EASTMAN

Building Blocks for Better Resins


DMCD
HPHP
CHDM Glycol
PIA
TMPD Glycol
NPG Glycol
1,4-CHDA

Contents

Building Blocks for Better Resins

Product, Innovation, Support, Commitment

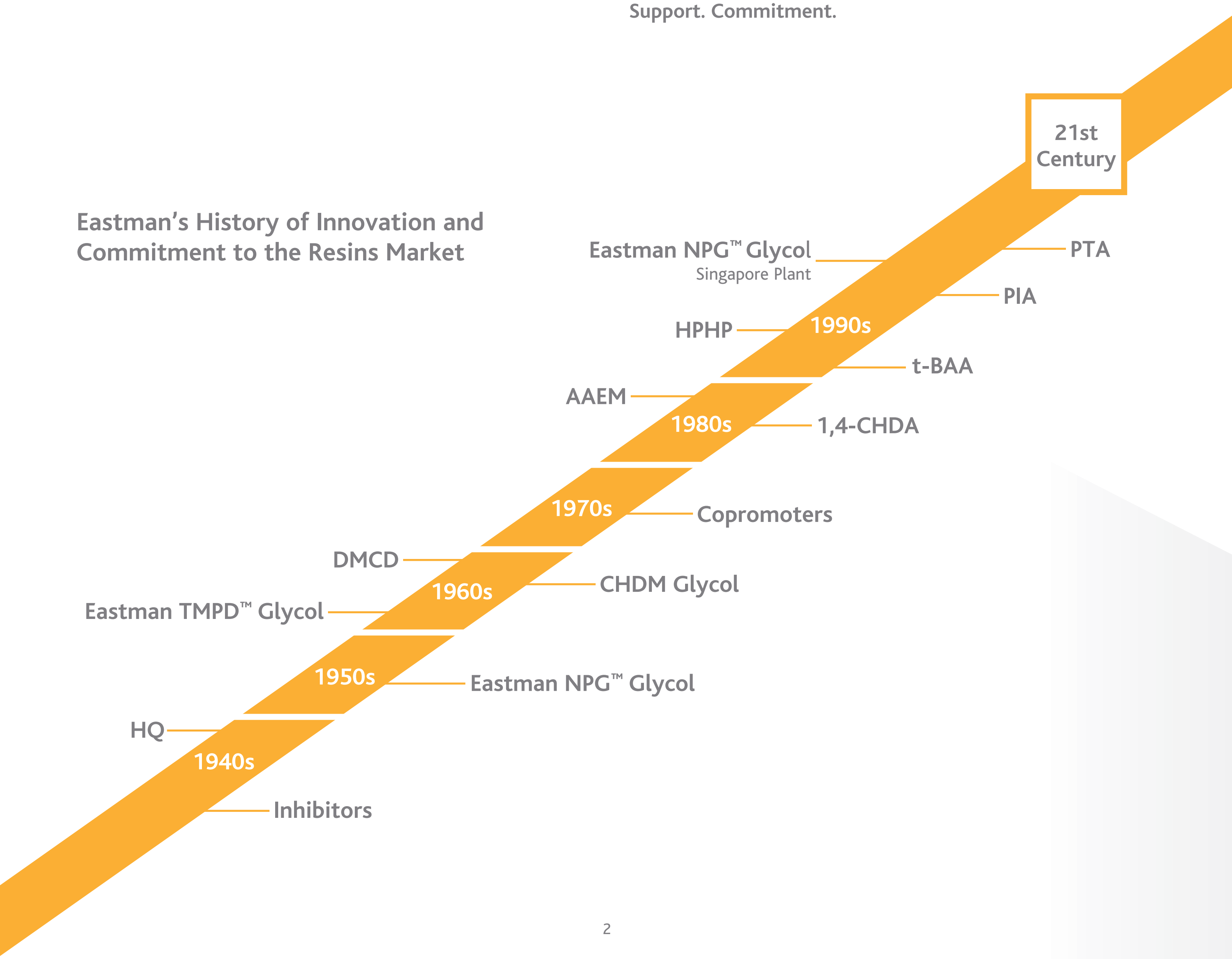
You put a lot of time and energy into developing resins that meet today's stringent demands. Eastman™ resin intermediates are the building blocks that make them even better. Eastman products serve the resins market for coatings, fiberglass reinforced plastics, gel coats, adhesives, and inks applications.

With over 50 years of experience in this industry, Eastman has developed intermediates that help meet your performance needs.

In developing your resins, not only do you need the right building blocks, you also need the support behind them. We stand behind our products with innovative and proven technical and business support. Our teams of sales, business, and technical personnel are available to help with your business opportunities and product development.

The right combination of products and people makes a winning solution. Eastman doesn't just make the building blocks for better resins. We're also the building blocks for better business. **Product. Innovation. Support. Commitment.**

Eastman's History of Innovation and Commitment to the Resins Market



Eastman has one of the broadest product lines of any raw material supplier. Intermediates range from aromatics, cycloaliphatics, neostructures, and acetoacetates.

Our product line includes such workhorses as Eastman NPG™ glycol, purified isophthalic acid (PIA), and purified terephthalic acid (PTA). Our specialty intermediates offer the performance requirements needed to meet the stringent demands for today's coatings and composites applications.

Since resin performance is directly related to the intermediate used, an understanding of the structural features and performance characteristics of the intermediate is the first step in designing resins to meet specific needs. An intermediate typically exhibits the same basic performance properties across applications.

This publication describes the structural features and expected performance characteristics of Eastman™ intermediates. Synthesis tips are also provided for each intermediate as well as typical properties and regulatory clearances.

The Foundation for Eastman™ Resin Intermediates

NeoStructures

- Eastman NPG™ Glycol—2,2-Dimethyl-1,3-Propanediol
- Eastman TMPD™ Glycol—2,2,4-Trimethyl-1,3-Pentanediol
- HPHP Glycol—Hydroxypivalyl Hydroxypivalate

Aromatics

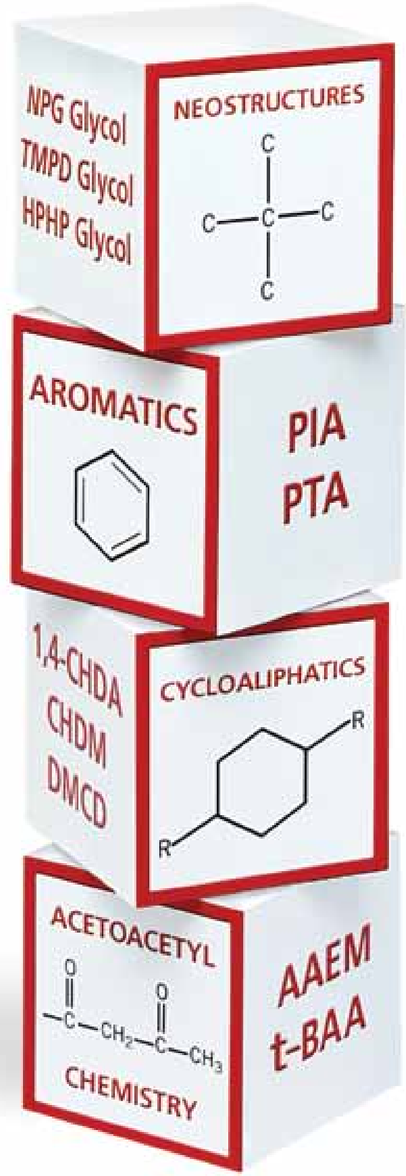
- PIA—Purified Isophthalic Acid
- PTA—Purified Terephthalic Acid

Cycloaliphatics

- 1,4-CHDA HP—1,4-Cyclohexanedicarboxylic Acid
- CHDM-D—1,4-Cyclohexanedimethanol
- DMCD—Dimethyl-1,4-Cyclohexane Dicarboxylate

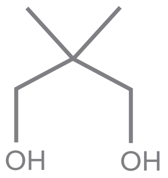
Acetoacetyl

- AAEM—Acetoacetoxyethyl Methacrylate
- t-BAA—Tertiary-Butyl Acetoacetate



Glycols

Eastman NPG™ Glycol



IUPAC: 2,2-Dimethyl-1,3-Propanediol

Photo courtesy of Sea Ray Boats

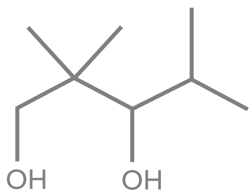
Structure/Property Relationships

Structural Features	Performance Characteristics
Absence of beta hydrogens	Excellent weatherability
Primary hydroxyl groups	Rapid reactivity during esterification and cure
Slightly hindered hydroxyl groups	Good humidity resistance Good corrosion resistance Good chemical resistance Good stain resistance
Symmetrical	Excellent thermal stability for low resin color Moderate solution viscosity High T_g
Pendant methyl groups	Good solubility

Synthesis Tips

- Water solubility and sublimation of Eastman NPG™ glycol make a packed, partial-condensing column desirable.
- Good thermal stability gives low-color resins even at synthesis temperatures of 240°–250°C.
- Two primary hydroxyls offer good reactivity.
- Although an esterification catalyst is not required when reacting with many acid functional intermediates, 0.1 wt% monobutyltin oxide based on total reactor charge can be used to reduce processing time.
- When transesterifying Eastman NPG™ glycol with an ester such as DMCD, use 0.1 wt% PTSA (*p*-toluenesulfonic acid monohydrate) based on total reactor charge to stabilize the glycol.

Eastman TMPD™ Glycol
(2,2,4-Trimethyl-1,3-Pentanediol)



IUPAC: 2,2,4-Trimethyl-1,3-Pentanediol

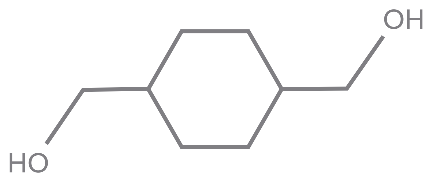
Structure/Property Relationships

Structural Features	Performance Characteristics
Bulky, asymmetrical	Low solution viscosity Low resin density Excellent solubility
Sterically hindered hydroxyl groups	Excellent resin hydrolytic stability Excellent chemical resistance Excellent stain resistance Good humidity resistance Good corrosion resistance Moderate reactivity during esterification and cure
Branched chain	Moderate thermal stability Low T_g
Beta hydrogens	Moderate weatherability

Synthesis Tips

- Water insolubility makes a packed column unnecessary unless used in combination with other water-soluble glycols.
- 0.1 wt% monobutyltin oxide based on total reactor charge will aid in the esterification of the secondary hydroxyl.
- Avoid rapid heating. Hold reaction temperature between 180°–200°C during first 30%–60% of reaction. limit reaction temperature to a maximum of 215°C.
- For processing Eastman TMPD™ glycol with anhydrides, consider the following options:
  - Stage either the anhydride or TMPD glycol with other reactants.
  - Do not charge anhydride initially with TMPD glycol; add anhydride to molten TMPD glycol.
  - Use a process solvent, such as 3–7 wt% xylene based on total reactor charge.

CHDM Glycol
(1,4-Cyclohexanedimethanol)



IUPAC: 1,4-Cyclohexanedimethanol

Structure/Property Relationships

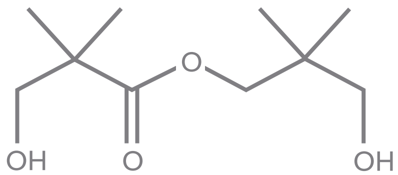
Structural Features	Performance Characteristics
Primary, unhindered hydroxyl groups	Very rapid polymer synthesis Lower temperature cure or shorter cure time
Symmetrical	Excellent thermal stability for low resin color
Saturated ring	Very good hardness along with some flexibility
1,4-Substitution	Very high T_g Moderate solubility Excellent detergent resistance Excellent humidity resistance Excellent corrosion resistance
Beta hydrogens	Moderate weatherability

Synthesis Tips

- To ensure a uniform mixture of isomers, melt entire contents of CHDM container and agitate prior to using.
- Use CHDM as a partial replacement for Eastman NPG™ glycol or other glycol intermediates.
- Water solubility makes a packed, partial-condensing column desirable.
- Good thermal stability gives low-color resins even at synthesis temperatures of 240°–250°C.
- Two primary hydroxyls offer excellent reactivity and reduced synthesis times.
- Although an esterification catalyst is not required when reacting with many acid functional intermediates, 0.1 wt% monobutyltin oxide based on total reactor charge can be used to reduce processing times.

HPHP Glycol

(Hydroxypivalyl Hydroxypivalate)



IUPAC: 3-Hydroxy-2,2-Dimethylpropyl 3-Hydroxy-2,2-Dimethylpropanoate

Structure/Property Relationships

Structural Features	Performance Characteristics
Absence of beta hydrogens	Excellent weatherability
Primary hydroxyl groups	Rapid reactivity during esterification and cure
Slightly hindered hydroxyl groups	Good humidity resistance Good chemical resistance Excellent stain resistance
High molecular weight	Good flexibility while maintaining weatherability Improved melt flow

Synthesis Tips

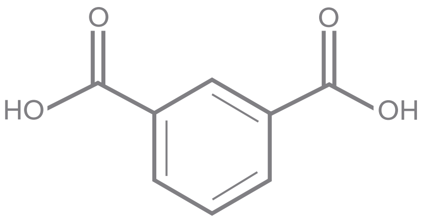
- Water solubility makes a packed, partial-condensing column desirable.
- Good thermal stability gives low-color resins even at synthesis temperatures of 240°–250°C.
- Two primary hydroxyls offer good reactivity.
- Although an esterification catalyst is not required when reacting with many acid functional intermediates, 0.1 wt% monobutyltin oxide based on total reactor charge can be used to reduce processing times.
- When transesterifying HPHP with an ester such as DMCD, use 0.1 wt% PTSA (*p*-toluenesulfonic acid monohydrate) based on total reactor charge to stabilize the glycol.
- Use HPHP as a partial replacement for Eastman NPG™ glycol or other glycol intermediates.

Diacids and Diesters

Photo courtesy of Xerxes® Corporation

PIA

(Purified Isophthalic Acid)



IUPAC: 1,3-Benzenedicarboxylic Acid

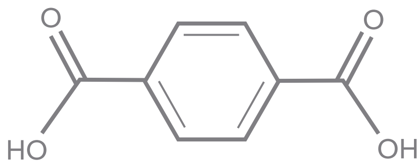
Structure/Property Relationships

Structural Features	Performance Characteristics
Aromatic ring	High gloss Excellent hardness Excellent corrosion and stain resistance Excellent humidity resistance in coatings Excellent blister resistance in gel coats Excellent thermal stability for low resin color
1,3-Substitution	Moderate solubility in molten glycols Moderate resin solubility

Synthesis Tips

- An esterification catalyst is not required, but 0.1 wt% monobutyltin oxide based on total reactor charge can be used to increase resin throughput.
- With heat-stable glycols, such as Eastman NPG™ glycol, synthesis temperatures of 240°–250°C may be used without sacrificing PIA stability or resin color.
- When used with faster reacting diacids, a more complete reaction can be achieved by incorporating PIA with glycols in a first-stage reaction followed by a second stage in which the faster reacting diacids are added.
- Reactivity with glycols is facilitated by increasing the amount of PIA that is dissolved in the molten glycols. PIA solubility in molten glycols increases with temperature and polarity of the glycols.

PTA
(Purified Terephthalic Acid)



IUPAC: 1,4-Benzenedicarboxylic Acid

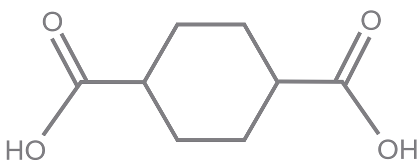
Structure/Property Relationships

Structural Features	Performance Characteristics
Aromatic ring	High gloss
	Excellent hardness
	Good corrosion and stain resistance
	Good humidity resistance of coatings
	Excellent thermal stability for low resin color
1,4-Substitution	Moderate solubility in molten glycols
	Moderate resin solubility

Synthesis Tips

- With heat-stable glycols, such as Eastman NPG™ glycol, synthesis temperatures of 240°–250°C may be used without sacrificing PTA stability or resin color.
- An esterification catalyst, such as 0.1 wt% monobutyltin oxide based on total reactor charge, is generally used to facilitate the reaction.
- When used with faster reacting diacids, a more complete reaction can be achieved by incorporating PTA with glycols in a first-stage reaction followed by a second stage in which the faster reacting diacids are added.
- Reactivity with glycols is facilitated by increasing the amount of PTA that is dissolved in the molten glycols. PTA solubility in molten glycols increases with temperature and polarity of the glycols.
- For powder coating resins, a slow ramp rate to maximum process temperature is desirable due to the moderate solubility of PTA in neopentyl glycol.

1,4-CHDA
(1,4-Cyclohexanedicarboxylic Acid)



IUPAC: 1,4-Cyclohexanedicarboxylic Acid

Photo courtesy of Clopay® Corporation

Structure/Property Relationships

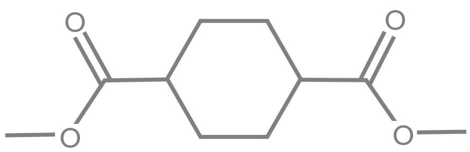
Structural Features	Performance Characteristics
Saturated ring	Excellent solubility in molten glycols for rapid processing
	Excellent resin hydrolytic stability
	Excellent thermal stability for low resin color
	Excellent combination of hardness and flexibility
	Improved corrosion and stain resistance compared with linear aliphatic acids
	Excellent weathering in gel coats
	Moderate weathering in unstabilized coatings
	Excellent weathering in stabilized coatings
	Good humidity resistance
1,4-Substitution	Moderate resin solubility

Synthesis Tips

- Good thermal stability gives low-color resins even at synthesis temperatures of 240°–250°C.
- Saturated ring structure gives excellent solubility and rapid synthesis in molten glycols, even at temperatures of 190°–200°C.
- An esterification catalyst is not required, but 0.1 wt% monobutyltin oxide based on total reactor charge can be used to reduce process times.

DMCD

(Dimethyl 1,4-Cyclohexanedicarboxylate)



IUPAC: Dimethyl
1,4-Cyclohexanedicarboxylate

Structure/Property Relationships

Structural Features	Performance Characteristics
Saturated ring	Excellent solubility in molten glycols for rapid processing Excellent resin hydrolytic stability Excellent thermal stability for low resin color Excellent combination of hardness and flexibility Improved corrosion and stain resistance compared with linear aliphatic acids Excellent weathering in gel coats Moderate weathering in unstabilized coatings Excellent weathering in stabilized coatings Good humidity resistance
1,4-Substitution	Moderate resin solubility

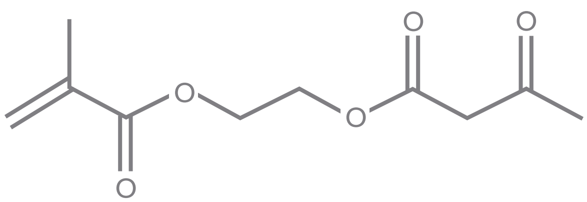
Synthesis Tips

- Melt entire contents of DMCD container and agitate prior to using to ensure a uniform mixture of isomers.
- Use a two-stage synthesis, reacting DMCD with glycols/polyols in the first stage.
- 0.2 wt% dibutyltin oxide catalyst is required to complete the first-stage ester interchange reaction.
- Process the first stage until methanol is no longer evolved.
- After adding second-stage reactants, process the resin to the desired acid number.

Acetoacetates

AAEM

(Acetoacetoxyethyl Methacrylate)



IUPAC: 2-[(2-Methyl-1-Oxo-2-Propenyl) Oxy]Ethyl 3-Oxobutanoate

Structure/Property Relationships

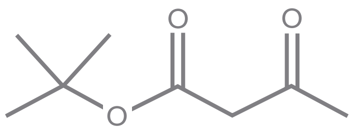
Structural Features	Performance Characteristics
Bulky pendant group	Low solution viscosity Excellent solubility Low T_g
Pendant acetoacetate group	Cross-linking versatility – Melamines – Isocyanates – Michael reaction – Enamine formation – Aldehydes – Chelation Chelation to metal substrates improves – Adhesion – Flexibility – Corrosion resistance

Synthesis Tips

- Can be used in both solution (solvent) and emulsion (water) polymerization.
- Reacts readily with other acrylic and methacrylic monomers.
- For solution polymerization, use either tertiary-amyl peroxide or azonitrile initiators.
- For waterborne acrylic emulsion polymerization, adjust final pH to 6–7 to improve stability.
- Avoid monomers that contain pendant groups (especially aldehydes and amines) that will react with acetoacetates.

t-BAA

(Tertiary-Butyl Acetoacetate)



IUPAC: Dimethylethyl-3-Oxobutanoate

Structure/Property Relationships

Structural Features	Performance Characteristics
Bulky pendant group	Low solution viscosity Excellent solubility Low T_g
Pendant acetoacetate group	Cross-linking versatility – Melamines – Isocyanates – Michael reaction – Enamine formation – Aldehydes – Chelation Chelation to metal substrates improves – Adhesion – Flexibility – Corrosion resistance
Tertiary-butyl ester	Rapid reaction during acetoacetylation

Synthesis Tips

- For maximum viscosity reduction, resin should have a final acid number of 2 or less and a hydroxyl number of 150 or more.
- Add t-BAA as the last stage of the resin synthesis.
- No transesterification catalyst is needed.
- Acetoacetylation temperature should be between 120° and 160°C.
- Follow progress of the reaction by monitoring evolution of t-butanol distillate.
- If needed, use a synthesis solvent such as xylene to ensure thorough mixing.
- An azeotroping solvent, such as heptane or cyclohexane, can aid in the removal of t-butanol distillate.

Product Summary

Performance Benefits

	GLYCOL				DIACID/DIESTER				ACETOACETATE	
	Eastman NPG™ Glycol	Eastman TMPD™ Glycol	CHDM	HPHP	PIA	PTA	CHDA	DMCD	AAEM	t-BAA
RESIN										
Processibility	●		●	●			●		●	●
Thermal stability	●		●	●	●	●	●	●		
Low color	●	●	●	●	●	●	●	●		
Low solution viscosity		●							●	●
Hydrolytic stability		●			●		●	●		
COATING/COMPOSITE										
Hardness	●	●	●	●	●	●	●	●		
Flexibility	●			●			●	●	●	●
Stain resistance	●	●		●	●	●			●	●
Corrosion resistance	●	●	●	●	●	●	●	●	●	●
Chemical resistance	●	●	●	●	●	●	●	●	●	●
Humidity resistance	●	●	●	●	●	●	●	●	●	●
Excellent weathering	●		●	●	●		●	●		

Technology and Application

	GLYCOL				DIACID/DIESTER				ACETOACETATE	
	Eastman NPG™ Glycol	Eastman TMPD™ Glycol	CHDM	HPHP	PIA	PTA	CHDA	DMCD	AAEM	t-BAA
TECHNOLOGY										
High solids	●	●	●	●	●	●	●	●	●	●
Powder	●		●	●	●	●	●			
Waterborne	●	●	●	●	●	●	●		●	●
Radiation cure	●	●	●	●	●	●	●	●	●	●
Conventional	●		●	●	●	●	●	●		
APPLICATION										
Auto OEM	●	●	●	●	●	●	●	●	●	●
Auto refinish	●	●	●	●	●	●	●	●	●	●
Industrial maintenance	●	●	●	●	●	●	●	●	●	●
Coil	●		●	●	●	●	●		●	●
Appliance	●	●	●	●	●	●	●	●	●	●
Metal furniture	●	●	●	●	●	●	●	●	●	●
Container	●		●		●	●	●	●		
Heat sensitive substrates	●	●	●	●	●	●	●	●	●	●
FRP	●	●	●	●	●	●	●	●	●	
Gel coats	●	●	●	●	●		●		●	
Corrosion resistant resins	●	●			●	●			●	

Typical Properties

Product	Physical Form	Molecular Weight	Equivalent Weight	Assay, Wt%	Melting Point, °C	Boiling Point, °C	Specific Gravity, 20°/20°C	Solubility in Water, Wt% at 20°C Unless Noted	Wt% Solids	Volatile	Standard Sample Size
Eastman NPG™ Glycol	Platelets Molten	104.15	52.07	99.2	124–130	210	1.06	84 (25°C)	100	None	1 lb 4 kg
Eastman NPG™ 90 Glycol	Liquid[a]	104.15	52.07	89	31[a]	100–121	0.94 (60°C)	NA	90	Water	1 qt, 5 gal, or 1 lb
Eastman TMPD™ Glycol	Solid waxy platelets Molten	146.22	73.11	98.2	46–55	220–235	0.928 (55°/15°C)	3.6	100	None	1 lb
CHDM-D[b]	Solid Molten	144.21	72.11	98.5	41–61	284–288	1.02	47.9	100	None	1 gal
CHDM-D90[b]	Liquid	144.21	72.11	88	−30–+40	113	0.95	NA	90	Water	4 kg
HPHP	Solid Nugget Molten	204.26	102.13	97.5	46–50	293	1.01 (55°/20°C)	12.8	100	None	2.4 kg 2 or 5 kg 2.4 kg
1,4-CHDA[b]	Powder	172.00	86.00	99	164–167	—	1.38	1	100	None	1 kg
PIA	Powder	166.14	83.07	99.8	345–348	—	1.507	Negligible	100	None	4 kg
PTA	Powder	166.14	83.07	—	>300[c]	—	1.51 (15°C)	Negligible	100	None	1 lb
DMCD[b]	Slurry Molten	200.23	100.12	93	14 (cis) 71 (trans)	259	1.102 (35°/4°C)	1.2 (25°C)	100	None	4 kg
AAEM	Liquid	214.22	214.22[d]	95	—	Polymerizes	1.12 (25°/25°C)	Slight	—	—	1 pt, 1 gal, 5 gal, 1 kg
t-BAA	Liquid	158.20	158.20	98.8	—	190[e]	0.954	Slight	—	—	1 pt, 1 gal, 5 gal, 1 kg

[a] *Crystallizes below 31°C*
[b] *Mixture of cis/transisomers*
[c] *Sublimes*
[d] *Cross-linker dependent*
[e] *Extrapolated under vacuum*

Eastman™ resin intermediates are available in bulk and various package sizes. Please contact Eastman Technical Service or your Eastman sales representative for packaging options and availability.

CHDM-D90 is a CHDM-D/water mixture exhibiting multiple melting points across this range. This complexity makes melting and freezing point determinations difficult. Eastman suggests CHDM-D90 be stored and handled at temperatures between −30° and +40°C.

Regulatory Information

Resin Intermediate	CAS Registry No.[a]	FDA Clearance (U.S.)[b,c]	Directive 2002/72/EC (Europe)[c,d]	TSCA (U.S.)[e]	EINECS Number (Europe)[f]	DSL (Canada)[g]	AICS/NICNAS (Australia)[h]	MITI (Japan)[i]	ECL (Korea)[j]
AAEM	21282-97-3	None	Not listed	Listed	244-311-1	Listed	Listed	Listed	Listed
t-BAA	1694-31-1	None	Not listed	Listed	216-904-5	Listed	Listed	Listed	Not listed
1,4-CHDA	1076-97-7	21 CFR 175.300(b)(3)(vii)(a)	Listed	Listed	214-068-6	Listed	Listed	Listed	Listed
CHDM-D and/or CHDM-D90[k]	105-08-8	21 CFR 175.105 21 CFR 175.300 (FCN 87)[l] 21 CFR 177.1680	Listed	Listed	203-268-9	Listed	Listed	Listed	Listed
DMCD	94-60-0	21 CFR 175.105	Not listed	Listed	202-347-5	Listed	Listed	Listed	Not listed
HPHP	1115-20-4	None	Not listed	Listed	214-222-2	Listed	Listed	Listed	Listed
Eastman NPG™ Glycol and/or Eastman NPG™ 90 Glycol[k]	126-30-7	21 CFR 175.105 21 CFR 175.260 21 CFR 175.300(b)(3)(vii)[l] 21 CFR 175.300(b)(3)(xxxvii) 21 CFR 175.320 21 CFR 177.1680 21 CFR 177.2420	Listed	Listed	204-781-0	Listed	Listed	Listed	Listed
PIA	121-91-5	21 CFR 175.300(b)(3)(xxxviii)[l] 21 CFR 175.320 21 CFR 177.2420 FCN 211	Listed	Listed	204-506-4	Listed	Listed	Listed	Listed
PTA	100-21-0	21 CFR 175.105 21 CFR 175.300(b)(3)(xxxviii)[l] 21 CFR 177.2420	Listed	Listed	202-830-0	Listed	Listed	Listed	Listed
Eastman TMPD™ Glycol (platelets and molten)	144-19-4	21 CFR 177.2420	Not listed	Listed	205-619-1	Listed	Listed	Listed	Listed

[a] *Chemical Abstract Services*

[b] *In addition to the above listings, there are additional FDA regulations and food-contact notifications for specific polymer compositions that utilize one or more of these monomers.*

[c] *In all cases, the applicable food-contact regulations or listings must be consulted to determine the applicable restrictions on use in contact with food.*

[d] *Commission Directive 2002/72/EC relating to plastic materials and articles intended to come into contact with foodstuff.*

[e] *U.S. Toxic Substances Control Act*

[f] *European Inventory of Existing Commercial Chemical Substances*

[g] *Canadian Domestic Substances List*

[h] *Australian Inventory of Chemical Substances and National Industrial Chemicals Notification and Assessment Scheme*

[i] *Japanese Handbook of Existing and New Chemical Substances*

[j] *Korean Toxic Substances Control Act*

[k] *Contains 10% water; CAS registry number for water is 7732-18-5.*

[l] *Polyesters regulated at 21 CFR 175.300 are also referenced for use in various other regulations including 21 CFR 176.170(b)(1) and 21 CFR 177 1210(b). Use is subject to the limitations of applicable regulations for the intended use.*

Technical Solutions

Technical Service

Eastman's Technical Service laboratory has the expertise and capabilities to help you develop resins for various coating technologies and composites applications.

Our strength is in understanding the performance benefits of resin intermediates relative to their structure/property relationships. We can help you select the right building blocks to meet resin performance requirements and understand how to properly use them. We have developed an extensive list of "synthesis tips" that facilitate resin processing with Eastman™ resin intermediates.

Computer control for automated resin synthesis

Our application of computer control for automated resin synthesis puts us on the leading edge of resin processing capabilities. And we share our experience with interested customers in the development of these systems. Automation brings many advantages to laboratory resin processing that include reducing operator variability, improving batch-to-batch consistency, increasing efficiency, and greatly enhancing data collection and analysis for the study of resin reaction profiles.

In addition to resin formulation and processing, we have the expertise to formulate, apply, and evaluate resins in coatings systems, fiberglass-reinforced plastics, and gel coats. We are capable of performing the tests familiar to the coatings and composites industries. Testing is performed on resins, coatings, cured films, castings, laminates, and gel coats. Moreover, we have invested in a state-of-the-art powder-coating processing, application, and test facility to support customer development of this growing technology area.

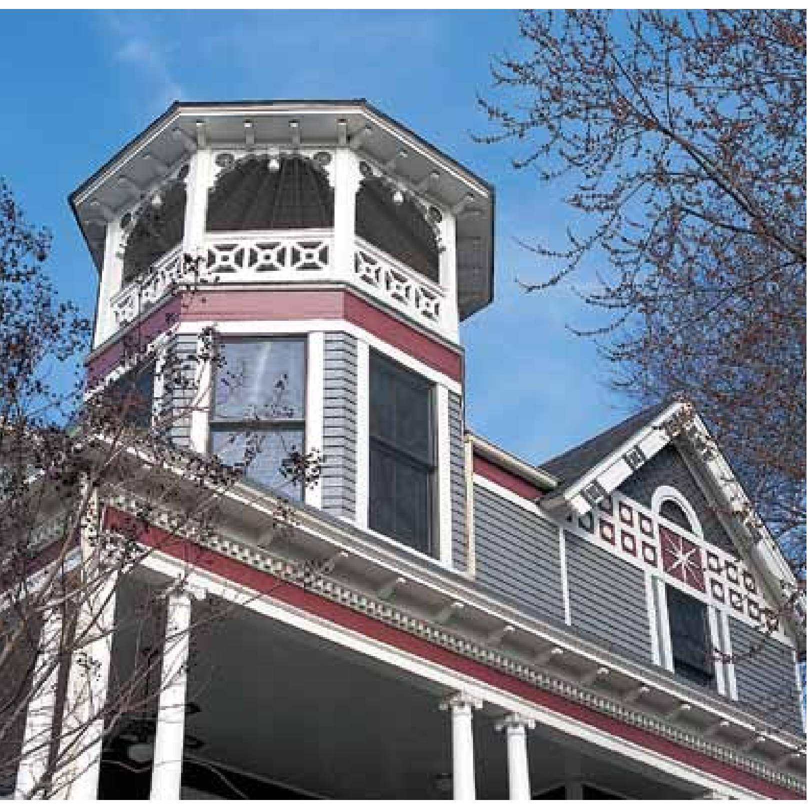
Under the Responsible Care® pledge, Eastman is committed to protecting the health and safety of people and the environment. Product Stewardship is an important initiative of Responsible Care® that ensures the proper use and safe handling of Eastman products by chemical manufacturers and distributors throughout the life cycle of the product. Product Stewardship is an important role of the Technical Service Resin Intermediates laboratory to assist customers with the safe handling and use of Eastman resin intermediates.

Eastman Technical Service is available to assist you in resin design, laboratory resin synthesis, production scale-up, coating and composites formulation, and product stewardship issues. Contact an Eastman Technical Service representative about designing high-performance resins with Eastman™ resin intermediates.

Polyester Resin Calculation Wizard

The Polyester Resin Calculation Wizard is a novel approach to resin design and the understanding of resin processing. It calculates condensation-type (step growth) resins for coatings, inks, and adhesives applications. Selecting raw materials and entering certain resin parameters will produce a reactor charge, process logs, and graphical representations of the theoretical polymerization data. The results are easily printed or downloaded to a spreadsheet.

To access the Polyester Resin Calculator, visit www.eastman.com/ResinWizard.



Benefits

- More advanced features and easier to use than tools currently available to the industry.
- Graphs give a visual representation of polymerization and help anticipate gel points.
- Process logs provide guidance during resin processing with respect to changes in acid number, hydroxyl number, molecular weight, and evolved distillate.
- Generates theoretical resin properties at desired acid or hydroxyl number.
- Reactor charge is easily scaled for laboratory, pilot, and plant batches.
- Results are printed in a logically arranged, easy to read, ready to use format; or they can be downloaded to a spreadsheet for storing electronically; or they can be sent to an e-mail address.
- Standardizes resin calculations performed within a company.
- Links to Eastman™ resin intermediate product pages are available for additional information.
- Link to Eastman Technical Service representatives.

Building Blocks on eastman.com

Information at your fingertips
Visit www.eastman.com/ResinIntermediates.

Information at this website includes:

- Product information
- Technical publications
- Contact Technical Service
- Wizard access

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