins
- ✓ Eastotac™ hydrogenated hydrocarbon resins

★ Corporate headquarters

● Eastman Manufacturing

EASTMAN CONTROLLED DISTRIBUTION

Anniston, AL
Antwerp, Belgium
Canoga Park, CA
Chestertown, MD
Columbia, SC
Dresden, Germany
Fengxian, China
Fieldale, VA
Franklin, VA
Ghent, Belgium
Hefei, China
Indianapolis, IN
Itupeva, Brazil
Jefferson, PA
Jurong Island, Singapore
Kashima, Japan
★ **Kingsport, TN**
Kohtla-Järve, Estonia
Kuantan, Malaysia
Lemoyne, AL
Leuna, Germany
Linden, NJ
Longview, TX
Martinsville, VA
Middelburg, The Netherlands
Monongahela, PA
Nanjing, China
Newport, Wales
Nienburg, Germany
Oulu, Finland
Pace, Florida
Santo Toribio, Mexico
São Paulo Mauá, Brazil
Sauget, IL
Shenzhen, China
Springfield, MA
St Gabriel, Louisiana
Sun Prairie, WI
Suzhou, China
Texas City, TX
Trenton, MI
Ulsan, Korea
Uruapan, Mexico
Watertown, NY
Wuhan, China
Yixing City, China
Zibo, China

What are tackifying resins?

- Amorphous, usually low molecular weight compounds
- Typically:
  - Softening Point: liquid - 160°C
  - Molecular Weight: Mz usually <10,000
  - Color: yellow to water white
- Classified by feedstock
  - Rosin Base
  - Petroleum Resin
  - Others

EASTMAN

The role of tackifying resins in adhesives

- Tackifying Resins
  - Key component in many adhesives formulations
  - In many cases tackifiers amount to > 50% w/w of the adhesive formulation
  - Commonly employed to impart
    - improved processibility
    - functional performance to adhesives

- Some specific benefits
  - Improving tack and peel for PSA tapes & labels
  - Imparting hot tack properties of packaging hot melts
  - Enhancing cohesion properties of nonwoven hot melts
  - Modifying viscosity of hot melts based on SIS & SBS

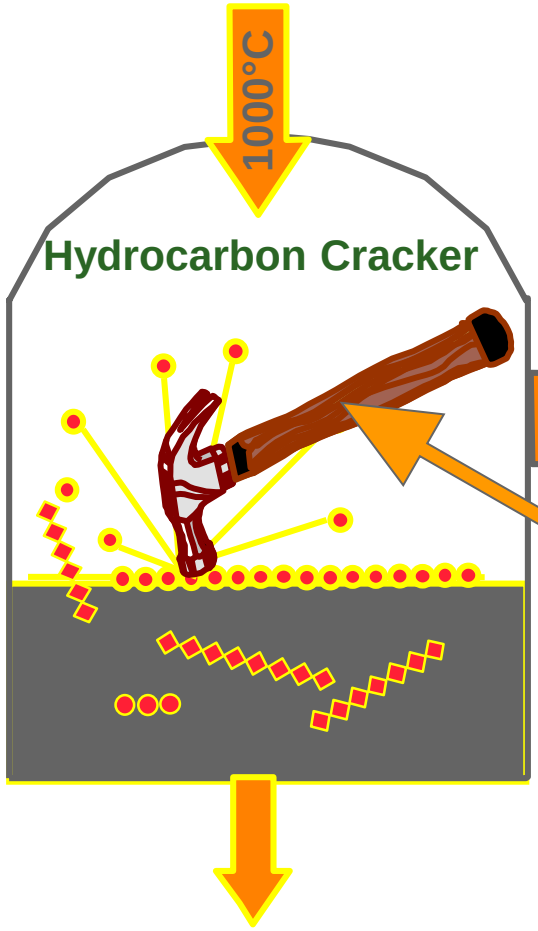
Knowing which tackifier(s) to select for a specific application is critical for optimum performance!.

EASTMAN

Feedstock: petroleum hydrocarbon

EASTMAN

Naphtha, Natural Gas, or Petroleum



Distillation

TYPICAL CONDITIONS:

400 Milliseconds at 850°C with 2 atmospheres pressure

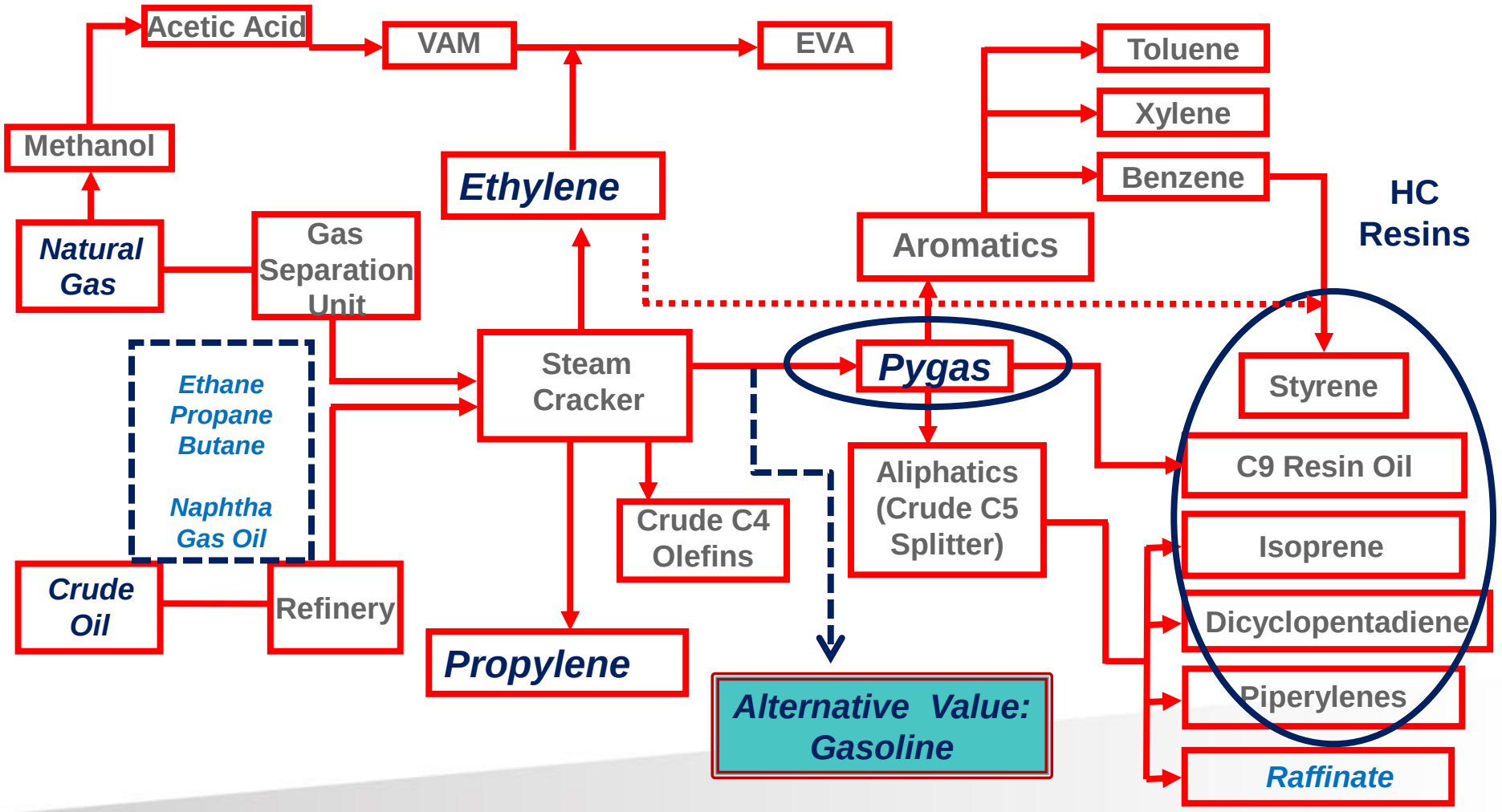
ALIPHATIC

- Piperylene
- CPD ➔ DCPD
- Mixed aliphatic

AROMATICS

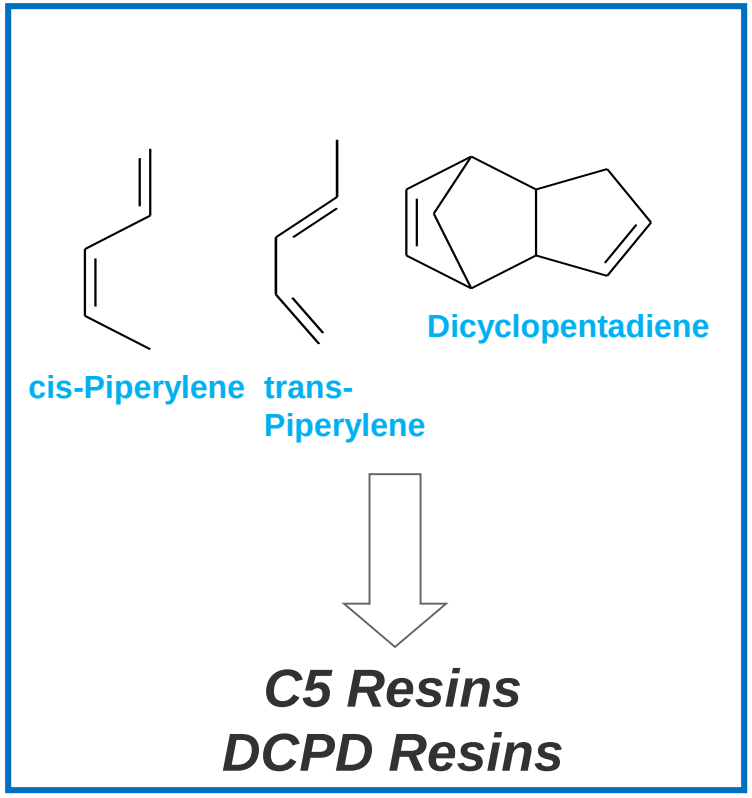
- C9 Oil
- Styrene
- α-Methyl styrene
- etc

Hydrocarbon resin raw materials

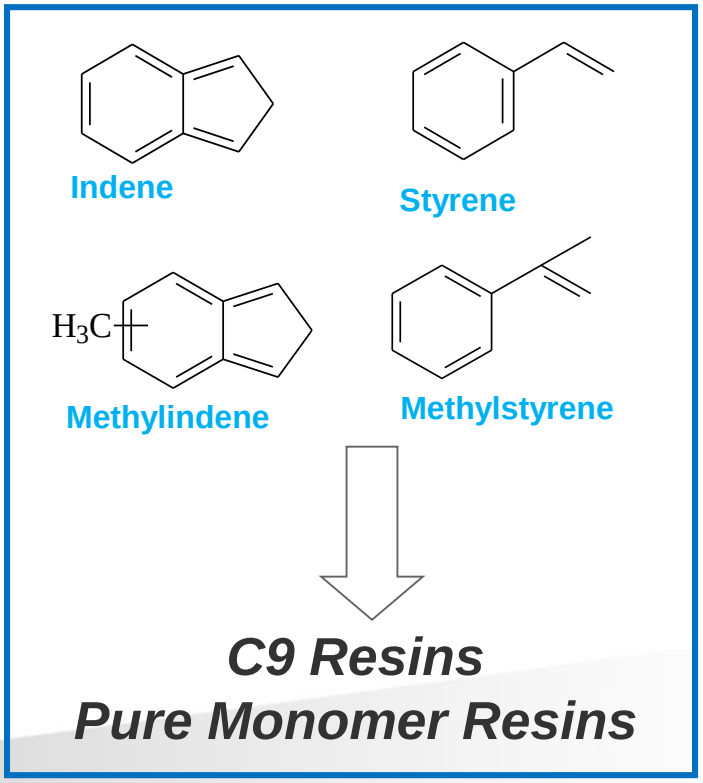


Composition of hydrocarbon resins

Aliphatic resins



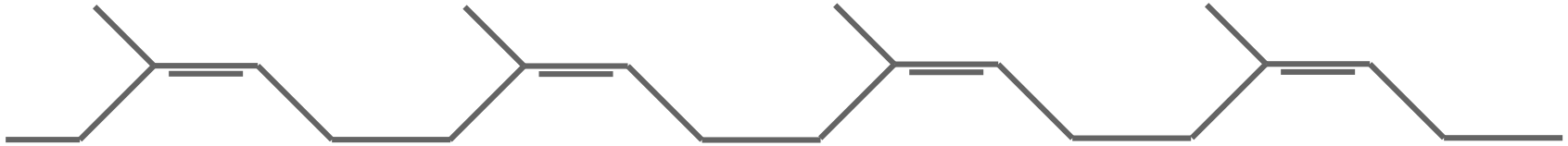
Aromatic resins



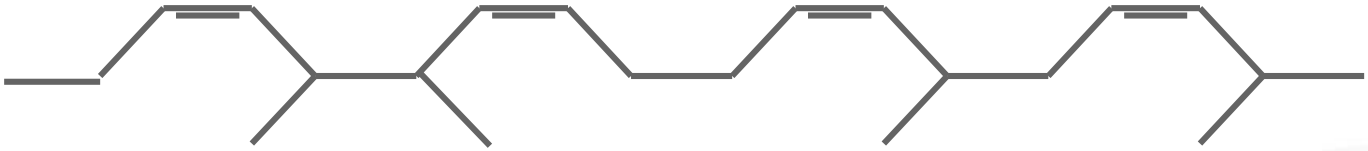
EASTMAN

Aliphatic resins are structurally similar to rubber

- Natural rubber is 100% cis-1,4-polyisoprene

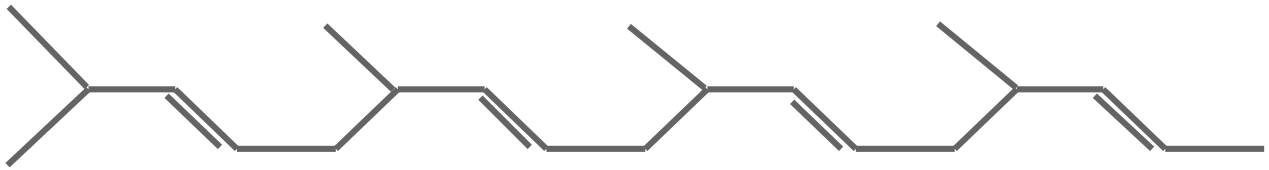


- Synthetic polyisoprene is >92% cis-1,4-polyisoprene plus 3 other isomers
- Aliphatic tackifiers (particularly C5) can be modeled as poly-1,3-pentadiene

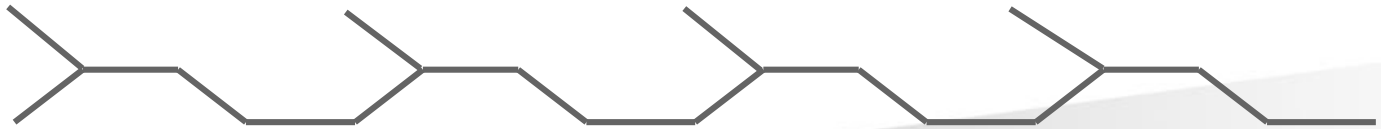


What does hydrogenation do to aliphatic resin

- Aliphatic hydrocarbon without hydrogenation



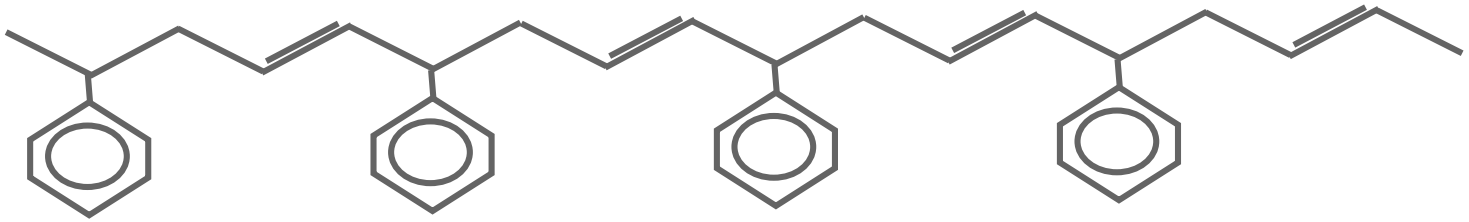
- Hydrogenate to:



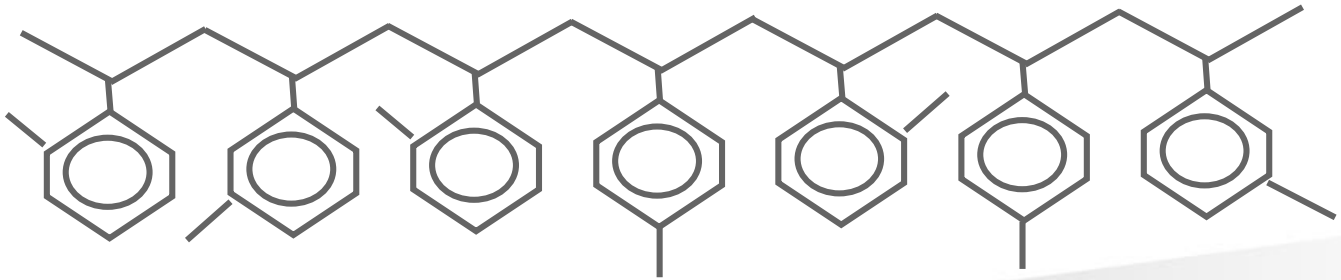
EASTMAN

Aromatic resins are structurally similar to SBR

- SBR is a co-polymer of styrene and butadiene

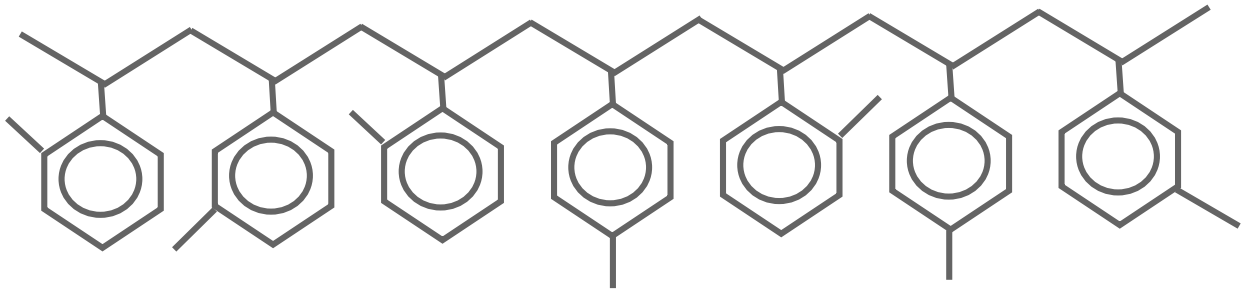


- Aromatic tackifiers can be modeled by polyvinyltoluene

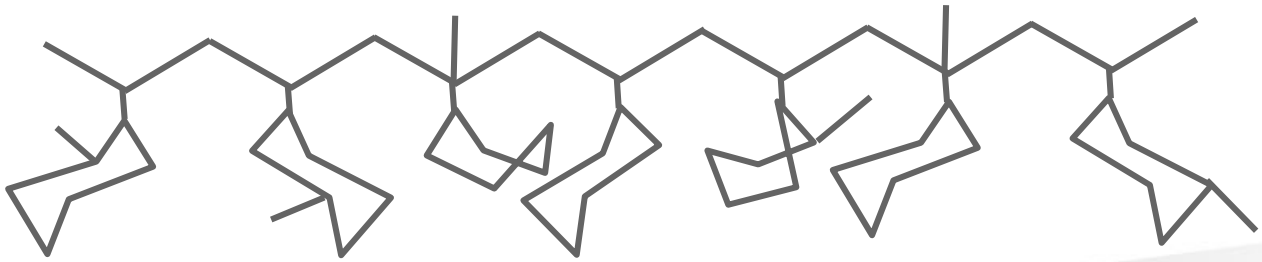


What does hydrogenation do to aromatic resin

- Aromatic hydrocarbon without hydrogenation

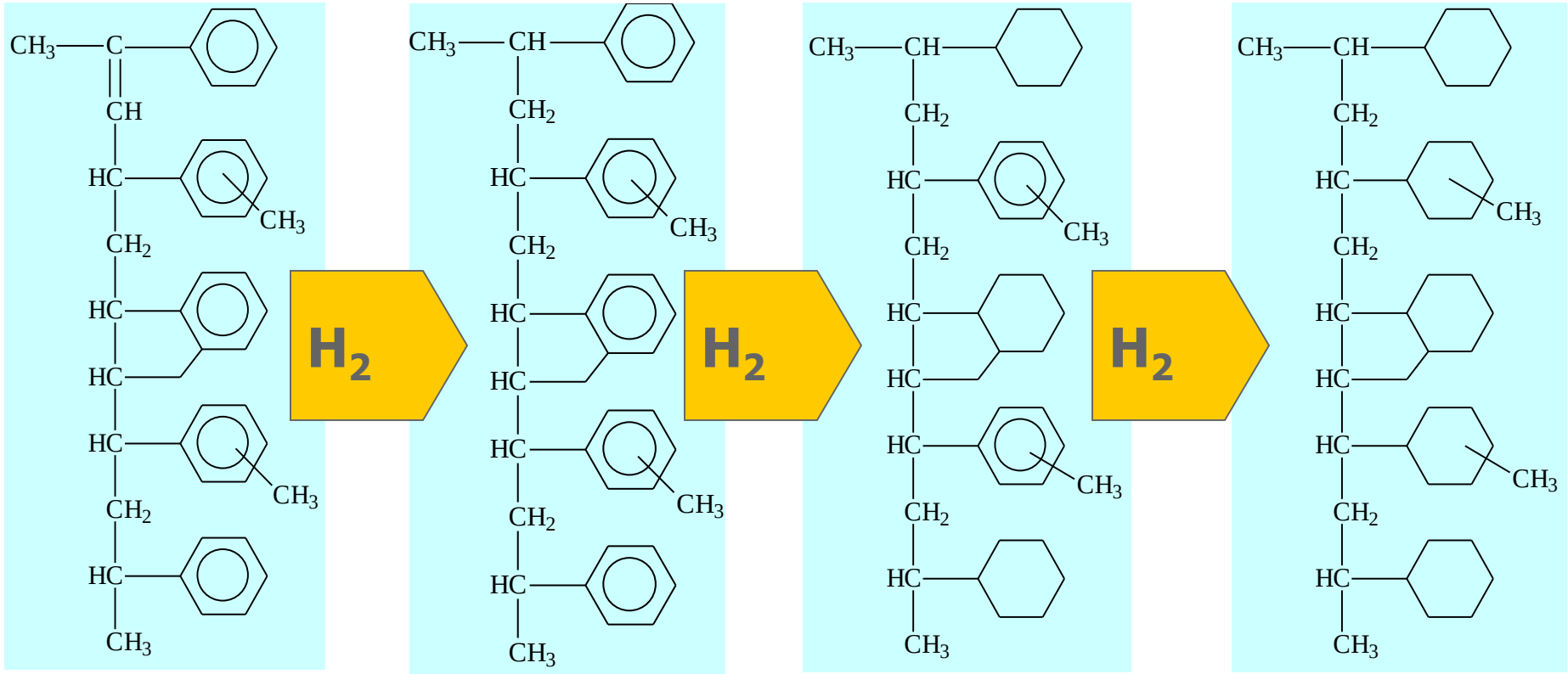


- Hydrogenate to:



EASTMAN

Hydrogenation of Aromatic Resins (Base Resins: C-9 & Pure Monomer Resins)



Aromatic Resin

Highly Aromatic

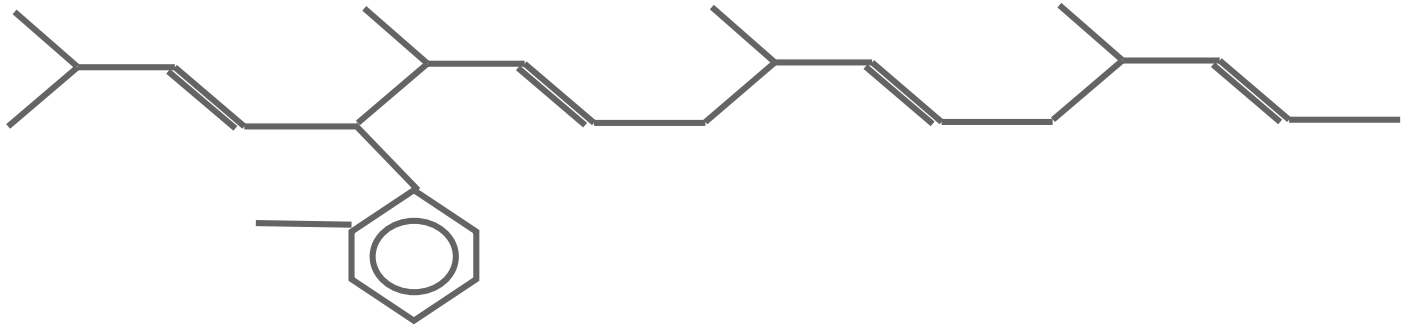
Aromatic/ Aliphatic

Fully Aliphatic

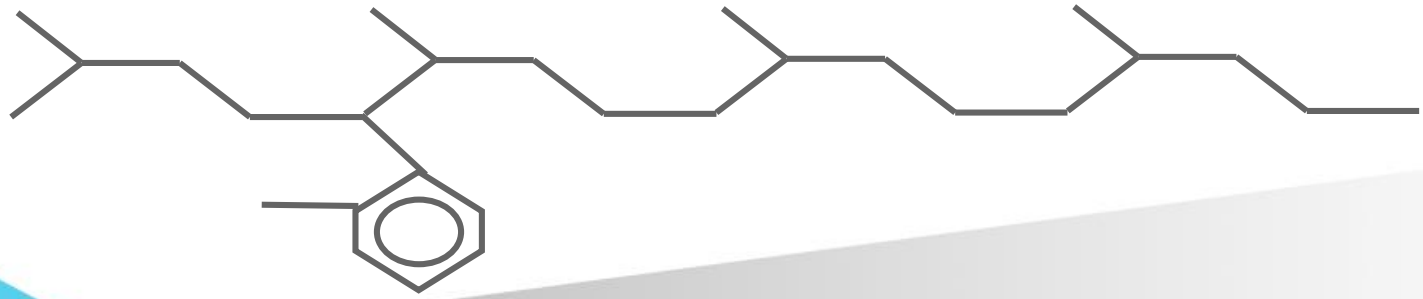
EASTMAN

What does hydrogenation do to an aliphatic-aromatic resin

- Aliphatic/aromatic resin without hydrogenation



- Hydrogenated C5/C9 – Under certain conditions

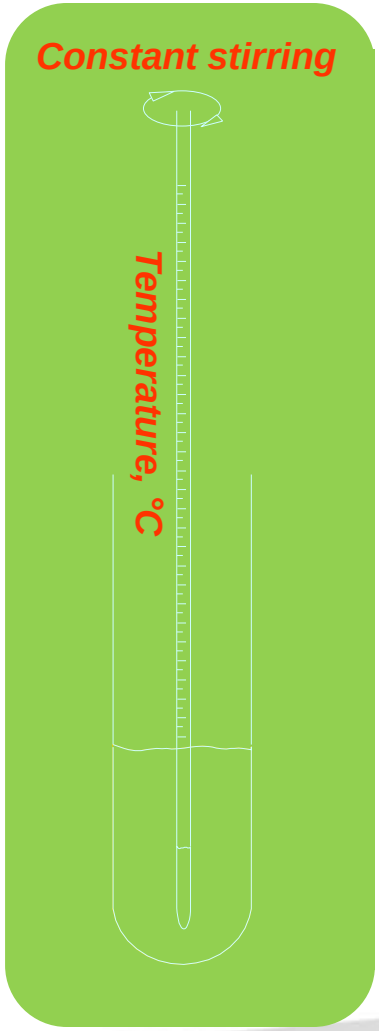


Eastman Tackifier Product Line

Key properties of tackifying resins

- Color
  - Gardner scale for non-hydrogenated resins
  - Yellowness index for hydrogenated resins
- Ring and ball softening point
  - Not melting point – not a state change
  - Indicates relative tack, adhesion and heat resistance
- Glass transition temperature (Tg)
  - Resin begins to exhibit viscous (liquid) properties
  - Indicates low temperature properties
- Cloud points
  - MMAP indicates aromaticity
  - DACP indicates polarity
- Molecular weight

What is cloud point



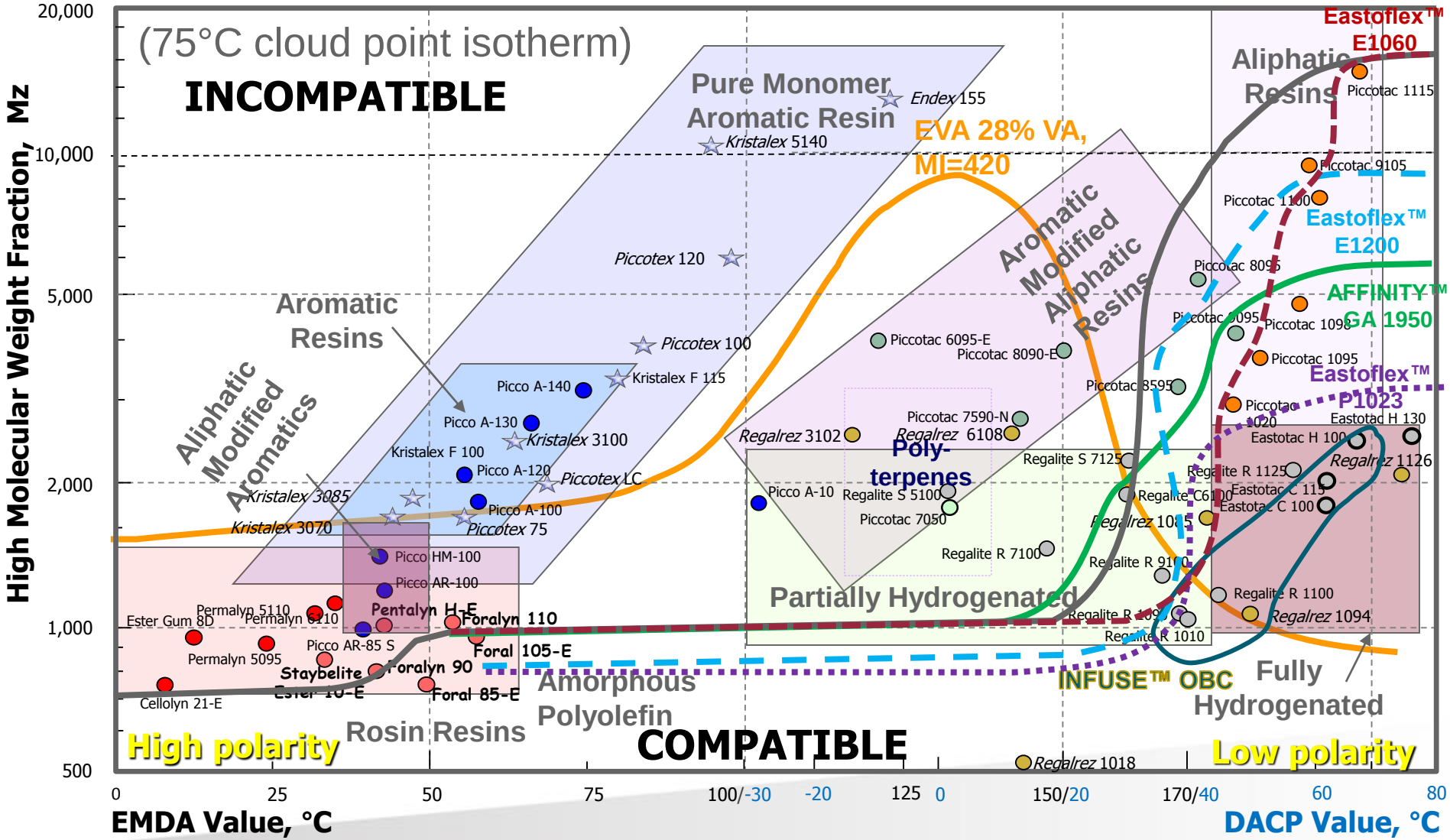
- The cloud point of a solution is the temperature at which a dissolved material begins to precipitate.
- Procedure:
  - *Dissolve the resin in hot solvent – 150°C max.*
  - *Allow the mixture to cool in air with stirring and observe the point the sample becomes cloudy*
  - *For temperatures between 25 and 2°C use an ice water bath to cool the sample*
  - *For temperatures between 2 and -50°C use an acetone-dry ice bath*

Why use cloud point

EASTMAN

Cloud Point	Solvent Type	Description
MMAP	Aromatic	A measurement of aromatic (no polar) solubility Resins with a low MMAP are more aromatic Distinguishes between aliphatic, aromatic and mixed resins
DACP/EMDA	Polar	Measurement of resin polarity Resins with low DACP are more polar Low DACP values often produce better adhesion to polar substrates
OMS	Non Polar	Used only for highly aromatic resins Nonpolar resins all are soluble at -50°C Aromatic resins have OMSCP between -10 and 180°C Indicates the molecular weight and compatibility of a resin OMS values increase with molecular weight when monomer composition is constant Low OMS values indicate compatibility with high vinyl acetate EVA copolymers

Resin-Polymer Compatibility



Eastman Adhesives products

EASTMAN

	Products	Markets	Manufacturing sites
Hydrogenated hydrocarbons	• Hydrogenated C9 Resins • Hydrogenated C5 Resins • Hydrogenated PMR Resins	• Personal Care • Packaging • B&C • Film Modification	• USA • Europe • China
Non Hydrogenated hydrocarbons	• Pure monomer resins • C5 resin • C9 resin	• Personal Care • Packaging • B&C	• USA • Europe
Rosins, Dispersions, and Polyolefins	• Hydrogenated rosins • Hybrid dispersions • Amorphous polyolefins • Rosin esters • Resin soaps • Oleic and linoleic acids • Rosin & HCR dispersions	• B&C – roofing • Personal Care • Packaging • Food & Bev. – chewing gum	• USA • Europe

Broad portfolio of products → Various market applications → Reliable supply worldwide

Eastotac™ hydrogenated hydrocarbon resins

- Eastotac™ C and H series
  - *Aliphatic in nature exhibiting good EVA, APO, PE and SIS/SEBS compatibility*
- Wide RBSP and Color Grade
- R grade: Light yellow
  - *Excellent compatibility with EVA up to 28% VA*
  - *Better heat & viscosity stability regular C5 resins*
  - *Excellent cost effective resins for packaging and non woven HMA*
- W grade: Water white
  - *Competitive water white resins for EVA low color hot melt and olefin based premium hot melt*
  - *Excellent heat color stability and EVA/SIS/APO/mPO compatibility*

Eastotac™ hydrogenated hydrocarbon resins

EASTMAN

Grade	Source	RBSP/°C	Color, Gardner	Cloud Points, °C	
				DACP	MMAP
Eastotac™ C-100R	China	100	1.5	60-70	75-85
Eastotac™ C-100L		100	<1		
Eastotac™ C-100W		100	<1		
Eastotac™ C-115R		115	1.5		
Eastotac™ C-115L		115	<1		
Eastotac™ C-115W		115	<1		
Eastotac™ H-100R	USA	100	1.5		
Eastotac™ H-100L		100	< 1		
Eastotac™ H-100W		100	< 1		
Eastotac™ H-115R		115	1.5		
Eastotac™ H-115L		115	<1		
Eastotac™ H-115W		115	<1		
Eastotac™ H-130R		130	1.5		
Eastotac™ H-130L		130	<1		
Eastotac™ H-130W		130	<1		
Eastotac™ H-142R		142	1.5		
Eastotac™ H-142W		142	<1		

- Newly launched Eastotac C100XF which has excellent thermal stability

Regalite™ hydrogenated hydrocarbon resins

- Wide range polymer compatibility profiles
  - Depending on the degree of modification and hydrogenation
- Fully hydrogenated Regalite™ R1090,R1100,R1125
  - Polyolefins, NR, SIS, SEBS compatible
- EVA, SIS, SBS, compatible
  - Partially Hydrogenated Regalite™ R9100,R7100, S5100
  - Modified Hydrogenated Aliphatic Regalite™ C6100, C6100L
- Widely used in
  - Non-woven hot melt adhesives
  - Packaging Adhesives
  - HMPSA and SB PSA

EASTMAN

Regalite™ hydrogenated resins

Product	Source	RB SP, °C	Color, Gardner	Molecular Weight Distribution				Cloud Points, °C		
				M_n	M_w	Pd	M_z	DACP	EMDA	MMAP
Regalite™ R 1010	EU	liquid	<1	-	-	-	-	-	-	82
Regalite™ R 1090	EU	88	<1	500	700	1.4	1100	39	169	74
Regalite™ R 1100	EU	100	<1	600	900	1.5	1500	45	175	78
Regalite™ S 1100	EU	100	< 1	600	900	1.5	1500	46	176	82
Regalite™ R 1125	EU	123	<1	800	1300	1.6	2100	56	186	86
Regalite™ R 9100	EU	99	<1	600	850	1.4	1300	36	165	71
Regalite™ R 7100	EU	102	<1	600	900	1.5	1500	14	145	63
Regalite™ S 7125	EU	122	<1	800	1300	1.6	2200	35	165	72
Regalite™ C 6100	AP	100	< 1	610	1010	1.7	1880	31	-	60
Regalite™ S 5100	EU	97	<1	600	900	1.5	1800	8	135	59

- Regalite has different RBSP and aromaticity which is compatible to different polymer system
- Excellent thermal stability and color for hotmelt adhesive and film modification application

EASTMAN

Regalrez™ hydrogenated pure monomer resins

Product	Source	Softening Point, R&B, °C	Color, YI	Molecular weight distribution				Cloud Points, °C	
				M_n	M_w	Pd	M_z	DACP	MMAP
Regalrez™ 1018	USA	18	8*	390	420	1.1	460	15	68
Regalrez™ 1085	USA	85	2	680	925	1.4	1,200	40	85
Regalrez™ 1094	USA	94	2	630	900	1.4	1,370	54	83
Regalrez™ 1126	USA	124	3	720	1,250	1.7	2,000	62	91
Regalrez™ 1128	USA	128	3	1,050	1,800	1.7	2,900	67	101
Regalrez™ 1139	USA	140	3	1,500	3,100	2.1	5,400	81	108
Regalrez™ 6108	USA	108	4	780	1,500	1.9	2,500	15	54
Regalrez™ 3102	USA	102	3	880	1,300	1.5	1,900	-30	24

*neat

- Hydrogenation at different levels to achieve different degree of aliphatic/aromatic balance
- Regalrez™ 1xxx
  - Fully hydrogenated to give aliphatic characteristics
- *Regalrez* ™ 3xxx and 6xxx are unique as partially hydrogenated pure monomer resins
  - *Regalrez ™ 3xxx is 30% hydrogenated, Regalrez ™ 6xxx is 60% hydrogenated*
  - *Solubility parameters between aromatic and aliphatic*
  - *Simultaneous endblock softening and midblock tackifying*
  - *The only products with both aromatic/aliphatic composition and pure monomer resin color and stability properties*

Piccotac™ C5 and C9 modified C5 resins

- These resins are not hydrogenated but can have light initial color and excellent stability
- Piccotac™ 1095, 1098, 1100, 1115 Resins
  - Pure aliphatic C5 resins widely used in EVA based HMA and SIS based PSA
  - NR based Tapes
- Piccotac™9105, 9095, 8595, 8095, 7590, 6095-E Resins
  - Modified C5
  - Designed for EVA-based HMA
  - Also compatible with SBS and high-styrene SIS and used in PSA
- Piccotac™ 1020 Resin
  - Liquid Aliphatic Resin
  - Excellent tack promoter
  - Used as plasticizer to reduce viscosity, enhance low-temperature adhesion and replace low-molecular weight oils

Piccotac™ hydrocarbon resins typical properties

EASTMAN

Product	Source	RBSP, °C	Color (1)	Molecular Weight Distribution					
				M_n	M_w	Pd	M_z	DACP	MMAP
Piccotac™ 1020	USA	5	3*	800	1380	1.7	2600	43	92
Piccotac™ 1095	USA	94	3	800	1700	1.7	3500	52	94
Piccotac™ 1098	USA	100	3	900	2150	2.4	4950	57	94
Piccotac™ 1100	USA	100	3	950	2900	3.0	8250	62	96
Piccotac™ 1115	USA	110	3	1100	3800	3.4	15900	69	99
Piccotac™ 9105	USA	105	2	1000	3200	3.2	9750	60	92
Piccotac™ 9095	USA	94	3	850	1900	2.3	4250	47	88
Piccotac™ 8595	USA	95	3	900	1700	1.7	3200	38	81
Piccotac™ 8095	USA	95	3	850	2200	2.6	5500	38	76
Piccotac™ 7590-N	EU	91	2	1000	1700	1.7	2500	14	62
Piccotac™ 7050	USA	50	3	600	980	1.7	1730	7	65
Piccotac™ 6095-E	EU	98	7	1085	1750	1.6	2900	-10	35

(1) Garnder Color 50% in Toluene
* as it is

What are pure monomer resins (PMRs)

- Made from purified aromatic starting materials
- Water white resins with excellent thermal and UV stability
- Amorphous, usually low molecular weight compounds. Softening point & physical form: liquid -160°C
- FDA direct food contact approval

The solution for low color, excellent thermally stable resins with broad compatibility

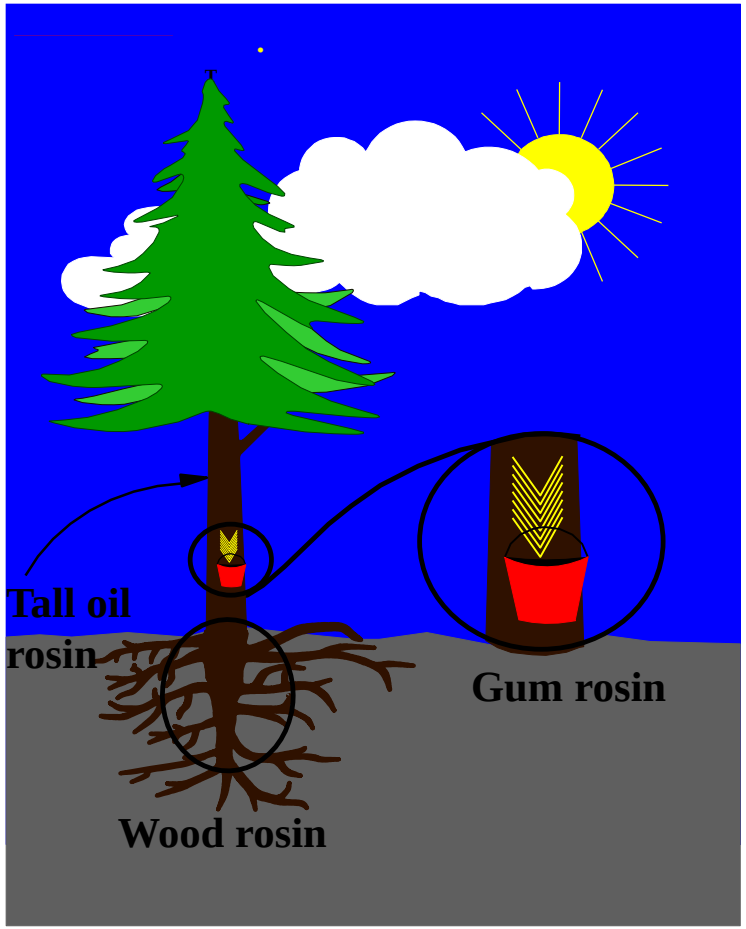
Pure monomer resins

EASTMAN

- *Eastman is the biggest supplier for PMRs with broader product portfolio*

Product Name	RBSP, °C	Color, 50%	MMAP	DACP	OMS	HMDA	Tg, °C	Mz
***Endex* Resins**		**YID**						
***Endex* 155**	152	7	16	-23	115	123	100	14300
***Endex* 160**	160	7	18	-15	138	130	105	19500
***Kristalex* Resins**		**YID**						
***Kristalex* F 85**	86	<1 G			46	45		1950
***Kristalex* F 100**	99	< 1 G			73	57		2200
***Kristalex* F 115**	116	< 1 G						4150
***Kristalex* 1120**	120	7	5	-35	> 180		56	7300
***Kristalex* 3070**	70	8	0.4	<-50	9/7	18	27	1300
***Kristalex* 3085**	85	8	1.5	<-50	44/39	42	36	1990
***Kristalex* 3100**	100	5	4	<-50	60/55	60	46	2700
***Kristalex* 3115**	115	5	3	<-50	107	81	64	4100
***Kristalex* 5140**	140	7	9	-48	>175	111	88	9590
***Piccolastic* Reins**		**Gardner**						
***Piccolastic* A5**	5	2	-4	<-50	140/-5			510
***Piccolastic* A75**	75	1	6	<-50	93/72		28	2450
***Piccolastic* D125**	125	2	13	-32	>180		60	207000
***Piccotex* Resins**		**YID**						
***Piccotex* 75**	75	10	1	<-50	-12	57	29	1700
***Piccotex* LC**	90	10	2	<-50	-13	62	43	2400
***Piccotex* 100**	98	8	6	<-50	18	83	42	4300
***Piccotex* 120**	118	7	10	-35	51	105	68	6400
***Plastolyn* Resins**		**Gardner**						
***Plastolyn* 240**	120	1	8	<-50	> 180	8	74	14985
***Plastolyn* 290**	140	1	9	-44	> 180	9	91	20130

Rosin-based tackifiers

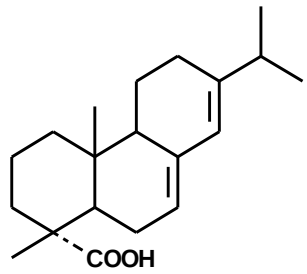


- Derived directly or indirectly from pine trees
- Three sources of rosin acids:
  - **Gum rosin:** harvested directly from a living tree; China is currently the largest supplier
  - **Wood rosin:** solvent extraction from aged tree roots; relatively expensive and limited supply
  - **Tall oil rosin:** collected as a by-product of wood fiber pulping for papermaking; crude tall oil can also be burned as fuel

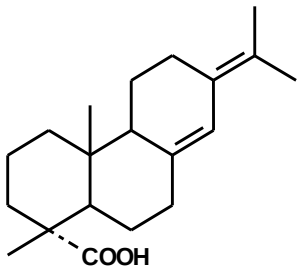
Rosin-based tackifiers

EASTMAN

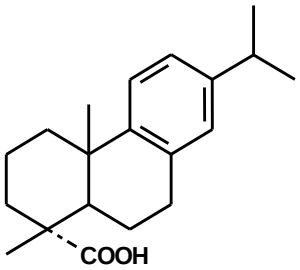
Rosin is a mixture of naturally occurring organic acids, including:



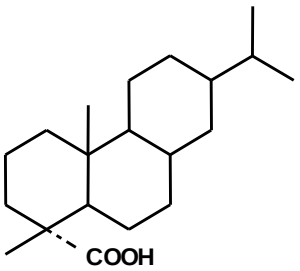
Abietic



Neoabietic

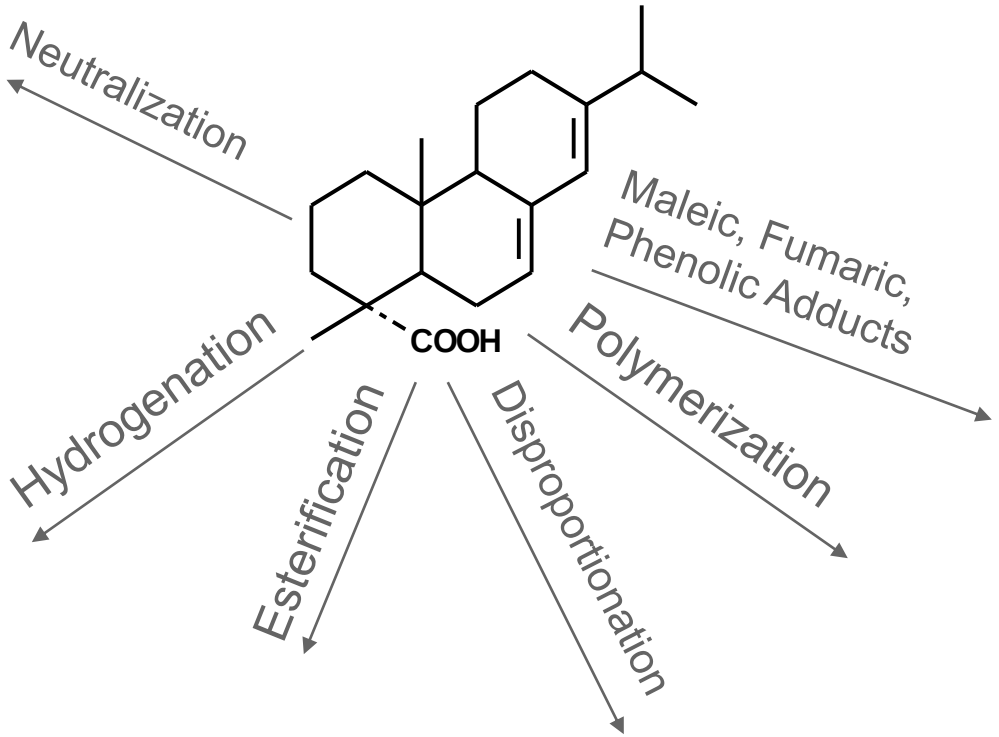


Dehydroabietic



Tetrahydroabietic

Chemical modification of rosins

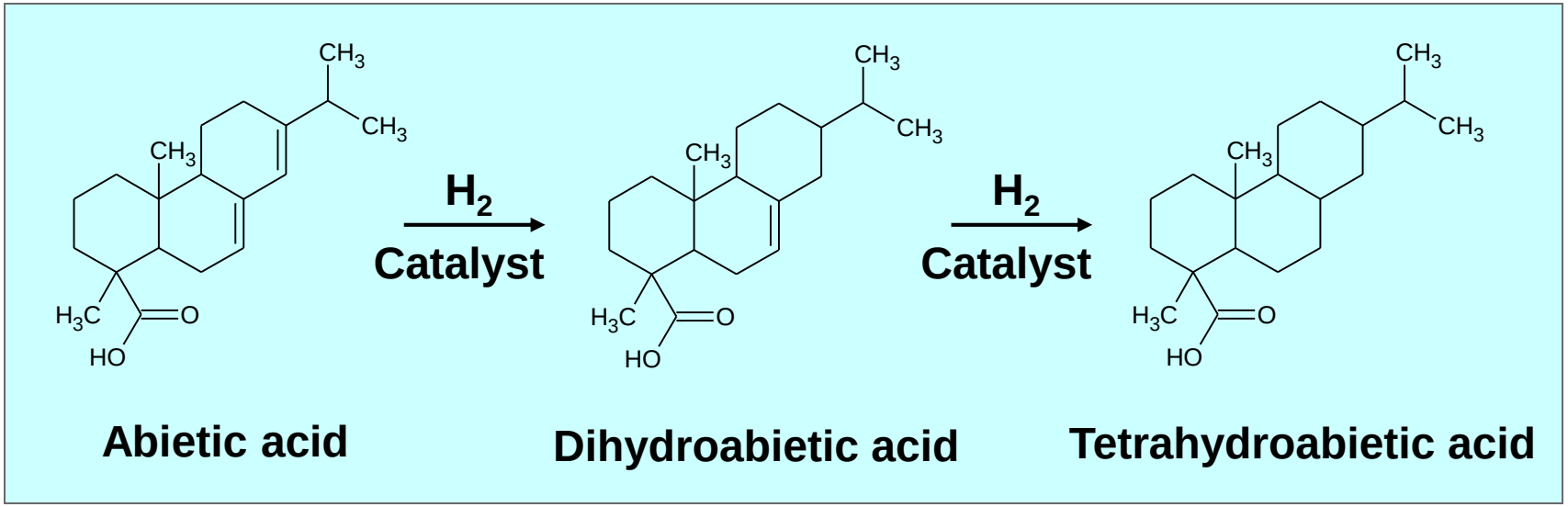


Typically rosins are modified to improve color, stability, and/or to expand usability

Why need rosin modification

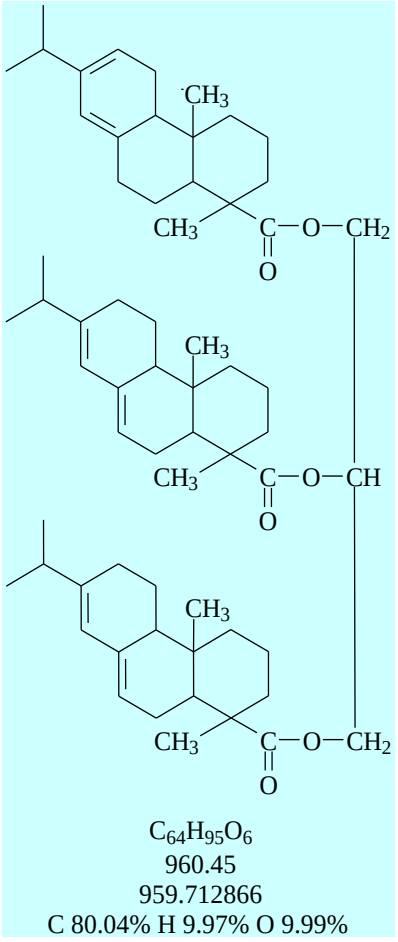
- Lighten initial color
- Raise softening point
- Improve color stability
- Alter compatibility/solubility
- Increase molecular weight

Chemistry of Rosin: Hydrogenation

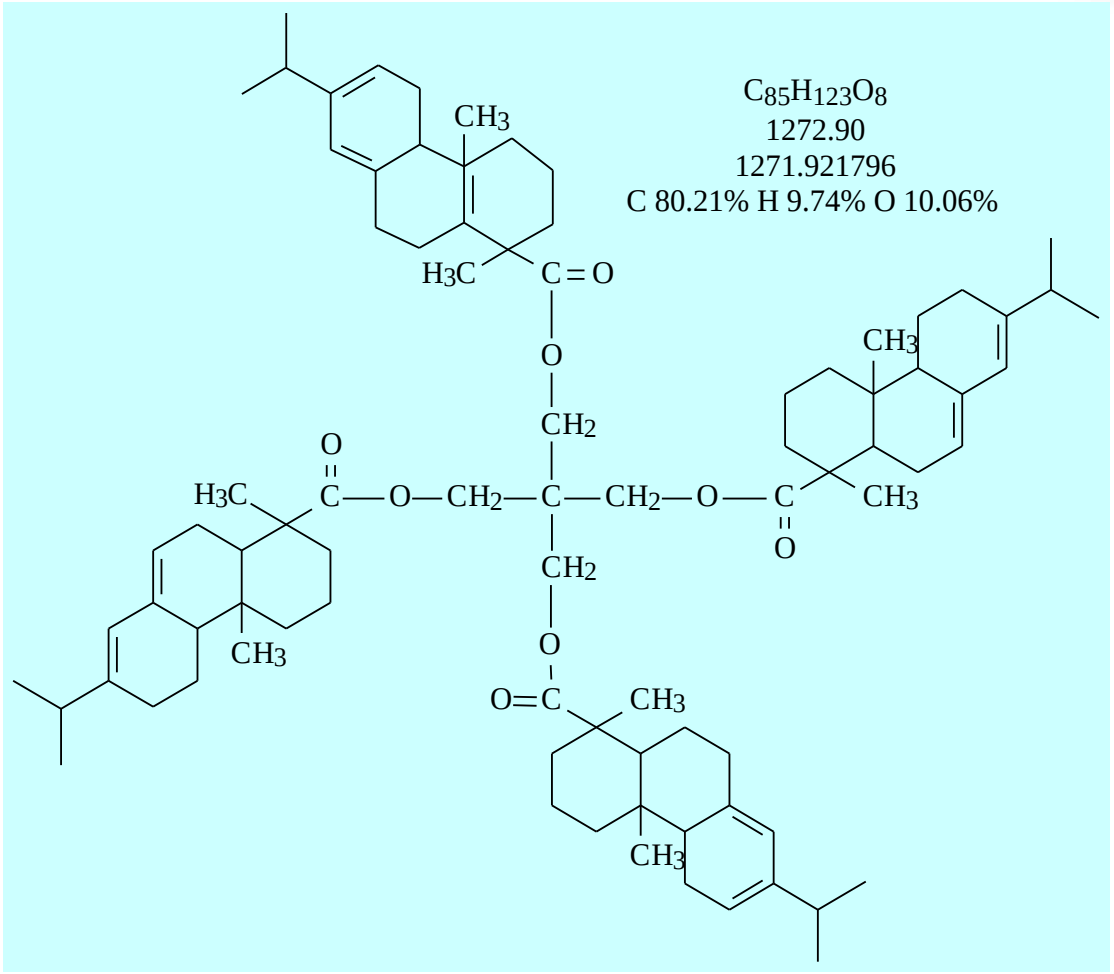


- Elimination of double bonds improves stability, lowers color
- Hydrogenation can be full or partial
- Does not affect acid functionality

Esterification

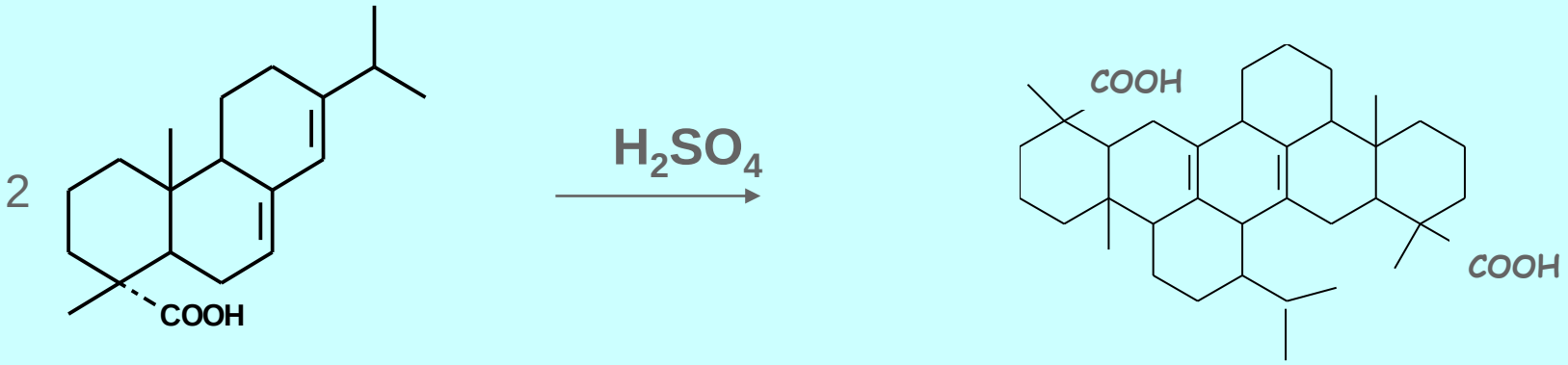


Glycerol Ester
E.g. : *Permalyn* 5095-C



Pentaerythritol Ester + 4H20
E.g. : *Permalyn* 5110-C

Polymerization of rosin



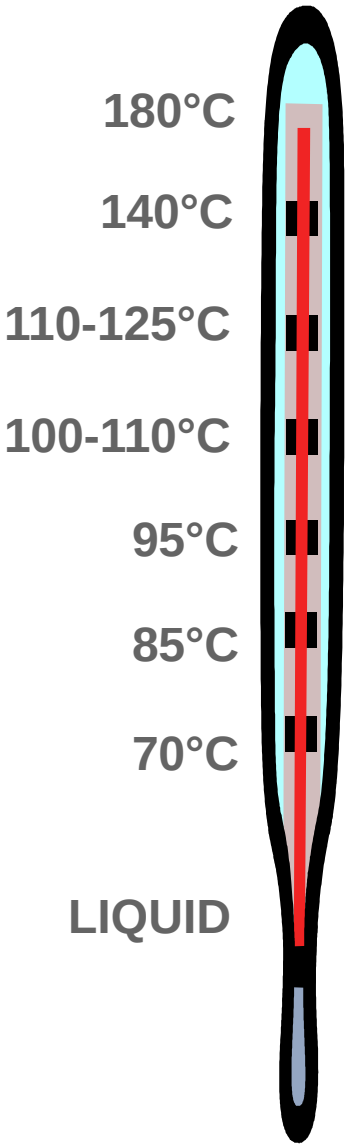
Gum rosin (abietic acid)
RBSP = 80°C

Poly-Pale™(RBSP=96°C)
Dymerex™ (RBSP=140°C)

Stability of Rosin Resins

- Rosin acid – very poor thermal stability
- Rosin ester – slightly improved from rosin acid
- Polymerized rosin – reduced unsaturation, improved stability
- Polymerized rosin ester – reduced unsaturation + esterified
- Partially hydrogenated rosin – less unsaturation
- Partially hydrogenated rosin ester – less unsaturation + esterified
- Fully hydrogenated rosin – saturated hydrocarbon
- Fully hydrogenated rosin ester – saturated hydrocarbon + esterification

Rosin Resin Softening Points



- Dimerized Rosin Esters
- Dimerized Rosin

- Partially dimerized rosin ester
- Pentaerythritol rosin ester
- Partially dimerized rosin
- Glycerol rosin ester
- Rosin acid
- Methyl rosin ester

- Rosin alcohol

Rosin-based resins

EASTMAN

Softening Point: Low ↕ High

Esterification Alcohols	Rosin Acid			Dimerized Rosins	
	Gum Rosin (80)[a]	**Staybelite™** Resin-E (75)	**Foralyn™** E **Foral™** AX-E (75)	**Poly-Pale™** (96)	**Dymerex™** (140)
Methanol CH_3OH		**Foralyn™** 5020-F Liquid			
Triethylene Glycol $HO(CH_2CH_2O)_3H$		**Staybelite™** Ester 3-E Viscous Liquid			
Glycerol $HOCH_2CH(OH)CH_2OH$	**Permalyn™** 5095 (86) **Ester Gum™** 8D (86)	**Staybelite™** Ester 5-E (80)	**Foralyn™** 90 **Foral™** 85-E (80)		
Pentaerythritol $C(CH_2OH)_4$	**Permalyn™** 5110 (99)	**Pentalyn™** H-E (99)	**Foralyn™** 110 **Foral™**105-E (90)		

[a]Numbers in ( ) = Softening Point; Ring and Ball Approximate in °C

Low ⟷ High

Stability

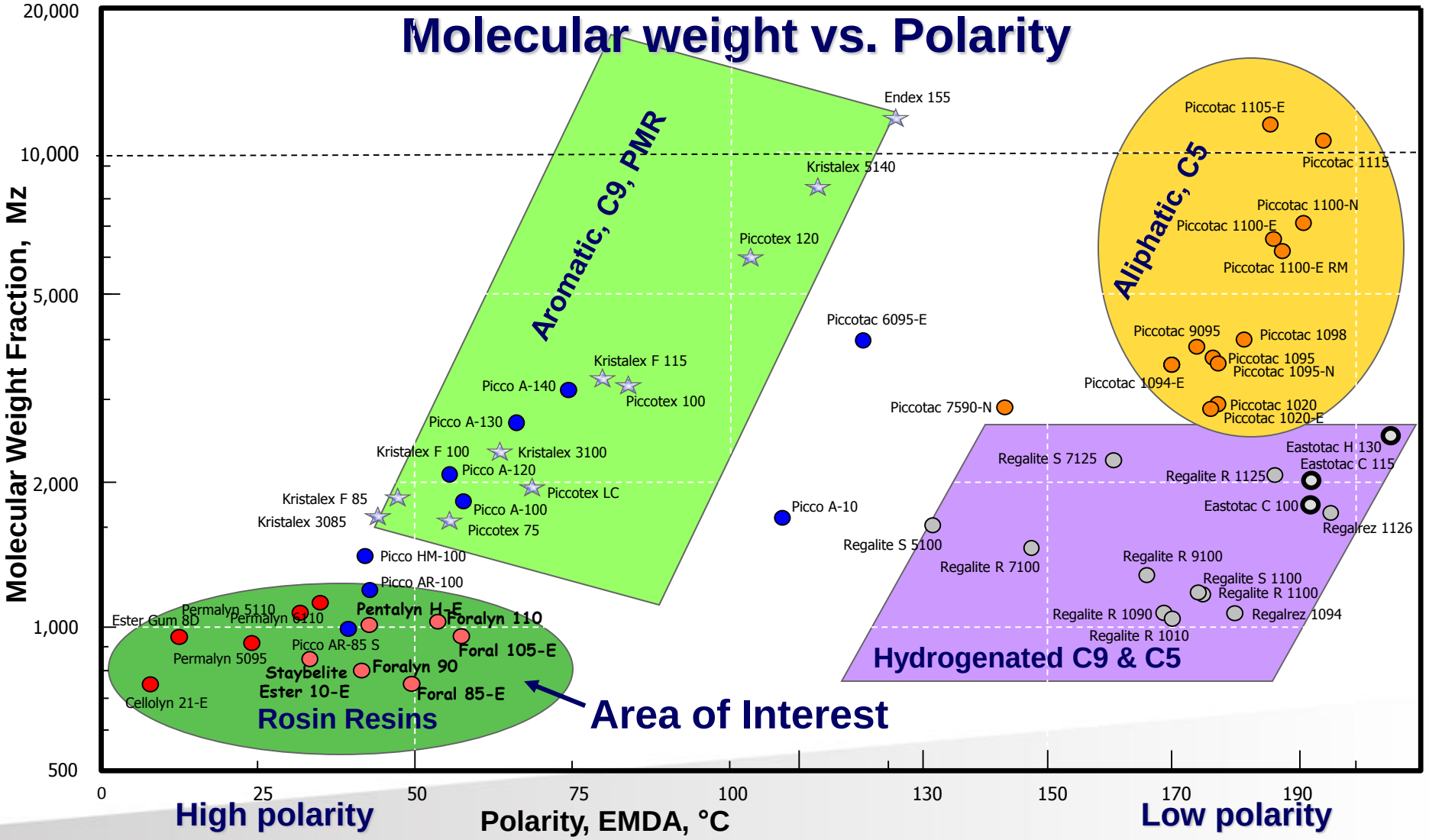
Rosin resins typical properties

Product	Softening Point, °C[a]	Color, Gardner[b]	Acid No.	End Use
Staybelite Resin-E™	79	5	162	Hot melt adhesives, solder flux, pigment coating
Foralyn™-E	81	2	168	
Foral™ AX-E	81	<1	166	
Permalyn™ 5095	92	3	8	Hot melt adhesives
Eastman Ester Gum™ 8D	93	USRG WW	7	Chewing gum
Staybelite Ester™ 5-E	85	USRG X	8	Chewing gum
Staybelite Ester™ 10-E	86	6	8	Adhesives, cosmetics
Foral™ 85-E	86	2	9	Hot melt adhesives, solvent based adhesives
Foralyn™ 90	89	1	9	
Permalyn™ 5110	106	6	14	Hot melt adhesives
Permalyn™ 6110	110	<1	13	
Pentalyn™ H-E	108	8	14	Pressure sensitive adhesives
Foral™ 105-E	106	5+	14	Hot melt adhesives, solvent based adhesives
Foralyn™ 110	109	2	14	

Liquid & specialty rosin derivatives typical properties

Product	Chemical Type	Softening Point, °C[a]	Color, Gardner	Acid No.	Melt Viscosity, mPa.s @ 25°C	End Use
Liquid Rosins						
Foralyn™ 5020-F	Partially hydrogenated rosin ester	Liquid	3	6	5,400	Cosmetics, perfumery, tackifier, plasticizer
Abitol™-E	Technical hydroabietyl alcohol	Liquid	Hunter 2	0.1	6,500 @ 50°C	Tackifier, plasticizer
Other Specialties						
Cellolyn™ 21-E						Tackifier for deep-freeze acrylic tape and label

Hydrogenated Rosin-Esters polarity compared with other Eastman tackifier resins



Advantages of rosin resins

- Broad compatibility with many polymers
  - Natural rubber, polyisoprene, polybutadiene, EVA, polychloroprene, acrylic
  - Simple esters all have similar solubility and compatibility
- Broad range of properties
  - Softening point: liquid to 180°C
  - Color: Gardner <1 to >10
- Hydrogenated rosin resins have low color and improved oxidative stability
- Good adhesion due to small molecular weight and polar group
- Produced from renewable resources

Disadvantages of Rosin Resins

EASTMAN

- Low thermal stability compared to hydrocarbon tackifiers
  - Can be improved through hydrogenation, polymerization
  - Most economical rosin resins are unsuitable for hot melt applications
- Strong characteristic odor, especially of tall oil based products
- Limited shelf life – color stability is limited to 6-12 months
- No end-block softening in styrenic block copolymers – rheology control requires use of some aromatic hydrocarbon

Eastman Chemical Company – a key supplier of tackifying resins

- Piccotac™ C5 aliphatic resins
- Picco™ C9 aromatic resins
- Eastotac™, Regalite™ & Regalrez™ hydrogenated hydrocarbon resins
- Permalyn™ Stabilized Rosin Esters
- Staybelite™E, Foral™E & Foralyn™ Hydrogenated Rosin/Esters
- Endex™ , Kristalex™ Piccolastic™ & Piccotex™ Pure Monomer Resins
- Tacolyn™ Resin Dispersions

Markets and Applications

EASTMAN

Aliphatic Resins C5

- *PSA Tapes and Labels*
- *Road Marking*

Pure Monomers Resins (PMR)

- *Solvent/UV PSA*
- *Hotmelt Adhesives*
- *Rubber Modification*
- *TPE Compounding*
- *PUR*

Hydrogenated Resins

- *Diaper/Packaging HMA*
- *Auto/Electronics HMA*
- *Film and Plastics*

Aromatic Resins C9

- *Printing Inks*
- *Rubber Compounding*
- *Hot Melt Adhesives*

Rosin Ester

- *Solvent/UV PSA*
- *Hotmelt Adhesives*
- *Fragrance Fixative*
- *PUR*

Common Market Applications

EASTMAN

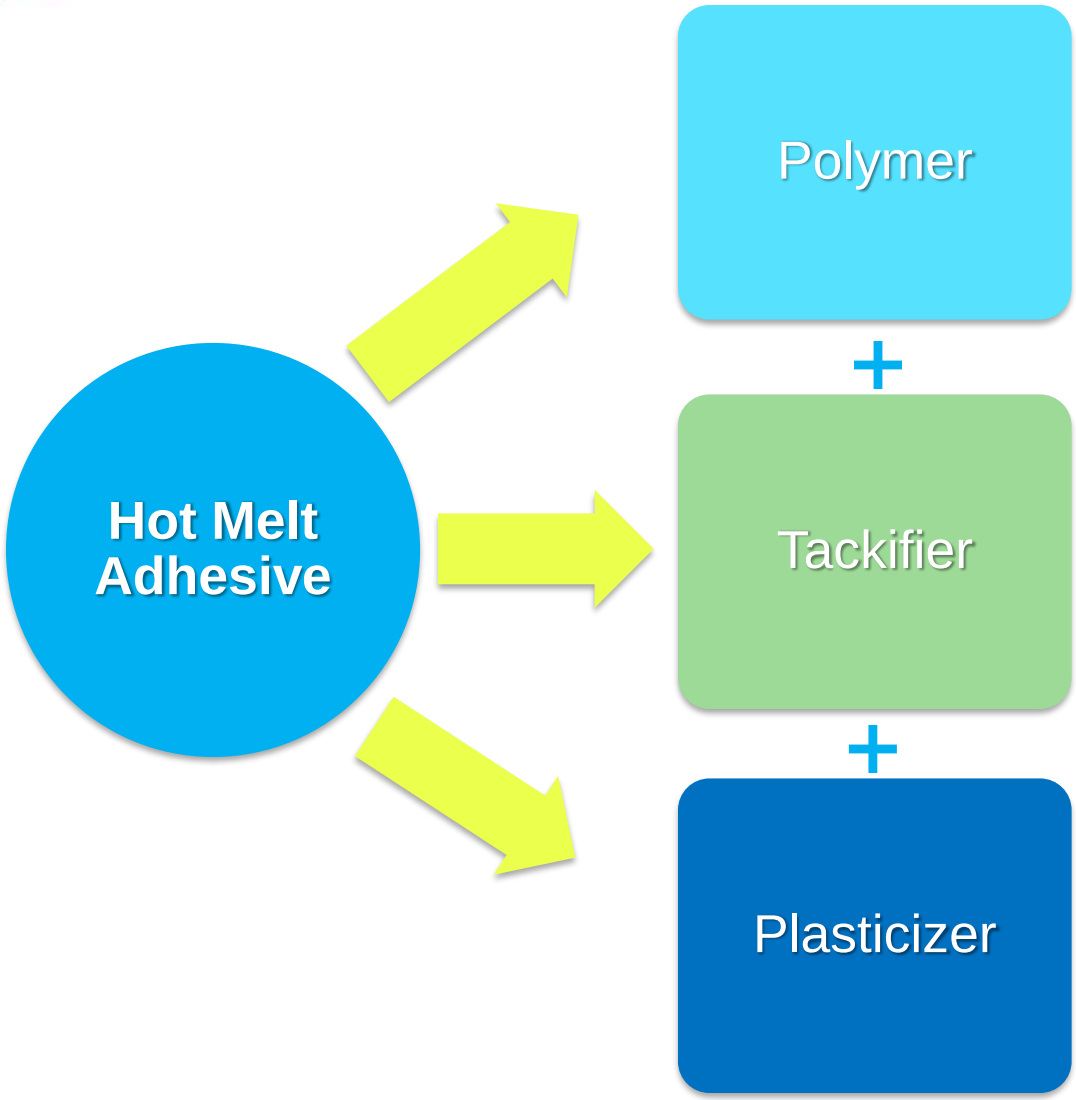
- Packaging
  - Eastotac C and H series
  - Regalite R series
  - Pure Monomer Resin (PMR)

- Hygiene - “Low Odor, Low VOC”
  - Regalite SD
  - Pure Monomer Resin (PMR)

- Tapes and Labels
  - Piccotac
  - Eastotac

Hot Melt Adhesives - Main components

EASTMAN



- Mechanical properties like strength, flexibility

  (e.g.) SBC (SIS, SBS …), EVA, APO

- Provides adhesion properties and wetting

- Flow properties, controls viscosity

  (e.g.) oil, wax

Thank you for your attention.

www.eastman.com/adhesives