

# CYTEC



## PRODUCT GUIDE – Powder Coating Resins

Binder Resins, Hardeners and Additives

Europe, Middle East and Africa

# About Us

## Total Solutions Provider

Cytec Industries is one of the world's leading specialty chemicals and materials technology companies. Our focus is on creating advanced technological solutions in global markets, including aerospace, coatings, mining and plastics.

We are a total solutions provider with a broad range of products, including eco-friendly technologies. We support our customers worldwide with excellent technical service and applications research.

## Innovative Technology

Cytec's products are innovative and diverse, and can help manufacturers realize the competitive advantages of environmental compliance, while also meeting their needs for:

- Improved performance (scratch/stain/corrosion resistance, and adhesion)
- Greater ease of application (required cure response)
- Better finishes (gloss/matte, texture, and specialty)

## Broad Product Portfolio

We offer an extensive selection of performance-driven products, including low volatile organic compounds (VOC) and hazardous air pollutant substance-free (HAPS) technologies, for existing and emerging markets:

- Industrial
- Architectural/Construction
- Automotive/Transportation
- Wood/Paper
- Plastic

- Opto-electronics
- Graphic Arts
- Packaging/Adhesives

Our product portfolio is inclusive:

- UV/EB energy curable resins
- Liquid coating resins
  - Waterborne
  - High solids
  - Solvent-borne
- Amino crosslinkers
- Powder coating resins
- Coating additives

## Global Technical Support

Through our manufacturing facilities, technology and distribution centers, we are able to provide responsive service on a consistent global basis, and to help our customers identify and profit from emerging opportunities.



<b>Introduction</b>	4
<b>Product Overview</b>	5
<b>Global Support</b>	6
<b>Product Nomenclature</b>	7
<b>Polyester Resins for Hybrid Powder Coatings</b>	9
<b>Typical Properties for Hybrid Resins</b>	10
<b>Polyester Resins for Primid<sup>1</sup> Powder Coatings</b>	11
<b>Typical Properties for Primid<sup>1</sup> Resins</b>	12
<b>Polyester Resins for TGIC Powder Coatings</b>	13
<b>Typical Properties for TGIC Resins</b>	14
<b>Polyester Resins for PT910 Powder Coatings</b>	15
<b>Typical Properties for PT910 Resins</b>	16
<b>Resins and Hardeners for Urethane Powder Coatings</b>	17
<b>Typical Properties for Urethane Resins</b>	18
<b>Resins and Additives for UV-curable Powder Coatings</b>	19
<b>Typical Properties for UV-curable Resins</b>	20
<b>Masterbatches and Additives for Powder Coatings</b>	21
<b>Typical Properties for Masterbatches and Additives</b>	22
<b>Superdurable Resins for Powder Coatings</b>	23
<b>Gloss Control Systems for Powder Coatings</b>	24
<b>Health, Safety and Product Handling</b>	25
<b>Glossary of Terms</b>	26
<b>Material Source</b>	27

<sup>1</sup> Trademark of EMS-Chemie

## 4 Introduction

### One-Source Global Supplier

Cytec is a single-source, worldwide supplier of high-quality powder coating resins, hardeners and additives. We offer one of the broadest lines of resins for powder coating finishes, including top-name polyester resins, coupled with global product availability, and expert technical support.

### Leading-edge Technologies

Cytec continues to pioneer the development of innovative technologies for a wide range of surfaces:

- Superdurable resins for exterior powder applications
- Semi-crystalline polyesters for powder coating systems
- Resins for clearcoat and matte finishes
- Resins for low bake powder systems
- UV curing powder systems

Our newest resin technologies are designed for cutting-edge applications where powder paints are not widely used, including industrial and automotive finishes:

- High-performance exterior durable systems
- Natural and manufactured wood products
- Plastic and other heat-sensitive substrates

### Wide Selection of Top Products

As a leading global supplier of powder coating resins, hardeners and additives, Cytec offers one of the broadest choices of resins for powder coating finishes.

Proven worldwide, our extensive selection of **CRYLCOAT**<sup>®</sup> polyester resins include carboxyl and hydroxyl resins for hybrid, TGIC, glycidylester, hydroxy alkyl amide, urethane, and glycoluril powder coating systems.

For new technologies like UV curable powder coatings, we have one of the widest product ranges available, including **UVECOAT**<sup>®</sup> unsaturated resins.

Cytec's powder coating resin technologies also include **SYNTHACRYL**<sup>®</sup> acrylic resins and matting agents, specialty hardeners, and additives which can be supplied on a silica or resin carrier.

For improving flow and leveling characteristics in all types of coatings, the versatile **MODAFLOW**<sup>®</sup> product family is the benchmark name among flow modifiers and powder resins in the coatings industry.

Bringing value to the formulation of powder coatings are **ADDITOL**<sup>®</sup> masterbatch flow modifiers, catalysts and related products. Additionally, **BECKOPOX**<sup>™</sup> and **ADDITOL** specialty hardeners solve problems related to flow, and provide special textures or performance to finished coatings.



Products	Description
<b>Vehicle Binder Resins</b>	
<b>CRYLCOAT®*</b>	Polyester powder resins including superdurable and semi-crystalline products – Hydroxyl (-OH) resins for polyurethane and glycoluril powder coatings – Carboxyl (-COOH) resins for hybrid, TGIC, glycidylester and β-HAA powder coatings.
<b>SYNTHACRYL®*</b>	Glycidyl (GMA) acrylic powder resins and matting agents.
<b>UVECOAT®*</b>	Unsaturated resins for UV-curable powder coatings.
<b>Curing Hardeners (Powder Crosslinkers)</b>	
<b>ADDITOL®*</b>	Polyanhydride resin for epoxy functional (glycidyl) acrylics and urethane hardeners (where available) for hydroxyl binder resins.
<b>BECKOPOX™</b>	Anhydride-like resin for epoxy or hydroxyl functional binder resins.
<b>Powder Additives and Modifiers</b>	
<b>MODAFLOW®*</b>	Powder resins flow modifiers on a silica carrier base.
<b>ADDITOL</b>	Flow additives, catalysts, and tribo masterbatches provided on resin carriers and photoinitiators to accelerate the cure of UV-curable powder coatings.
<b>SYNTHACRYL</b>	GMA acrylic matting agents.



\* **ADDITOL** additives  
 \* **CRYLCOAT** polyester resins  
 \* **MODAFLOW** flow modifiers  
 \* **SYNTHACRYL** acrylic resins  
 \* **UVECOAT** UV-curable resins

## 6 Global Support

Cytec provides an unmatched level of technical service for customer support on a consistent global basis. Cytec's expertise in resin development and new technology exploration is backed up by our superior powder coating applications facilities and outstanding resin and coatings analytical capability.

The Cytec manufacturing operations are state-of-the-art. Our products are made with unparalleled consistency and quality. Our production plants have achieved ISO certification; specific registration can be provided upon request. Cytec's manufacturing capability provides the powder coating industry with global coverage for sourcing and logistics.



ISO 9001–2000 Registration  
**Americas Technology**  
Indian Orchard (MA, US): SGS updated Nov 2004  
Smyrna (GA, US): SGS updated Nov 2004  
Stamford (CT, US): 4Q 2007 Certification  
Suzano (BR): TUV updated Feb 2006  
**Americas Manufacturing**  
North Augusta (SC, US): SGS updated Nov 2004  
Langley (NC, US): SGS updated Nov 2004  
Suzano (BR): TUV updated Nov 2005  
Wallingford (US): QMI updated Nov 2002

ISO 9001–2000 Registration  
**European Technology**  
Bassano (IT): DNV updated Aug 2006  
Drogenbos (BE): SGS updated Nov 2006  
Graz (AT): TUV updated 2006  
**European Manufacturing**  
ISO 9001–2000 Registration  
Bassano (IT): DNV updated Aug 2006  
Drogenbos (BE): SGS updated Nov 2006  
Werndorf (AT): TUV updated 2006







ISO 9001–2000 Registration  
**Asia Pacific Technology**  
Bangkok (TH): TUV updated Jul 2006  
Fenxiang (CN): SGS updated Oct 2006  
Tokyo (JP):  
Ulsan (SK): SGS updated Oct 2006  
**Asia Pacific Manufacturing**  
Fenxiang (CN): SGS Oct 2006  
Rayong (TH): TUV updated Jul 2006  
Seremban (MY): SGS updated Oct 2006

Thermoset powder coatings are typically cured in a temperature range of 160–200 °C (object temperature) for 10 minutes. Low temperature cure for heat sensitive substrates or for thick metallic objects is achieved through a combination of catalysis and/or longer oven dwell times. General cure guidelines for products listed in this bulletin are summarized below.

Cure Temperature and Time Definitions	
<b>Slow</b>	190 °C or greater for 10 min
<b>Medium</b>	170–180 °C for 10 min
<b>Fast</b>	160 °C for 10 min
<b>Low Bake</b>	150° or lower for 10–30 min

Products are presented in this guide using two approaches. The charts and tables in the first section organize products by a powder coating system, and summarize typical resin characteristics.

The second section allows formulators to select resins for a given coating effect. The color background used for each product in the charts helps to delineate special product features, as summarized in the table below.

Resin Selection Guide	
	<b>CRYLCOAT®*</b> polyester resins
	<b>CRYLCOAT</b> new generation hybrid polyester resins
	<b>CRYLCOAT</b> polyester resins systems for matte finishes
	<b>CRYLCOAT</b> polyester resins for low temperature curing
	<b>ADDITOL®*</b> , <b>MODAFLOW®*</b> , and <b>SYNTHACRYL®*</b> systems and additives
	<b>UVECOAT®*</b> unsaturated resins for UV-curable powder coatings

From the wide range of resins available, users can match the desired properties with the required coating performance.

As an alternative, UV powders can be applied. The powder is made to flow with a brief IR heating followed by exposure to ultraviolet light.



\* **ADDITOL** additives  
 \* **CRYLCOAT** polyester resins  
 \* **MODAFLOW** flow modifiers  
 \* **SYNTHACRYL** acrylic resins  
 \* **UVECOAT** UV-curable resins

# 8 Product Nomenclature (continued)

The Cytec product line for powder coatings has been renamed and renumbered to provide customers with a more logical understanding of the portfolio. The graphic sections of this guide

contains both the new and old product names. Translations describing how the new product names were derived, and what they stand for, are provided in the tables below.

## CRYLCOAT<sup>®\*</sup> System – 5 Digit System

Digit 1	Digit 2	Digit 3 + 4	Digit 5
1 = Hybrid	5 = 50/50 6 = 60/40 7 = 70/30 8 = 80/20	Whenever possible equivalent to last two digits of former product name	- 0 = Standard (no additives) - 1 = Tribo - 2 = Overbake - 3 = Tribo and overbake - 4 = Clear coat - 5 = Special - 6 = Low bake (<160 °C)
2 = Standard outdoor 4 = Superdurable outdoor 8 = Crystalline 9 = Other	4 = TGIC 5 = PT 910 6 = Primid <sup>1</sup> 8 = Urethane		

Example: **CRYLCOAT 1514-2** = 314

Digit 1: 1 for Hybrid; Digit 2: 5 for 50/50; Digits 3 + 4: 14 from 314 and Digit 5: 2 for Overbake.

## ADDITOL<sup>®\*</sup> System

Masterbatch Type	Number
Flow aid	P 800–P 899
Tribo, catalysts, crosslinkers	P 900–P 999

## UVECOAT<sup>®\*</sup> System

Type	Number
General purpose resin	1000–1999
Resins for metal substrates	2000–2999
Resin for wood and plastic	3000–3999
Specialty (i. e. Crystalline)	9000–9999

## SYNTHACRYL<sup>®\*</sup> System

Type	Number
Acrylic	700–799

\* **ADDITOL** additives

\* **CRYLCOAT** polyester resins

\* **SYNTHACRYL** acrylic resins

\* **UVECOAT** UV-curable resins

1 Trademark of EMS-Chemie

# Polyester Resins for Hybrid Powder Coatings

	50/50 AV ~ 70	60/40 AV ~ 50–60	70/30 AV ~ 34	80/20 AV ~ 24
210 °C	CRYLCOAT®* 1544-4			
200 °C		CRYLCOAT 1622-0	CRYLCOAT 1660-0	CRYLCOAT 1783-0
		CRYLCOAT 1622-1		CRYLCOAT 1783-1
180 °C	CRYLCOAT 1514-2		CRYLCOAT 1626-0	CRYLCOAT 1770-0
	CRYLCOAT 1573-0		CRYLCOAT 1627-0	CRYLCOAT 1771-0
			CRYLCOAT 1606-1	CRYLCOAT 1771-3
				CRYLCOAT 1716-0
				CRYLCOAT 1781-0
170 °C	CRYLCOAT 1557-5	CRYLCOAT 1620-0	CRYLCOAT 1658-5	
		CRYLCOAT 1620-1		CRYLCOAT 1701-0
160 °C	CRYLCOAT 1540-0	CRYLCOAT 1696-0		CRYLCOAT 1750-1
				CRYLCOAT 1756-0
150 °C			CRYLCOAT 1680-6	
140 °C	CRYLCOAT 1506-6			
	CRYLCOAT 1551-2			

CRYLCOAT®*	Ratio	AV	Viscosity	Tg (°C)	Cure T	Description
1506-6	50/50	69	9000/175 °C	62	140	Fast cure for metal application or for low bake textured formulation for MDF.
1514-2	50/50	71	9300/175 °C	55	180	Excellent flow and overbake resistance.
1540-0	50/50	71	8700/175 °C	58	160	Good pigment wetting, high gloss. Good for clears.
1544-4	50/50	70	2500/200 °C	54	210	Low reactivity, possible to blend with other carboxyl functional polyester resins.
1551-2	50/50	71	6000/175 °C	51	140	High reactive with good flow on metal and heat-sensitive substrates such as MDF.
1557-5	50/50	71	2000/200 °C	50	170	Medium reactivity, excellent scratch resistance.
1573-0	50/50	70	3500/200 °C	56	180	Medium reactivity new generation hybrid, excellent flow and good gloss.
1606-1	60/40	48	3000/200 °C	52	180	Tribo version of CC 1626-0.
1620-0	60/40	60	2700/200 °C	54	170	Medium reactivity, can be also used as 50/50.
1620-1	60/40	60	2700/200 °C	54	170	Tribo version of CC 1620-0.
1622-0	60/40	60	2500/200 °C	54	200	Low reactivity, can be also used as 50/50.
1622-1	60/40	60	2600/200 °C	54	200	Tribo version of CC 1622-0.
1626-0	60/40	48	3000/200 °C	52	180	Medium reactivity new generation hybrid, excellent flow and very good gloss.
1627-0	60/40	44	4000/200 °C	62	180	Medium reactivity new generation hybrid, high Tg, excellent flow and very good gloss.
1658-5	60/40	53	2500/200 °C	57	170	Medium reactivity, excellent scratch resistance.
1660-0	60/40	48	9400/175 °C	50	200	Low reactivity, good flexibility and excellent flow with high filler load.
1680-6	60/40	48	10400/175 °C	50	150	Fast cure, high gloss, high loading, good flexibility.
1696-0	60/40	47	4800/200 °C	56	160	Low bake with good balance of properties.
1701-0	70/30	36	6300/200 °C	62	170	Medium reactivity with good flow and overbake resistance.
1716-0	70/30	30	6500/200 °C	60	180	Medium reactivity, good flow, can be used for mattes.
1750-1	70/30	35	4500/200 °C	52	160	High reactive, tribo, non-blooming.
1756-0	70/30	30	5300/200 °C	51	160	High reactive, good gloss. TMA free.
1770-0	70/30	34	5400/200 °C	58	180	Medium reactivity with good balance of properties, can be used for mattes.
1771-0	70/30	33	4700/200 °C	56	180	Medium reactivity new generation hybrid, good balance of properties.
1771-3	70/30	33	4700/200 °C	56	180	Tribo and overbake version of CC 1771-0.
1781-0	70/30	33	5000/200 °C	60	180	Medium reactivity new generation hybrid, high Tg for better storage stability.
1783-0	70/30	34	5000/200 °C	58	200	Excellent flow, high gloss and elasticity. Good for clears.
1783-1	70/30	34	5000/200 °C	56	200	Tribo version of CC 1783-0.
E04118	80/20	24	9800/200 °C	54	200	Low reactivity with good balance of properties.
E04143	80/20	24	10000/200 °C	57	180	Medium reactivity with good balance of properties.

\*CRYLCOAT polyester resins

# Polyester Resins for Primid<sup>1</sup> Powder Coatings

	96/4-97/3 AV ~ 25	95/5 AV ~ 33	92/8 AV ~ 50	90/10-88/12 AV ~ 70	Superdurable
200 °C				CRYLCOAT 2621-2	CRYLCOAT 4641-0
				CRYLCOAT E37250	CRYLCOAT 4420-0
					CRYLCOAT E37179
190 °C					CRYLCOAT 4659-0
180 °C	CRYLCOAT <sup>®*</sup> 2619-3	CRYLCOAT 2698-3	CRYLCOAT 2671-3	CRYLCOAT 2642-0	CRYLCOAT E06055
	CRYLCOAT 2670-3	CRYLCOAT 2618-3			CRYLCOAT 4626-0
	CRYLCOAT 2684-4	CRYLCOAT 2617-3			CRYLCOAT 4642-3
	CRYLCOAT 2691-2				CRYLCOAT 4433-4
	CRYLCOAT 2695-0				CRYLCOAT E36988
170 °C		CRYLCOAT 2682-1			

1 Trademark of EMS-Chemie

<b>CRYLCOAT®*</b>	<b>Ratio</b>	<b>AV</b>	<b>Viscosity</b>	<b>Tg (°C)</b>	<b>Cure T</b>	<b>Description</b>
<b>2617-3</b>	95/5	33	3500/200 °C	61	180	Tribo resin with excellent flow. Overbake and gas oven resistance.
<b>2618-3</b>	95/5	33	3100/200 °C	61	180	Tribo resin with excellent weathering and very good flow. Overbake and gas oven resistance.
<b>2619-3</b>	96.5/3.5	23	6500/200 °C	62	180	Tribo resin for low demand Primid with excellent flow. Overbake and gas oven resistance.
<b>2621-2</b>	88/12	72	9000/200 °C	62	200	For matt dry blend systems in combination with <b>CRYLCOAT 2691-2</b> . Industrial application.
<b>2642-0</b>	90/10	72	2500/200 °C	52	180	For matt dry blend systems in combination with <b>CRYLCOAT 2691-2</b> . Industrial application.
<b>2670-3</b>	97/3	21	8000/200 °C	61	180	For matt dry blend systems in combination with high demand Primid resins. Optimised weathering resistance.
<b>2671-3</b>	93/7	48	5800/200 °C	58	180	For matt dry blend systems in combination with <b>CRYLCOAT 2670-3</b> . Optimised weathering resistance.
<b>2682-1</b>	95/5	34	6000/200 °C	64	170	Tribo active resin suitable for low temperature curing formulations.
<b>2684-4</b>	96/4	24	9200/200 °C	58	180	Low demand Primid resin for clear coat formulations. Outstanding flow.
<b>2691-2</b>	97/3	21	7600/200 °C	62	180	For matt dry blend systems in combination with high demand Primid resins.
<b>2695-0</b>	96/4	25	5500/200 °C	59	180	General purpose resin for low demand Primid formulations.
<b>2698-3</b>	95/5	33	3500/200 °C	56	180	Tribo active resin with outstanding flow and degassing properties up to 160 µ. Overbake and gas oven resistance.
<b>E37250</b>	90/10	70	6200/175 °C	51	200	For matt dry blend systems in combination with <b>CRYLCOAT 2670-3</b> . Optimised weathering resistance.
<b>4420-0</b>	92/8	51	5500/200 °C	64	200	Resin for matt dry blend superdurable systems in combination with <b>CRYLCOAT 4641-0</b> .
<b>4626-0</b>	92/8	50	4300/175 °C	64	180	Superdurable resin suitable for high Tg powder coatings.
<b>4433-4</b>	95/5	31	5600/175 °C	54	180	Superdurable resin for clear coat formulations with excellent flow and flexibility.
<b>4641-0</b>	97/3	20	4300/200 °C	60	200	Resin for matt dry blend superdurable systems in combination with high demand Primid resins.
<b>4642-3</b>	95/5	35	1900/200 °C	62	180	Superdurable resin withstanding 5 years Florida exposure.
<b>4659-0</b>	95/5	33	3700/200 °C	59	190	Superdurable resin with some flexibility. Can be used in Primid and TGIC formulations.
<b>E06055</b>	95/5	31	8000/200 °C	66	180	Resin to be blended with CC 8079-0 to obtain high flexible superdurable system.
<b>E36988</b>	95/5	30	5500/175 °C	54	180	Superdurable resin with good flexibility and excellent flow. Suitable for ACE applications.
<b>E37179</b>	90/10	70	5000/175 °C	63	200	Resin for matt dry blend superdurable systems in combination with <b>CRYLCOAT 4641-0</b> .

\* CRYLCOAT polyester resins

1 Trademark of EMS-Chemie

# Polyester Resins for TGIC Powder Coatings

	93/7 AV ~ 33	96/4 AV ~ 20	90/10 AV ~ 50	Superdurable
200 °C	CRYLCOAT®* 2401-2	CRYLCOAT 2432-0	CRYLCOAT 2414-0	CRYLCOAT 4420-0
	CRYLCOAT 2430-0			CRYLCOAT 4430-0
	CRYLCOAT 2441-2			
	CRYLCOAT 2441-3			
	CRYLCOAT 2440-2			
	CRYLCOAT 2471-4			
190 °C	CRYLCOAT 2425-0			
180 °C	CRYLCOAT 2450-2			CRYLCOAT 4433-4
170 °C	CRYLCOAT 2477-5			
160 °C	CRYLCOAT 2433-2			

CRYLCOAT®*	Ratio	AV	Viscosity	Tg (°C)	Cure T	Description
2401-2	93/7	33	3500/200 °C	60	200	Low reactive resin with outstanding flow, high flexibility and excellent outdoor resistance.
2414-0	90/10	47	4700/200 °C	57	200	For matt dry blend systems in combination with CC 2432-0.
2425-0	93/7	34	6200/200 °C	70	190	Medium reactivity, high Tg.
2430-0	93/7	30	9800/200 °C	69	200	Low reactivity, high Tg.
2432-0	96/4	20	7900/200 °C	53	200	For matt dry blend systems in combination with CC 2414-0.
2433-2	93/7	33	3500/200 °C	60	160	High reactivity, good flow and flexibility.
2440-2	93/7	33	5100/200 °C	67	200	Low reactive resin, good flow and flexibility, stabilized.
2441-2	93/7	33	5000/200 °C	67	200	Low reactive resin, excellent flow, stabilized.
2441-3	93/7	33	4600/200 °C	67	200	Tribo version of CC 2441-2.
2450-2	93/7	33	5000/200 °C	67	180	Accelerated version of CC 2441-2.
2471-4	93/7	33	3500/200 °C	58	200	Low reactive resin for clear coat formulations, excellent smoothness and clarity.
2477-5	93/7	33	3500/200 °C	58	170	Resin for use in coil or PCM. It has an excellent overbake resistance.
4420-0	90/10	51	5500/200 °C	64	200	Superdurable resin. May be used alone or as part of matt dry blend system in combination with CC 4430-0.
4430-0	93/7	35	2000/200 °C	62	200	Superdurable resin with outstanding flow. May be used alone or as part of matt dry blend system in combination with CC 4420-0.
4433-4	93/7	31	5600/200 °C	54	180	Superdurable resin for clear coat formulations, excellent flow and flexibility.

\* CRYLCOAT polyester resins

# Polyester Resins for PT910 Powder Coatings

	93/7 AV ~ 26	92/8 AV ~ 33	91/9-90/10 AV ~ 40	Superdurable
200 °C	CRYLCOAT®* 2593-0		CRYLCOAT 2501-2	CRYLCOAT 4540-0
	CRYLCOAT 2592-0			
	CRYLCOAT 2592-1			
180 °C	CRYLCOAT 2503-2		CRYLCOAT 2506-1	
			CRYLCOAT 2536-0	
170 °C		CRYLCOAT 2578-0		

<b>CRYLCOAT®*</b>	<b>Ratio</b>	<b>AV</b>	<b>Viscosity</b>	<b>Tg (°C)</b>	<b>Cure T</b>	<b>Description</b>
<b>2501-2</b>	91/9	33	9400/200 °C	73	200	Excellent flow, flexibility and chemical resistance.
<b>2503-2</b>	93/7	24	8500/200 °C	68	180	Very high heat resistance.
<b>2506-1</b>	91/9	33	5000/200 °C	67	180 (15')	General purpose tribo resin.
<b>2536-0</b>	90/10	40	7000/200 °C	68	180	For matt dry blend systems in combination with CC 2593-0.
<b>2578-0</b>	92/8	33	9000/200 °C	71	170	Resin suitable for low temperature curing.
<b>2592-0</b>	93/7	26	10500/200 °C	70	200	General purpose resin.
<b>2592-1</b>	93/7	26	9500/200 °C	69	200	Tribo version of CC 2592-0.
<b>2593-0</b>	93/7	26	10500/200 °C	70	200 (15')	Outstanding flow, recommended for use in clear. For matt dry blend systems in combination with CC 2536-0.
<b>4540-0</b>	93/7	25	9000/200 °C	67	200	Superdurable resin with excellent properties.

\* CRYLCOAT polyester resins

# Resins and Hardeners for Urethane Powder Coatings

## Hydroxyl Polyester Resins for Urethane Powder Coatings

	OHV 30	OHV 50	OHV 80-100	OHV 300	Superdurable
200 °C	<i>CRYLCOAT</i> <sup>®*</sup> 2840-2	<i>CRYLCOAT</i> 2883-0		<i>CRYLCOAT</i> 2814-0	<i>CRYLCOAT</i> 4890-0
		<i>CRYLCOAT</i> 2839-0			
		<i>CRYLCOAT</i> E04060			
190 °C			<i>CRYLCOAT</i> 2818-0		

## Special Hydroxyl Polyester Resins and Hardeners

Wrinkle System	Anhydride Hardener	NCO Hardeners	Utility Resins
<i>CRYLCOAT</i> 2920-0	<i>BECKOPOX</i> <sup>™</sup> EH 694	<i>ADDITOL</i> P932	<i>CRYLCOAT</i> 9292-0
<i>ADDITOL</i> <sup>®*</sup> P920		<i>ADDITOL</i> P965	<i>CRYLCOAT</i> 9246-0

\* *ADDITOL* additives  
 \* *BECKOPOX* epoxy resins  
 \* *CRYLCOAT* polyester resins

<b>CRYLCOAT®*</b>	<b>OHV</b>	<b>Viscosity</b>	<b>Tg (°C)</b>	<b>Cure T</b>	<b>Description</b>
<b>2814-0</b>	300	3200/200 °C	52	200	Outstanding hardness, chemical and stain resistance. Useful for low gloss formulations.
<b>2818-0</b>	100	3000/200 °C	58	190	Improved chemical and stain resistance. Can be used to produce thermally stable coatings.
<b>2839-0</b>	50	5500/200 °C	57	200	Good flow and resistance properties. Good for clears.
<b>2840-2</b>	30	8200/200 °C	56	200	Resin with excellent performance recommended for internally blocked polyisocyanate crosslinkers.
<b>2883-0</b>	47	4000/200 °C	61	200	Excellent flow, high hardness and good outdoor durability. High Tg.
<b>2920-0</b>	33	12700/200 °C	67	200	Produces durable wrinkle finishes in combination with <b>Additol P 920</b> .
<b>4890-0</b>	30	5000/200 °C	58	200	Superdurable resin with excellent properties.
<b>E04060</b>	50	3500/200 °C	52	200	Resin for one shot matt systems in combination with CC 2814-0. Product under development.

<b>ADDITOL®*</b>	<b>OHV</b>	<b>Visc.</b>	<b>Tg (°C)</b>	<b>Cure T</b>	<b>Description</b>
<b>P920</b>	42	8500/200 °C	N/A	N/A	Catalyst masterbatch for CC 2920-0 to obtain durable wrinkle finish. 5% active substance.

<b>ADDITOL</b>	<b>NCO %</b>	<b>Visc.</b>	<b>Tg (°C)</b>	<b>Cure T</b>	<b>Description</b>
<b>P932</b>	9–10	N/A	47	N/A	Aliphatic urethane pre-polymer crosslinker. Not available in the US or Canada.
<b>P965</b>	16–17	N/A	51	N/A	Aromatic urethane adduct crosslinker. For indoor applications.

<b>BECKOPOX™</b>	<b>AV</b>		<b>MT (°C)</b>	<b>Cure T</b>	<b>Description</b>
<b>EH 694</b>	275		50–60	N/A	Anhydride hardener for OH polyester or acrylic or epoxy resins. Outstanding chemical and overbake resistance.

<b>CRYLCOAT</b>	<b>OHV</b>	<b>Visc.</b>	<b>Tg (°C)</b>	<b>Cure T</b>	<b>Description</b>
<b>9246-0</b>	35	12500/200 °C	62	NA	Suitable as organic filler or as cleaning material for extruders.
<b>9292-0</b>	37	4000/200 °C	58	200 °C	For use as organic filler or for indoor coatings with aromatic urethane hardeners.

## Resins for UV-curable Powder Coatings

Metal	MDF / Wood	Plastics
<i>UVECOAT</i> <sup>®*</sup> 2100	<i>UVECOAT</i> 3001	<i>UVECOAT</i> 3003
<i>UVECOAT</i> 2200	<i>UVECOAT</i> 3002	
<i>UVECOAT</i> 2300	<i>UVECOAT</i> 3005	
<i>UVECOAT</i> E37539		

## Additives and Specialty Resins for UV-curable Powder Coatings

Additives	Co-Reactant	Semi-crystalline
<i>ADDITOL</i> <sup>®*</sup> BDK	<i>UVECOAT</i> 9146	<i>UVECOAT</i> 9010

\* *ADDITOL* additives  
 \* *BECKOPOX* epoxy resins  
 \* *CRYLCOAT* polyester resins  
 \* *UVECOAT* UV-curable resins

<b>UVECOAT®*</b>	<b>AV</b>	<b>Viscosity</b>	<b>Tg (°C)</b>	<b>Description</b>
<b>2100</b>	≤3	5500/200 °C	57	For metal applications. Exterior durable. Can be pigmented or used as clear.
<b>2200</b>	<2	4500/175 °C	54	Outstanding weathering for metal applications. Can be pigmented or used as clear.
<b>2300</b>	≤3	10000/175 °C	53	For metal applications. Increased reactivity. Improved corrosion resistance. Not for exterior applications.
<b>E37539</b>	≤13	4000/200 °C	44	For metal applications. To provide excellent adhesion of UV curable powder to a wide variety of metal substrates.
<b>3001</b>	≤5	2500/175 °C	44	For wood or wood composite applications. Ideal for sandable wood primer. Excellent smoothness and chemical resistance.
<b>3002</b>	≤3	4000/175 °C	49	High performance wood-based substrate coating. Good for textured and clear coats. Good yellowing resistance.
<b>3003</b>	≤3	3200/175 °C	49	For PVC flooring applications. Improved chemical and abrasion resistance with good flexibility. Not for exterior applications.
<b>3005</b>	≤10	4000/200 °C	48	For wood and wood substrate applications. May be pigmented or used as a clear. Excellent scratch resistance.
<b>9010</b>	≤3	350/100 °C	MT=85	Semi-crystalline co-resin for UV-curable formulations giving improved mechanical performance, flexibility, and smoothness.
<b>9146</b>	≤15	55000/140 °C	55	Unsaturated urethane acrylate for use as a "crosslinker" in UV powder coatings. Enhances reactivity, surface hardness and chemical resistance.

<b>ADDITOL®*</b>	<b>MW</b>		<b>MP (°C)</b>	<b>Description</b>
<b>BDK</b>	256		66	General purpose radical photoinitiator for use in UV powder coatings. Typically used at levels of 1 to 5 % by weight.

\* **ADDITOL** additives

\* **CRYLCOAT** polyester resins

\* **MODAFLOW** flow modifiers

\* **SYNTHACRYL** acrylic resins

\* **UVECOAT** UV-curable resins

## Masterbatches and Additives for Powder Coatings

Catalysts	Flow Promoters	Flow Aids	Tribo Additives	Semi-crystalline
<i>ADDITOL®*</i> <i>P964</i>	<i>ADDITOL</i> <i>P896</i>	<i>MODAFLOW®*</i> <i>POWDER III</i>	<i>ADDITOL</i> <i>P950</i>	<i>CRYLCOAT®*</i> <i>8079-0</i>
<i>ADDITOL</i> <i>P966</i>	<i>ADDITOL</i> <i>P824</i>	<i>MODAFLOW®*</i> <i>POWDER 2000</i>		
	<i>ADDITOL</i> <i>P820</i>	<i>MODAFLOW</i> <i>POWDER 6000</i>		
	<i>ADDITOL</i> <i>P891</i>			
	<i>ADDITOL</i> <i>E04149</i>			

## Acrylic Resins and Additives for Powder Coatings

Polyanhydride Hardener	Matting Hardener
<i>ADDITOL</i> <i>P791</i>	<i>SYNTHACRYL®*</i> <i>700</i>

## Typical Properties for Masterbatches and Additives

Products	#	Viscosity	Tg (°C)	Description
<b>ADDITOL®* P820</b>	AV 34	3000/200 °C	60	Flow-aid masterbatch for pigmented durable coatings. 10 % active substance in an outdoor resistant carboxylated polyester matrix.
<b>ADDITOL P824</b>	OHV 45	1400/200 °C	49	Flow-aid masterbatch for pigmented durable coatings. 15 % active substance in an outdoor resistant hydroxylated polyester matrix.
<b>ADDITOL P891</b>	AV 35	2300/200 °C	56	Flow-aid masterbatch for clear powder coatings. 5 % active substance in an outdoor resistant carboxylated polyester matrix.
<b>ADDITOL P896</b>	OHV 45	1700/200 °C	57	Flow-aid masterbatch for pigmented powder coatings. 15 % active substance in an outdoor resistant hydroxylated polyester matrix.
<b>ADDITOL E04149</b>	OHV 45	1500/200 °C	52	Flow-aid masterbatch for clear powder coatings. 10 % active substance in an outdoor resistant hydroxylated polyester matrix.
<b>ADDITOL P950</b>	OHV 28	7500/200 °C	N/A	Tribo masterbatch for indoor and outdoor coatings. 5 % active substance.
<b>ADDITOL P964</b>	AV 33	3200/200 °C	N/A	Catalyst masterbatch for hybrids, TGIC or PT 910 systems. 5 % active substance.
<b>ADDITOL P966</b>	AV 35	1800/200 °C	N/A	Catalyst masterbatch in a superdurable matrix for TGIC or PT 910 systems. 5 % active substance.

Products	Active %	Volatile Loss %	Density g/cm3	Description
<b>MODAFLOW®* POWDER III</b>	Min 65	Max 4	0.58–0.64	Addition at 0.6–1.5 % of the total formulation. Based on FDA listed monomers.
<b>MODAFLOW POWDER 2000</b>	Min 65	Max 4	0.58–0.64	Addition at 0.6–1.5 % of the total formulation. Excellent flow and gloss.
<b>MODAFLOW POWDER 6000</b>	Min 65	Max 4	0.58–0.64	Addition at 0.75–1.0 % of the total formulation. Excellent flow and gloss. Lessens cross-contamination issues.

Products	AV	Visc.	MT (°C)	Description
<b>CRYLCOAT®* 8079-0</b>	20	8000 200 °C	82	Semi-crystalline polyester. Improves mechanical performance, flexibility, and smoothness when blended with superdurable resins such as CC E06055.

Products	EEW	Visc.	Tg (°C)	Description
<b>SYNTHACRYL®* 700</b>	774	39800 200 °C	80	Glycidyl poly-acrylic resin designed as a matting hardener. Not available in US or Canada.

Products	PAV	Visc.	MT (°C)	Description
<b>ADDITOL P791</b>	317	N/A	85	Aliphatic polyanhydride hardener for use with solid acrylic resins containing glycidyl groups.

\* **ADDITOL** additives

\* **CRYLCOAT** polyester resins

\* **MODAFLOW** flow modifiers

\* **SYNTHACRYL** acrylic resins

TGIC	Primid	PT 910	Urethane
<i>CRYLCOAT®*</i> 4430-0	<i>CRYLCOAT</i> E36988	<i>CRYLCOAT</i> 4540-0	<i>CRYLCOAT</i> 4890-0
<i>CRYLCOAT</i> 4420-0	<i>CRYLCOAT</i> 4433-4		
<i>CRYLCOAT</i> 4433-4	<i>CRYLCOAT</i> 4642-3		
	<i>CRYLCOAT</i> 4659-0		
	<i>CRYLCOAT</i> 4626-0		
	<i>CRYLCOAT</i> 4641-0		
	<i>CRYLCOAT</i> 4420-0		
	<i>CRYLCOAT</i> E37179		
	<i>CRYLCOAT</i> E06055		

# Gloss Control Systems for Powder Coatings

## Dry-Blend Systems

	Primid Standard	Primid Superdurable	TGIC Standard	TGIC Superdurable
Min 30 %	CRYLCOAT®* 2670-3 AV 21	CRYLCOAT 4641-0 AV 20	CRYLCOAT 2414-0 AV 47	CRYLCOAT 4420-0 AV 51
	CRYLCOAT 2671-3 AV 48	CRYLCOAT 4420-0 AV 51	CRYLCOAT 2432-0 AV 20	CRYLCOAT 4430-0 AV 35
	CRYLCOAT 2691-2 AV 21			
	CRYLCOAT 2642-0 AV 72			
Min 20 %	CRYLCOAT 2670-3 AV 21	CRYLCOAT 4641-0 AV 20		
	CRYLCOAT E37250 AV 70	CRYLCOAT E37179 AV 70		
	CRYLCOAT 2691-2 AV 21			
	CRYLCOAT 2621-2 AV 72			

## One-Shot Systems

	Urethane	Acrylic	Wrinkle
Min 20 %	CRYLCOAT E04060 OHV 50		
	CRYLCOAT 2814-0 OHV 300		
< 12 %	CRYLCOAT E04060 OHV 50	SYNTHACRYL®* 700	CRYLCOAT 2920-0
	CRYLCOAT 2814-0 OHV 300	CRYLCOAT 2441-2	ADDITOL®* P920

\* ADDITOL additives

\* CRYLCOAT polyester resins

\* MODAFLOW flow modifiers

\* SYNTHACRYL acrylic resins

\* UVECOAT UV-curable resins

## Toxicity

**CRYLCOAT**<sup>®\*</sup> polyester products are solid, non-flammable resins with minimal toxicity. **MODAFLOW**<sup>®\*</sup> products have been subjected to acute toxicity and mutagenicity studies. Details on specific coverage of individual studies are available upon request.

Resin containers may contain polymer dust that could be irritating. Prevent dusty conditions and avoid breathing dust. Also, avoid contact with eyes and prolonged or repeated contact with skin. Use only with adequate ventilation. Equipment should be grounded to prevent electrical sparking. For more information on each product, please consult the current material safety data sheet (MSDS) which will be provided by Cytec. Take into account the potential risk resulting in formulation with other materials such as catalysts, hardeners, pigments, and fillers.

## Storage

**CRYLCOAT**, **UVECOAT**<sup>®\*</sup>, **SYNTHACRYL**<sup>®\*</sup>, and **ADDITOL**<sup>®\*</sup> resins should be stored in a dry location at room temperature. Keep away from heat sources and direct sunlight. Do not stack more than two pallets high.

**MODAFLOW** powder products should not be stored in environments of high heat or humidity. The ideal storage temperature is between 4 °C (40 °F) and 38 °C (100 °F). Keep away from sparks and flame.

## Shelf Stability

**CRYLCOAT**, **UVECOAT**, **SYNTHACRYL**, and **ADDITOL** resins have a minimum shelf life of one year when stored in a dry location at room temperature. The shelf life of **MODAFLOW** powder products is typically at least four years, when stored in the recommended environment.

## Packaging Information

**CRYLCOAT**, **UVECOAT**, **SYNTHACRYL**, and **ADDITOL** resins are typically provided in 25 kg (55.1 lb) polyethylene bags. Supersack containers of 500 kg or 1000 kg are available upon request. **MODAFLOW** powder products are typically provided in 68 kg (150 lbs) fiber drums. Upon special request, 454 kg (1000 lbs) polypropylene bulk bags are available.



Key Word	Description
<b>Acid Value (AV)</b>	The amount of KOH, reported in mg, necessary to neutralize the acid content of one gram of polyester.
<b>Blooming</b>	A hazy appearance on the surface of the coating brought on by migration of low molecular weight material during low temperature cure or extended exposure to heat.
<b>Curing Temperature</b>	The metal or object temperature required to fully cure the powder coating system in 10 minutes.
<b>Epoxy Equivalent Weight (EEW)</b>	The weight of resin, in grams, which contains one gram-equivalent of epoxy.
<b>Florida Exposure</b>	Standard outdoor exposure test to approximate the natural weathering performance of a coating under severe conditions. The test panels are exposed in south Florida.
<b>Glass Transition Temperature (Tg)</b>	The characteristic temperature in °C of an amorphous polymer corresponding to the change from a solid to liquid state as measured by DSC.
<b>Gloss</b>	Degree to which a surface reflects light.
<b>Hydroxyl Value (OHV)</b>	The amount of KOH, reported in mg, equivalent to the hydroxyl content of one gram of polyester.
<b>Matte</b>	A coating appearance that reflects a minimal amount of light.
<b>Melting Temperature (MT)</b>	The characteristic temperature in °C at which a solid material becomes a liquid.
<b>Polyester/Hardener Ratio</b>	Weight ratio between the polyester resin and the hardener recommended for optimal properties.
<b>Storage Stability</b>	Ability of powder coatings to maintain uniform powder flow properties after being subjected to a specified storage condition.
<b>Superdurable</b>	A polyester resin that exhibits extended outdoor weathering characteristics, typically maintaining > 50 % gloss after 3 years (EU) and 5 years (US)
<b>Viscosity</b>	The melt viscosity of the polymer, measured with a Brookfield <sup>1</sup> viscometer in mPa.s at a specified temperature
<b>Wrinkle</b>	A unique, special effect finish characterized by closely associated ridge-like structures

<sup>1</sup> Trademark of Brookfield Engineering Laboratories

Product Designation	Suppliers
Acrylic Powder Coating Resin	Cytec
Acrylic Resin – Additive	Cytec
<b>ADDITOL</b> ® Resin	Cytec
<b>BECKOPOX</b> ™ Resin	Cytec
Beta Hydroxy Alkyl Amides	EMS-CHEMIE HOLDING AG
Carboxyl Polyester Resin	Cytec
<b>CRYLCOAT</b> ® Resin	Cytec
Epoxy Powder Resin	Huntsman International LLC, Dow Corning Corporation and other suppliers
Glycoluril Resin	Cytec
Hydroxyl Polyester Resin	Cytec
<b>MODAFLOW</b> ® Powder	Cytec
Polyester Resin	Cytec
Polyanhydride Hardener	Cytec
Polyurethane Hardener	Cytec, Bayer AG, Degussa GmbH
Primid	EMS-CHEMIE HOLDING AG
Superdurable Resin	Cytec
<b>SYNTHACRYL</b> ® Resin	Cytec
TGIC (triglycidyl isocyanurate)	Huntsman International LLC, Nissan Motor Co. Ltd
PT 910	Huntsman International LLC
<b>UVECOAT</b> ® Resin	Cytec

- \* **ADDITOL** additives
- \* **BECKOPOX** epoxy resins
- \* **CRYLCOAT** polyester resins
- \* **MODAFLOW** flow modifiers
- \* **SYNTHACRYL** acrylic resins
- \* **UVECOAT** UV-curable resins

# Contacts

## EUROPE

### Cytec Surface Specialties SA/NV

Square Marie Curie, 11  
B-1070 Brussels  
Belgium

Tel: +32 2 560 4511

Fax: +32 2 560 4521

### Technical Service Italy

#### Cytec Italy s.r.l.

Via Matteo Bianchin, 62  
I-36060 Romano d'Ezzelino (VI)  
Italy

Tel: +39 042 451 6611

Fax: +39 042 451 6725

#### Trademark notice:

The ® symbol indicates a Registered Trademark in the United States and the TM or \* indicates a Trademark in the United States. The mark may also be registered, the subject of an application for registration or a trademark in other countries.

**Disclaimer:** Cytec Surface Specialties SA/NV in its own name and on behalf of its affiliated companies (hereinafter 'Cytec Surface Specialties') decline any liability with respect to the use made by any third party of the information contained herein. The information contained herein represents Cytec Surface Specialties best knowledge thereon without constituting any express or implied guarantee or warranty of any kind (including, but not limited to, regarding the accuracy, the completeness or relevance of the data set out herein). Cytec Surface Specialties is the sole owner or authorized user of the intellectual property rights relating to the information communicated.

The information relating to the use of the products is given for information purposes only. No guarantee or warranty is provided that the product is adapted to the client's specific use. The client should perform its own tests to determine the suitability for a particular purpose. The final choice of use of a product remains the sole responsibility of the client.

Pub. No. 220104E, Version B

[www.cytec.com](http://www.cytec.com)

© 2007 Cytec Industries Inc. All rights reserved.

Front-page picture: © 2007 – May – Motion Blur Formula One Photography