

From defining more efficient processes for mining customers to developing new additives for polymer-based alternatives to wood and metals, the product lines of Cytec Specialty Chemicals are unified in their dedication to customer-driven innovation.

Working closely with our customers, we develop revolutionary technologies that enable them to improve performance and productivity, enter new markets, and refine new applications. How to improve mine profitability or coatings efficiency in the face of important environmental concerns? How to develop polymers that really stand up to UV light? How to use phosphines to create better, safer biocides and fumigants for agriculture? Our technology and sales teams work on-site with customers every day to address today's business challenges and troubleshoot tomorrow's.

The applications are diverse, but the commitment is uniform: finding better solutions for customers through continual research, ongoing collaboration and a passion for innovation.

An Expansive Portfolio

Cytec Specialty Chemicals is a complete solution provider for customers requiring high-value surface technologies in industries that include industrial coatings, automotive, architectural, wood and paper, graphics, and electronics.

We offer our customers advanced and diverse products and technologies for surfaces with an emphasis on environmentally friendly products such as UV/EB curable resins and additives, powder coating resins and additives, as well as waterborne and solventborne liquid coatings resins and additives. We are committed to working with our customers to develop environmentally advanced solutions and we are dedicated to open communication concerning the safe handling, distribution, use and disposal of the products we make.

A Focus on Customer Satisfaction

Cytec Specialty Chemicals operates a globally integrated set of order fulfillment IT systems and processes. All Specialty Chemicals personnel in the order fulfillment processes are dedicated to delivering customer satisfaction through reliable and cost-effective supply of product to our customers. Cytec Specialty Chemicals has specialized personnel in Customer Service, Procurement, Manufacturing, Planning and Logistics to achieve this goal. In addition to timely and accurate order fulfillment, there is an equally important focus on maintaining safety and protecting the environment at all steps in the process, from the procurement of raw materials to the delivery of finished goods to the customer's door.

Dedication to Operational Excellence

Cytec's Specialty Chemicals manufacturing organization operates globally to provide superior service to our customers in all regions. Our vision of operational excellence brings value to our customers through ongoing, continuous improvement initiatives, including Lean Manufacturing, Six Sigma Principles, and Best Practice Engineering.

Our value proposition is driven by excellence in our Safety, Environmental, Quality Systems and Employee Development Programs. We are structured by business technology, which enables our sites to work transparently with R&D, Customer Service and the Businesses, to share best practices across common processes. We also are able to gain leverage from overall global manufacturing synergies to most efficiently meet customer needs.

Key Product Lines

- Liquid Coating Resins and Additives
- Mining Chemicals
- Phosphine and Phosphorus Specialties
- Polymer Additives
- Powder Coating Resins and Additives
- RADCURE® UV/EB
- Specialty Additives

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 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
- Products that allow for matte coatings through one-shot formulations or dry blending
- Resins that can be used for special coatings such as clearcoats or wrinkled effects
- Low temperature cure products that can be used with thermoset or UV technology

Our newest resin technologies are designed for cutting-edge applications where powder coatings are not widely used including architectural coatings, automotive finishes, and non-metal 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 raw materials for powder coating finishes.

Proven worldwide, our extensive selection of CRYLCOAT® polyester resins include carboxyl and hydroxyl functional resins for polyester/epoxy hybrid, TGIC, hydroxyalkyl amide, urethane, glycidyl-ester and glycouril powder coating systems.

For new technologies like UV curable powder coatings, we have the widest product range available, including UVECOAT® unsaturated resins.

For improving flow and leveling characteristics in all types of coatings, the versatile MODAFLOW® product family is the bench-mark name among flow modifiers and powder resins in the coatings industry.

Also bringing value to the formulation of powder coatings are:

- ADDITOL® masterbatch flow modifiers, catalysts and specialty hardeners
- BECKOPOX® specialty hardeners
- SYNTHACRYL® acrylic resins for use as matting agents



Cytec provides an unmatched level of technical service and customer support globally. Cytec's expertise in the resin development and new technology exploration is backed by superior powder coating application facilities and outstanding resin and coatings analytical capability.

Cytec's manufacturing operations are state-of-the-art. Products are made with unparalleled consistency and quality. ISO certification has been achieved at the North and South American production facilities; specific registration can be provided upon request. Cytec's manufacturing capability provides the powder coating industry with global coverage for sourcing and logistics.



Americas Technology ISO 9001-2000 Registration

Smyrna: SGS updated November 2008
Suzano: TÜV updated November 2008

Americas Manufacturing ISO 9001-2000 Registration

North Augusta: SGS updated November 2008
Langley: SGS updated November 2008
Suzano: TÜV updated November 2008

Powder Coating Resins, Hardeners and Additives Manufacturing, R&D Sites, and Technical Service

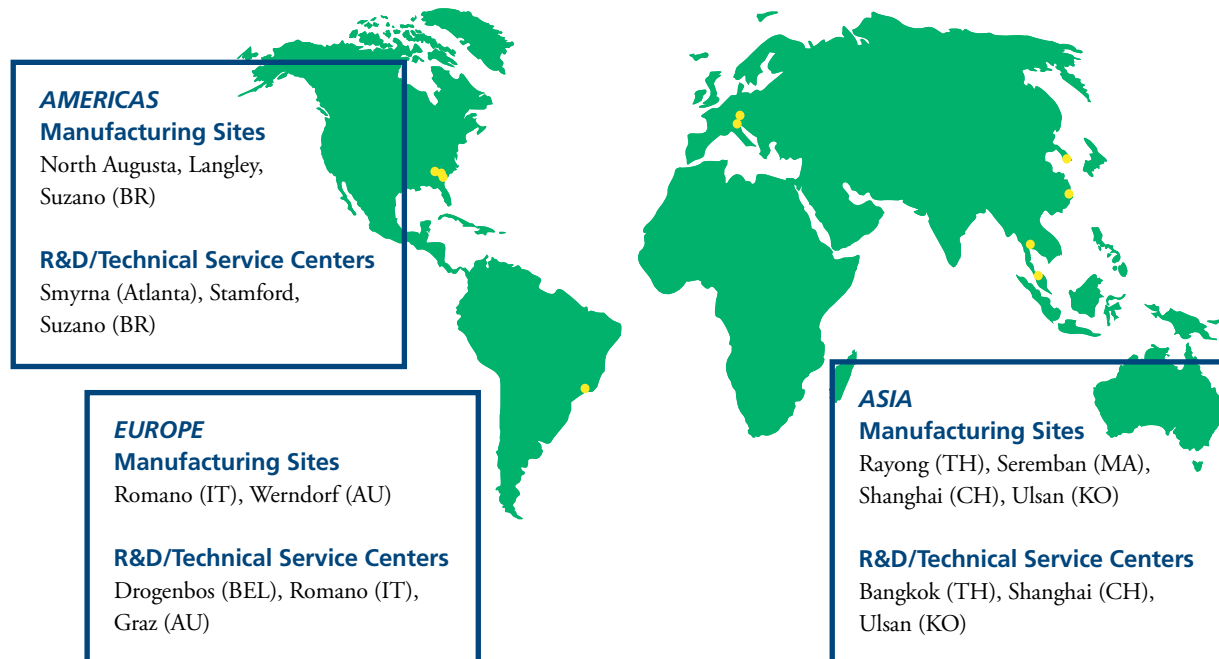


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Product	Description
Vehicle Binder Resins	
CRYLCOAT®	Polyester powder coating resins <ul style="list-style-type: none"> – Hydroxyl (-OH) resins for polyurethane and glycoluril powder coatings – Carboxyl (-COOH) resins for hybrid, TGIC, glycidylester and β-HAA powder coatings
SYNTHACRYL®	Glycidyl (GMA) acrylic powder resins and matting agents
UVECOAT®	Unsaturated resins for UV curable powder coatings
Curing Hardeners (Powder Crosslinkers)	
ADDITOL®	Polyanhydride resin for epoxy functional (glycidyl) acrylics and urethane hardeners for hydroxyl functional binder resins (where available)
BECKOPOX™	Anhydride-like resin for epoxy or hydroxy functional binder resins
Powder Additives and Modifiers	
MODAFLOW®	Powder coating flow modifiers on a silica base
ADDITOL®	Flow additives, catalysts and tribo masterbatches provided on resin carriers and photoinitiators to accelerate the cure of UV powder coatings
SYNTHACRYL®	GMA-acrylic matting agents



2 Product Nomenclature

Thermoset powder coatings are typically cured in a temperature range of 160-200°C (object temperature) for 10 minutes. General cure guidelines for products listed in this bulletin are summarized below.

Cure Temperature and Time Definitions

Slow = 190°C or greater for 10 min.

Medium = ~170-180°C for 10 min.

Fast = ~160°C for 10 min.

Low Temp = 150°C or lower for 10-30 min.

Low temperature cure is used for heat sensitive substrates or thick metallic objects. Cytec has products that can achieve the desired results through thermoset or UV cure. A list of these products can be found on pages 12 and 13.



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

Resin Selection Guide



CRYLCOAT[®] polyester resins



CRYLCOAT[®] next generation hybrid polyester resins



CRYLCOAT[®] polyester resin pair for one-shot matte finishes



CRYLCOAT[®] polyester resin pair for matte dry blend finishes



CRYLCOAT[®] polyester resins for clearcoats



UVECOAT[®] unsaturated resins



ADDITOL[®] masterbatch and additives
MODAFLOW[®] powder flow modifiers
SYNTHACRYL[®] acrylic resins



Limited Availability

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 contain 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.

Some of Cytec's newer products are referenced with an "E" designation. These resins have been recently developed and have only been commercially available for a short time, and do not follow the product nomenclature system.

CRYLCOAT® System = 5 Digit System

Digit 1	Digit 2	Digits 3 & 4	Digit 5
1 = Hybrid 2 = Standard Outdoor 4 = Superdurable Outdoor 8 = Crystalline 9 = Other	5 = 50/50 6 = 60/40 7 = 70/30 8 = 80/20 4 = TGIC 5 = PT-910 6 = Hydroxyakyl Amide 8 = Urethane 9 = Wrinkle Finish	Whenever possible these digits will be the last two digits of the old name	– 0 = Standard (no additives) – 1 = Tribo – 2 = Overbake – 3 = Tribo & Overbake – 4 = Clearcoat – 5 = Special – 6 = Low Bake (<160°C)

Example: CRYLCOAT® 1514-2 = 314

Digit 1: 1 = Hybrid; Digit 2: 5 = 50/50; Digits 3 & 4: 14 from 314; Digit 5: 2 = Overbake

ADDITOL® System

Masterbatch Type	Number
Flow Aid	P 800-P 899
Tribo, Catalysts, Crosslinkers	P 900-P 999

UVECOAT® System

Type	Number
General Purpose Resins	1000-1999
Resins for Metal Substrates	2000-2999
Resins for Wood & Plastic Substrates	3000-3999
Special (i.e., crystalline)	9000-9999

SYNTHACRYL® System

Type	Number
Acrylic – All	P 700-P 799

4 Polyester Resins for Hybrid Powder Coatings

	50/50 Acid # ~70	55/45 to 60/40 Acid # ~50-60	70/30 to 80/20 Acid # ~20-35
200°C 392°F	CRYLCOAT® 1544-4 ALFTALAT® AN 744	CRYLCOAT® 1660-0 CRYLCOAT® 360 CRYLCOAT® 1622-0 ALFTALAT® AN 722	CRYLCOAT® 1702-0 CRYLCOAT® 7402 CRYLCOAT® 1783-0 ALFTALAT® AN 783
180°C 356°F	CRYLCOAT® 1510-0 CRYLCOAT® 310	CRYLCOAT® 1650-2 CRYLCOAT® 360	CRYLCOAT® E04143
	CRYLCOAT® 1514-2 CRYLCOAT® 314	CRYLCOAT® 1671-0 CRYLCOAT® 371	CRYLCOAT® 1770-0 ALFTALAT® AN 770
	CRYLCOAT® 1557-5 ALFTALAT® AN 757	CRYLCOAT® 1658-5 ALFTALAT® AN 758	CRYLCOAT® 1771-0 ALFTALAT® 03942
	CRYLCOAT® 1573-0 ALFTALAT® 03873	CRYLCOAT® 1620-0 ALFTALAT® AN 720	CRYLCOAT® 1725-0 CRYLCOAT® 2625
		CRYLCOAT® 1626-0 ALFTALAT® 03926	CRYLCOAT® 1781-0 ALFTALAT® E04181
		CRYLCOAT® 1627-0 ALFTALAT® 04016	CRYLCOAT® 1721-0 ALFTALAT® AN 721
170°C 338°F		CRYLCOAT® E04236	
160°C 320°F	CRYLCOAT® 1540-0 CRYLCOAT® 340		CRYLCOAT® 1750-0 ALFTALAT® 03750
	CRYLCOAT® 1593-0 ALFTALAT® 03993		CRYLCOAT® 1701-0 CRYLCOAT® 7401
	CRYLCOAT® 1506-0 CRYLCOAT® 7206		
150°C 302°F		CRYLCOAT® 1680-6 CRYLCOAT® 380	
≤140°C ≤284°F	CRYLCOAT® E37704		

Typical Properties for Hybrid Resins

CRYLCOAT®	Ratio	Acid #	Viscosity @ 200°C	Tg(C°)	Cure	Benefit	Flow	Chemical	Over-bake	Economics	FDA Regulated**
1506-0	50/50	71	8000	62	160°C	Good overbake	o	++	+	-	
1510-0	50/50	71	8500*	58	180°C	High loading possible	o	+	-	o	●
1514-2	50/50	71	9250*	55	180°C	Excellent overbake	+	o	++	--	●
1540-0	50/50	71	8700*	58	160°C	Good pigment wetting	o	+	--	o	●
1544-4	50/50	70	2500	54	200°C	Blend resin	+	+	o	+	●
1557-5	50/50	71	2000	50	170°C	Blend resin	-	+	o	-	
1573-0	50/50	70	3500	56	180°C	Economical formulation	o	o	-	++	●
1593-0	50/50	70	3500	54	160°C	Economical formulation	-	+	-	++	
1620-0	55/45	60	2650	54	170°C		-	o	o	+	●
1622-0	55/45	60	2500	54	200°C		+	o	o	+	●
1626-0	60/40	48	3000	52	180°C	Workhorse resin	++	o	--	++	●
1627-0	60/40	44	4000	62	180°C	High Tg	+	o	--	++	●
1650-2	60/40	50	4200	57	200°C		+	-	o	-	
1658-5	60/40	53	2500	57	170°C	Scratch resistance	-	+	o	-	
1660-0	60/40	48	9400*	50	200°C	High loading possible	++	o	o	-	●
1671-0	60/40	48	11200*	50	180°C	Outstanding gloss	++	o	--	-	●
1680-6	60/40	48	10500*	50	150°C		--	o	-	--	
1701-0	70/30	36	6300	62	170°C	Overbake resistance	o	-	+	o	●
1702-0	70/30	36	5300	62	200°C		+	-	+	o	●
1721-0	70/30	40	5000	55	180°C	Can use for texture	-	++	o	+	●
1725-0	70/30	30	6400	55	180°C	TMA free	o	o	o	-	
1750-0	70/30	34	4750	54	160°C	Non-blooming	-	-	--	++	●
1770-0	70/30	34	5400	58	180°C	Economical formulation	o	-	-	+	●
1771-0	70/30	33	4700	56	180°C		o	-	-	++	●
1781-0	70/30	33	5000	60	180°C	High Tg	-	-	o	++	
1783-0	70/30	34	5000	58	200°C		o	-	o	+	●
E04143	80/20	22	10000*	57	200°C	Matting with	o	--	--	++	
E04236	60/40	48	3000	50	170°C		++	+	+	+	●
E37704	50/50	71	5000	50	140°C	Low cure for MDF	--	+	o	o	

++ = Outstanding + = Excellent o = Good - = Fair -- = Poor

* Viscosity at 175°C

** For a detailed description of FDA Status, please refer to page 24.

6 Polyester Resins for TGIC Powder Coatings

	93/7 Acid # ~33	95/5 Acid # ~25	90/10 Acid # ~50	Superdurable
200°C 392°F	CRYLCOAT® 2437-0 CRYLCOAT® 7337	CRYLCOAT® 2695-0 ALFTALAT® AN 995	CRYLCOAT® 2414-0 CRYLCOAT® 2514	CRYLCOAT® 4430-0 CRYLCOAT® 630
	CRYLCOAT® 2401-2 CRYLCOAT® 3301	CRYLCOAT® 2432-0 CRYLCOAT® 2532		CRYLCOAT® 4432-4 CRYLCOAT® 632
	CRYLCOAT® 2471-4 CRYLCOAT® 7332			CRYLCOAT® 4659-0 ALFTALAT® VAN 9959
	CRYLCOAT® 2689-0 ALFTALAT® AN 989			CRYLCOAT® 4488-0 CRYLCOAT® 2988
	CRYLCOAT® 2441-2 CRYLCOAT® 441			CRYLCOAT® 4420-0 CRYLCOAT® 620
	CRYLCOAT® 2488-2 ALFTALAT® VAN 9882			
	CRYLCOAT® 2440-2 CRYLCOAT® 440			
	CRYLCOAT® 2430-0 CRYLCOAT® 430			
	CRYLCOAT® 2425-0 ALFTALAT® AN 725			
	CRYLCOAT® E37728			
180°C 356°F	CRYLCOAT® 2408-0 CRYLCOAT® 7307			
	CRYLCOAT® 2421-5 CRYLCOAT® 7321			
	CRYLCOAT® 2450-2 CRYLCOAT® 450			
160°C 320°F	CRYLCOAT® 2409-0 CRYLCOAT® 7309			
	CRYLCOAT® 2494-6 CRYLCOAT® 7394			
	CRYLCOAT® 2473-4 CRYLCOAT® 7392			
	CRYLCOAT® 2433-2 CRYLCOAT® 3232			

Typical Properties for TGIC Resins

CRYLCOAT®	Ratio	Acid #	Viscosity @ 200°C	Tg(C°)	Cure	Benefit	Flow	Weathering	Over-bake	Economics	FDA Regulated**
2401-2	93/7	33	3500	60	200°C	Flexibility	++	o	+	o	
2408-0	93/7	33	4500	55	180°C		o	o	++	o	
2409-0	93/7	33	3900	58	160°C	TMA-free	o	-	o	-	
2414-0	90/10	47	4700	57	200°C		-	-	-	-	●
2421-5	93/7	33	4500	63	180°C	For PCM applications	o	o	++	--	
2425-0	93/7	34	6200	70	200°C		-	-	+	++	●
2430-0	93/7	30	9800	69	200°C		-	o	+	o	
2432-0	96/4	20	7900	53	200°C		--	o	+	-	●
2433-2	93/7	33	3000	60	160°C		o	o	+	-	
2437-0	93/7	33	3200	62	200°C	Non-blooming	++	o	+	--	●
2440-2	93/7	33	5100	67	200°C	Workhorse	+	o	+	o	●
2441-2	93/7	33	5000	67	200°C	Workhorse	+	o	+	o	●
2450-2	93/7	33	5000	67	180°C		o	-	++	o	●
2471-4	93/7	33	3500	58	200°C	Smoothness	++	o	+	o	●
2473-4	93/7	33	3200	63	160°C	Clarity	-	o	+	o	
2488-2	93/7	34	6000	64	200°C	Suitable for matting	o	o	+	++	
2494-6	93/7	33	2800	58	160°C	Non-blooming	-	-	o	o	●
2689-0	93/7	34	4000	62	200°C	Also used with HAA	o	--	o	+	●
2695-0	95/5	25	5500	59	200°C	Also used with HAA	+	--	o	+	●
4420-0	90/10	51	5500	64	200°C		-	++	o	--	
4430-0	93/7	35	2000	62	200°C		++	++	o	-	●
4432-4	93/7	35	2300	62	200°C	Superdurable	++	++	o	--	
4488-0	93/7	30	5400	64	200°C	Best Florida data	-	++	++	-	●
4659-0	93/7	33	3600	59	200°C	Flexibility	++	+	o	+	●
E37728	93/7	34	9400	74	200°C	Storage	-	o	o	o	

++ = Outstanding + = Excellent o = Good - = Fair -- = Poor

** For a detailed description of FDA Status, please refer to page 24.

Polyester Resins for Hydroxyakyl Amide Powder Coatings

	96.5/3.5 Acid # ~25	95/5 Acid # ~33	92/8 Acid # ~50	90/10 Acid # ~70	Superdurable
	CRYLCOAT® 2695-0 ALFTALAT® AN 995	CRYLCOAT® 2618-3 CRYLCOAT® 7618	CRYLCOAT® 2671-3 CRYLCOAT® 7671	CRYLCOAT® 2621-2 CRYLCOAT® 7621	CRYLCOAT® E36988
	CRYLCOAT® 2691-2 CRYLCOAT® 491	CRYLCOAT® 2617-3 CRYLCOAT® 7617	CRYLCOAT® 2620-2 CRYLCOAT® 7620	CRYLCOAT® E37250	CRYLCOAT® 4642-3 CRYLCOAT® 7642
180°C ↕ 200°C		CRYLCOAT® 2689-0 ALFTALAT® AN 989	CRYLCOAT® E04155*	CRYLCOAT® 2626-2 CRYLCOAT® 7626	CRYLCOAT® 4659-0 ALFTALAT® VAN 9959
		CRYLCOAT® 2682-1 ALFTALAT® 03882			CRYLCOAT® 4626-0 CRYLCOAT® 2026
		CRYLCOAT® 2670-3 CRYLCOAT® 7670			CRYLCOAT® 4641-0 CRYLCOAT® 7641
		CRYLCOAT® 2698-3			CRYLCOAT® 4420-0 CRYLCOAT® 620

Cytec also offers one shot matte powder coatings for hydroxyakyl amide crosslinkers. Information on these resins can be found on pages 20-21.

* Cure Temperature from 150-160°C

Typical Properties for Hydroxyakyl Amide Resins

CRYLCOAT®	Ratio	Acid #	Viscosity @ 200°C	Tg(C°)	Cure	Benefit	Flow	Weathering	Over-bake	Economics	FDA Regulated**
2617-3	95/5	33	3500	61	180°C	TMA free	++	-	o	o	
2618-3	95/5	35	3100	61	180°C	Gas oven stabilized	+	-	+	o	
2620-2	92/8	50	4200	58	180°C	Gas oven stabilized	+	o	o	-	●
2621-2	90/10	72	4000	62	200°C	Gas oven stabilized	+	o	o	--	●
2626-2	90/10	71	9600	55	200°C		--	o	-	--	
2670-3	95/5	34	6000	64	200°C		o	-	o	o	
2671-3	93/7	47	4000	62	180°C	HAA and TGIC use	+	o	-	-	
2682-1	95/5	34	6000	64	200°C		o	-	o	o	
2689-0	95/5	34	4000	62	180°C	Workhorse	+	-	o	+	●
2691-2	97/3	21	7600	62	200°C		-	-	+	++	●
2695-0	96.5/3.5	25	5500	59	180°C	Workhorse	o	--	o	++	●
2698-3	95/5	33	3500	56	180°C	High flow	++	o	+	-	
4420-0	92/8	51	5500	64	200°C		o	++	--	--	
4626-0	92/8	50	4300 ^a	64	180°C	Storage stability	+	++	--	--	
4641-0	97/3	20	4200	60	200°C		+	++	o	o	
4642-3	95/5	35	1900	62	180°C		++	++	-	-	●
4659-0	95/5	33	3600	59	190°C		+	+	-	+	●
E36988	95/5	30	5500 ^a	54	180°C	Flexible superdurable	o	++	-	--	
E37250	90/10	70	6200 ^a	51	200°C	For very low gloss	o	o	-	--	
E04155	93/7	47	5800	58	160°C	Low cure option	o	o	o	--	

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^a Viscosity at 175°C

** For a detailed description of FDA Status, please refer to page 24.

Hydroxyl Polyester Resins for Urethane Powder Coatings

OH # 30-40		OH # ~50		OH # 80-100		OH # >200		Superdurable	
CRYLCOAT® 2890-0 CRYLCOAT® 290		CRYLCOAT® 2883-0 CRYLCOAT® 283		CRYLCOAT® 2818-0 ALFTALAT® VAN 9918		CRYLCOAT® E04076 ALFTALAT® E04076		CRYLCOAT® 4890-0 CRYLCOAT® 690	
CRYLCOAT® 2845-0 ALFTALAT® AN 745		CRYLCOAT® 2839-0 ALFTALAT® AN 739						CRYLCOAT® E04174	
CRYLCOAT® 2872-0 ALFTALAT® 03672		CRYLCOAT® E04060 ALFTALAT® E04060						CRYLCOAT® E04290	
Specialty Hydroxyl Polyester Resins, Hardeners and Additives									
Wrinkle System					NCO Hardeners				
CRYLCOAT® 2920-0 CRYLCOAT® 820					ADDITOL® P 932 ALFTALAT® XL 432				
ADDITOL® P 920 CRYLCOAT® 120					ADDITOL® P 965 ALFTALAT® XL 465				
					BECKOPOX™ EH 694 ANHYDRIDE HARDENER				

Typical Properties for Hydroxyl Resins and Hardeners

CRYLCOAT®	OH #	Viscosity @ 200°C	Tg(C°)	Cure	Benefit	Flow	Weathering	Overbake	Economics	FDA Regulated**
2818-0	100	3200	58	200°C	Chemical resistance	--	o	+	--	●
2839-0	50	5500	57	200°C	Workhorse	-	-	-	+	●
2845-0	35	7100	57	200°C	Workhorse	-	-	-	++	
2872-0	40	3700	55	200°C	Chemical resistance	o	o	o	+	
2883-0	47	4000	61	200°C	Excellent hardness	+	o	+	-	●
2890-0	30	6700	60	200°C	Workhorse	+	o	+	o	●
2920-0	33	12700	67	200°C	Wrinkle	--	o	o	-	●
4890-0	30	5000	58	200°C	Outstanding smoothness	++	++	+	-	●
E04060	50	3500	52	200°C	One shot matte	o	o	o	-	
E04076	280	4000	60	200°C	One shot matte	--	o	o	--	
E04174	290	3000	52	200°C	Anti-graffiti	--	++	--	--	
E04290	30	5500	56	200°C	One shot matte w/E04174	++	++	o	--	
ADDITOL®	OH #	NCO %	Tg(C°)		Benefit	Flow	Weathering	Overbake	Economics	
P 920	42	NA	58		Wrinkle	--	o	o	o	
P 932	NA	9-10	62		Not on DSL	+	o	o	-	
P 965	NA	16-17	62		Aromatic urethane	-	--	+	-	
BECKOPOX®	Acid #		MP(C°)	Cure	Benefit	Flow	Weathering	Overbake	Economics	
EH 694	31		50-60	NA	Chemical resistance	o	o	-	o	

++ = Outstanding + = Excellent o = Good - = Fair -- = Poor

** For a detailed description of FDA Status, please refer to page 24.

Resins for Low Temperature Cure Powder Coatings

Cytec is dedicated to finding new applications for powder coating resins. Since many materials are sensitive to heat, standard thermoset powder coatings cannot be used. Cytec has products that can be used in low temperature thermoset coatings as well as UV powder coatings. These technologies offer the following advantages compared to standard thermoset coatings:

- Cost savings during application by using less energy
- The most environmentally friendly coatings on the market

- Expanding the reach of powder into temperature sensitive substrates such as wood, plastic, and paper

This portfolio represents low temperature cure offerings across three product lines: CRYLCOAT® polyester resins for thermoset powder coatings, UVECOAT® resins for UV powder coatings, and ADDITOL® catalyst masterbatches that can lower the cure time and temperature of thermoset powder coatings.

Metal Applications	MDF/Wood Applications	PVC Applications	Toner Applications	Additives
CRYLCOAT® 1680-6 CRYLCOAT® 380	CRYLCOAT® E37704	UVECOAT® 3003	UVECOAT® T37621	ADDITOL® P 964 CRYLCOAT® 164
CRYLCOAT® 2409-0 CRYLCOAT® 7309	UVECOAT® 3002			ADDITOL® P 963 CRYLCOAT® 165
CRYLCOAT® 2494-6 CRYLCOAT® 7394	UVECOAT® 3005			ADDITOL® P 966 CRYLCOAT® 166
CRYLCOAT® 2473-4 CRYLCOAT® 7392				UVECOAT® 9010
CRYLCOAT® 2433-2 CRYLCOAT® 3232				UVECOAT® 9539
UVECOAT® 2100				
UVECOAT® 2200				

Typical Properties for Low Temperature Cure Powder Coating Resins

Product	Viscosity (Temp.)	Tg(C°)	Product Use
Thermal Cure			
ADDITOL® P963	3400 (200°C)	NA	Catalyst for use in pigmented hybrid and TGIC coatings
ADDITOL® P964	3200 (200°C)	NA	Catalyst for use in pigmented hybrid and TGIC coatings
ADDITOL® P966	1900 (200°C)	NA	Catalyst for use in superdurable pigmented TGIC coatings
CRYLCOAT® 1680-6	10500 (175°C)	50	60/40 hybrid resin that can cure down to 150°C
CRYLCOAT® 2409-0	3900 (200°C)	NA	Smoothest TGIC resin for cure at 160°C and lower
CRYLCOAT® 2494-6	2800 (200°C)	60	Non-blooming TGIC resin for cure at 160°C and lower
CRYLCOAT® 2473-4	3200 (200°C)	49	160°C TGIC resin for use in clear powder coatings
CRYLCOAT® 2433-2	3000 (200°C)	57	Workhorse resin that can cure at 160°C
CRYLCOAT® E37704	5000 (200°C)	50	50/50 hybrid that can cure as low as 120°C
UV Cure			
UVECOAT® 2100	5500 (200°C)	57	Exterior durable UV powder resin for use in clear and pigmented coatings
UVECOAT® 2200	4500 (200°C)	54	Superdurable UV powder resin that can achieve 1000+ hours corrosion resistance
UVECOAT® 3002	4500 (175°C)	49	For MDF and wood substrates. Can be used for clear and pigmented systems. Excellent chemical resistance and improved UV resistance
UVECOAT® 3003	3200 (175°C)	49	Improved chemical and abrasion resistance with good flexibility for indoor PVC applications
UVECOAT® 3005	4000 (200°C)	48	General purpose grade for MDF and wood applications. Good chemical resistance
UVECOAT® 9010	350 (100°C)	85*	Semi-crystalline unsaturated additive to improve smoothness and flexibility
UVECOAT® 9539	4000 (200°C)	44	For use with Uvecoat 2100 to provide excellent adhesion to various metal substrates
UVECOAT® T37621	5200 (200°C)	51	Unsaturated resin that combines high reactivity and high Tg for toners

Masterbatches and Additives for Powder Coatings

Catalysts	Flow Promoters	Flow Aids	Tribo
<p>ADDITOL® P 964 CRYLCOAT® 164</p>	<p>ADDITOL® P 896 ADDITOL® XL 496</p>	<p>MODAFLOW® POWDER III</p>	<p>ADDITOL® P 950 CRYLCOAT® 150</p>
<p>ADDITOL® P 963 CRYLCOAT® 165</p>	<p>ADDITOL® P 824 ADDITOL® VXL 9824</p>	<p>MODAFLOW® POWDER 2000</p>	
<p>ADDITOL® P 966 CRYLCOAT® 166</p>	<p>ADDITOL® P 820 ADDITOL® VXL 9820</p>	<p>MODAFLOW® POWDER 6000</p>	
	<p>ADDITOL® P 891 ADDITOL® VXL 9991</p>		
Acrylic Hardener		Crystalline	
	<p>ADDITOL® P 791 ADDITOL® VXL 1381</p>	<p>CRYLCOAT® 8079-0 CRYLCOAT® E36079</p>	
	<p>BECKOPOX™ EH 694 ANHYDRIDE HARDENER</p>		
	<p>SYNTHACRYL® 700 MATting AGENT</p>		

Typical Properties for Masterbatches and Additives

ADDITOL®	Acid/ OH #	Viscosity @ 200°C	Tg(C°)	% Active	Used For	Flow	Catalyst	Tribo	Acrylic
P 791	Acid # 317	NA	NA	NA	Acrylic coatings				●
P 820	Acid # 34	3000	60	10	Pigmented coatings	●			
P 824	OH # 45	1400	49	15	Pigmented coatings	●			
P 827	NA	2200 ^a	57	15	Acrylic coatings	●			●
P 891	Acid # 35	2300	56	5	Clear coatings	●			
P 896	OH # 35	1700	57	15	Durable coatings	●			
P 950	OH # 28	8000	NA	5	All coatings			●	
P 963	Acid # 33	3400	NA	5	Hybrid and TGIC systems		●		
P 964	Acid # 33	3200	NA	5	Hybrid and TGIC systems		●		
P 966	Acid # 35	1900	NA	5	Superdurable TGIC systems		●		
MODAFLOW®	Activity %	Volatile loss %	Density (g/cm ³)		Description				
Powder III	Min. 65	Max. 4	0.58 - 0.64		Addition of 0.6-1.5% of the total formulation FDA listed monomers				
Powder 2000	Min. 65	Max. 4	0.58 - 0.64		Addition of 0.6-1.5% of the total formulation Excellent flow, gloss, and DOI				
Powder 6000	Min. 65	Max. 4	0.58 - 0.64		Addition of 0.6-1.5% of the total formulation Excellent flow and gloss Lessens cross-contamination issues				
SYNTHACRYL®	Epoxy EEW	Viscosity @ 200°C	Tg(C°)		Description				
700	714	40000	80		Glycidal poly acrylic for use as a matting hardener Only available in Latin America				
CRYLCOAT®	Acid #	Viscosity @ 200°C	Melt Point (C°)		Benefit	Flow	Weathering	Overbake	Economics
8079-0	20	~8000	82		Flexibility with superdurables	++	+	-	-
BECKOPOX®	Acid #		MP(C°)	Cure	Benefit	Flow	Weathering	Overbake	Economics
EH 694	31		50-60	NA	Chemical resistance	o	o	-	o

++ = Outstanding + = Excellent o = Good - = Fair --- = Poor
^a Viscosity at 175°C

Flow Additive Selection for Powder Coatings

MODAFLOW® Powder Flow Modifiers and ADDITOL® Masterbatch Flow Additive Applications

Powder System	MODAFLOW® Powder III	MODAFLOW® Powder 2000	MODAFLOW® Powder 6000	ADDITOL® P 896
Epoxy	●●	●	●	
Epoxy-Acrylic Hybrid	●	●	●	
Epoxy-Polyester Hybrid	●●	●●	●●	●●
Polyester TGIC	●	●●	●●	●●
Polyester Glycidylester	●	●●	●	●
Polyester Hydroxyakyl Amide	●	●	●	●
Acrylic Urethane	●●	●●	●	
Polyester Urethane	●	●●	●●	●●
Glycoluril	●	●●	●●	●●
Melamine	●●	●●	●●	●●
Glycidyl Methacrylate	●	●	●	
FDA Applications	●●	●	●	●

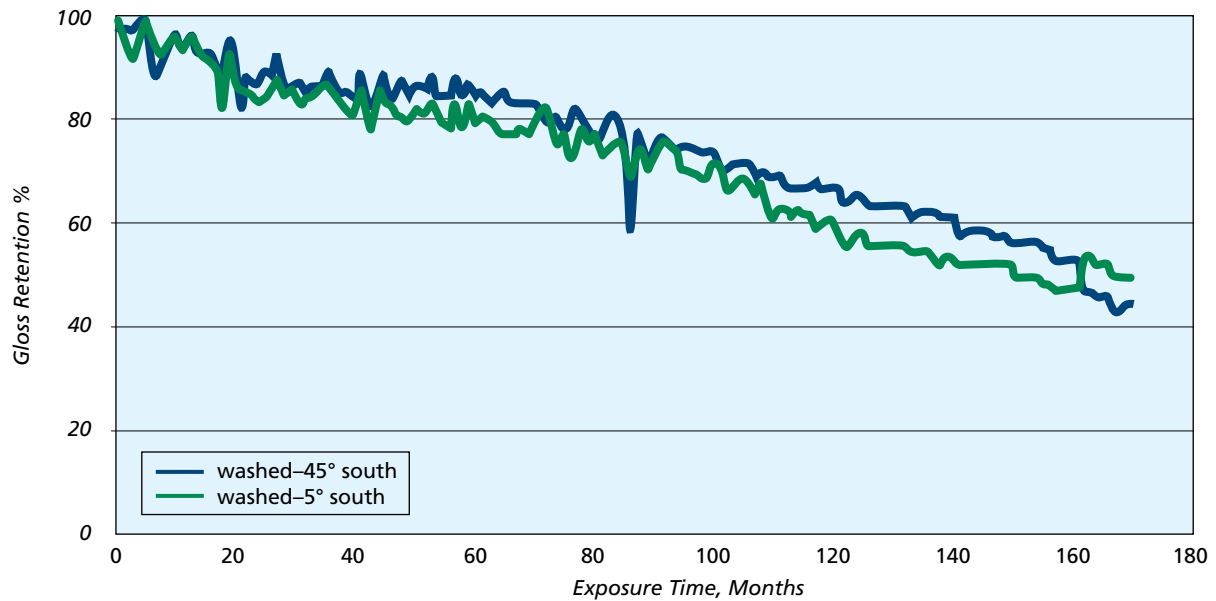
MODAFLOW® and ADDITOL® Product Performance Suggestions

Performance Requirement	MODAFLOW® Powder III	MODAFLOW® Powder 2000	MODAFLOW® Powder 6000	ADDITOL® P 896
Gloss	●	●●	●●	●
DOI, Reduce Orange Peel	●	●●	●	●
Leveling	●	●●	●●	●
Crater Control	●●	●	●	●●
Pinhole Elimination	●●	●	●	●●
De-air/Defoaming	●●	●	●	●●
Surface Wetting	●	●	●	●
Slip & Mar Resistance		●	●	
Adhesion-substrate/Intercoat	●	●	●●	●●
Recoatibility	●	●	●●	●●
Robust/Cross-compatibility	●	●	●●	●
Special Textures	●	●●	●	●
Clarity	●	●●	●	●

● Recommended ●● Highly Recommended

	TGIC	HAA High Gloss	HAA Low Gloss	Urethane
Flow ↑	CRYLCOAT® 4430-0	CRYLCOAT® E36988	CRYLCOAT® 4641-0	CRYLCOAT® 4890-0
	CRYLCOAT® 4432-4	CRYLCOAT® 4659-0	CRYLCOAT® 4420-0	CRYLCOAT® E04290
	CRYLCOAT® 4659-0	CRYLCOAT® 4642-3	CRYLCOAT® E04229	CRYLCOAT® E04174
	CRYLCOAT® 4488-0	CRYLCOAT® 4626-0	CRYLCOAT® E04251	
	CRYLCOAT® 4420-0		CRYLCOAT® E04193	
			CRYLCOAT® E04245	

13+ Years of Superdurable Florida Exposure – CRYLCOAT® 4488-0 in a Green Powder Formulation with TGIC



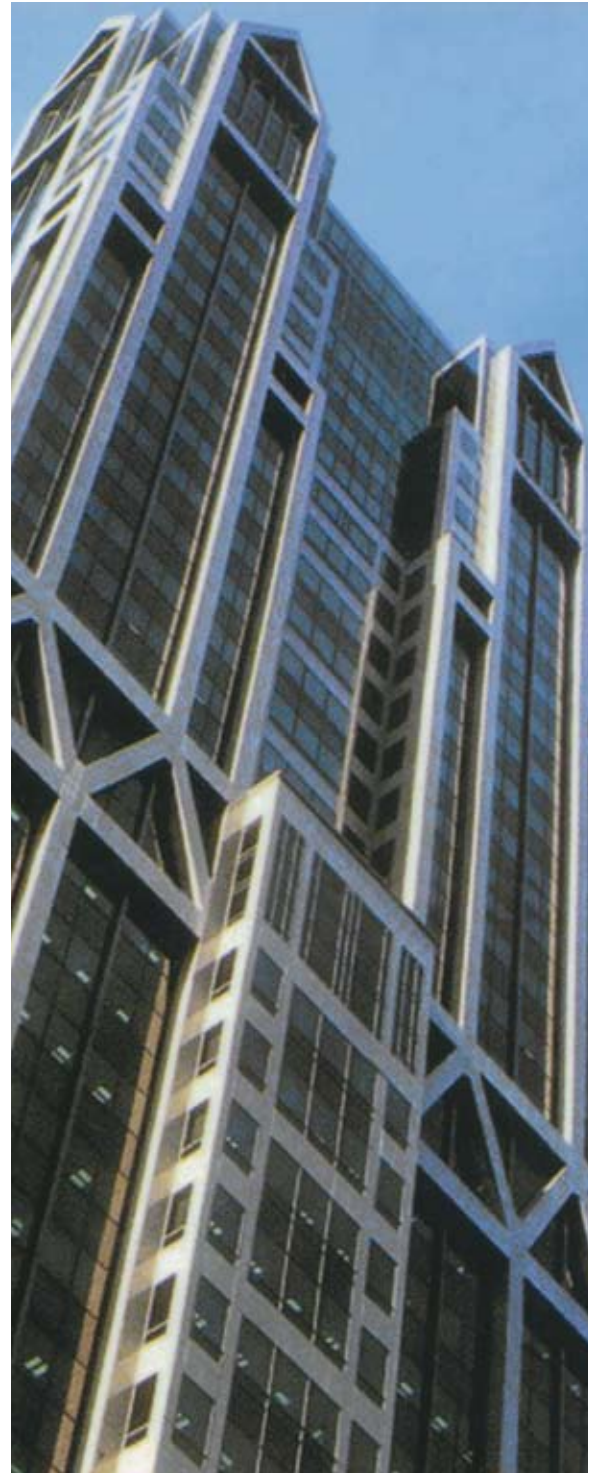
Most decorative powder coating applications require a high gloss. However, in some industries, like automotive and architecture, a lower gloss is preferred. Gloss is determined by the amount of light that is reflected back to the light source after it has been exposed to the coating. The chart below illustrates the labeling system for various gloss levels employed in the coatings industry as well as the gloss reading needed to qualify for each type of gloss.

Degree of Matting	
Designation	60° Gloss Range
Dead (Dull Matte)	<10%
Matte	10-25%
Semi Matte	25-45%
Semi Gloss	40-75%
Gloss	75-90%
High Gloss	>90%

Cytec has engineered resins to achieve lower glosses while giving the customer the properties that are required for their application. This is achieved in one of two ways:

1. Through blending two separate powders that are made with differing acid/OH numbers called matte dry blending.
2. Coextruding two resins of differing acid/OH numbers at the same time called one shot matte.

These resins are listed on pages 19-21.



Dry Blend Gloss Control Systems for Powder Coatings

	HAA Standard	HAA Superdurable	TGIC Standard	TGIC Superdurable
<i>Semi-Gloss</i>	CRYLCOAT® 2622-2 Acid # 21			CRYLCOAT® 4430-0 Acid # 33
	CRYLCOAT® 2620-2 Acid # 50			CRYLCOAT® 4420-0 Acid # 51
	Gloss from 30-40			Gloss from 40-50
<i>Semi-Matte</i>	CRYLCOAT® 2670-3 Acid # 34			
	CRYLCOAT® 2671-3 Acid # 47	CRYLCOAT® 4641-0 Acid # 20	CRYLCOAT® 2414-0 Acid # 47	
	Gloss from 32-36	CRYLCOAT® 4420-0 Acid # 51	CRYLCOAT® 2432-0 Acid # 20	
	CRYLCOAT® E37250 Acid # 70	Gloss from 25-35	Gloss from 25-40	
	CRYLCOAT® 2670-3 Acid # 20			
	Gloss from 25-35			
<i>Matte</i>	CRYLCOAT® 2691-2 Acid # 21			
	CRYLCOAT® 2621-2 Acid # 72			
	Gloss from 20-30			

Note: The resin information for these products are located in the "TGIC Resin Properties" on page 7 and "Hydroxyakyl Amide Resin Properties" on page 9.

One-Shot Gloss Control Systems for Powder Coatings

	Urethane Standard	Urethane Superdurable	HAA Standard	HAA Superdurable
<i>Semi-Matte</i>			CRYLCOAT® E04235 Acid # 85	CRYLCOAT® E04245 Acid # 90
			CRYLCOAT® E04238 Acid # 34	CRYLCOAT® E04229 Acid # 33
			Gloss from 25-40	Gloss from 25-40
<i>Matte</i>				
	CRYLCOAT® E04076 OH # 280	CRYLCOAT® E04174 OH # 290		
	CRYLCOAT® E04060 OH # 50	CRYLCOAT® E04290 OH # 30		
	Gloss from 8-30	Gloss from 8-30		
			CRYLCOAT® E04187 Acid # 90	CRYLCOAT® E04193 Acid # 90
<i>Dull Matte</i>			CRYLCOAT® E04211 Acid # 25	CRYLCOAT® E04251 Acid # 25
			Gloss from 6-16	Gloss from 6-16

One-Shot Gloss Control System Properties

CRYLCOAT®	Acid #	OH #	Viscosity @ 200°C	Tg(C°)	Description
E04060	1	50	3500	52	Polyester urethane durable system that achieves a gloss range from 8-30%
E04076	5	280	4000	60	
E04290	3	30	5500	56	Polyester urethane superdurable system that achieves a gloss range from 8-30%
E04174	5	290	3000	52	
E04211	25	3	5500	58	Polyester-HAA durable system that achieves a gloss range from 6-16%
E04187	90	5	3500	58	
E04235	85	5	3000	57	Polyester-HAA durable system that achieves a gloss range from 25-40%
E04238	33	1	5500	62	
E04193	85	5	3000	57	Polyester-HAA superdurable system that achieves a gloss range from 6-16%
E04251	21	1	4000	59	
E04229	32	2	2200	59	Polyester-HAA superdurable system that achieves a gloss range from 25-40%
E04245	85	5	4300	59	

Higher Tg

Clearcoats

Hybrids		TGIC		TGIC	
CRYLCOAT® 1627-0 60/40 ratio (62°C)		CRYLCOAT® 2425-0 93/7 ratio (70°C)		CRYLCOAT® 4432-4 Cure @ 200°C	
CRYLCOAT® 1781-0 70/30 ratio (60°C)		CRYLCOAT® E37728 93/7 ratio (70°C)		CRYLCOAT® 2471-4 Cure @ 200°C	
		CRYLCOAT® 2430-0 93/7 ratio (69°C)		CRYLCOAT® 2473-4 Cure @ 160°C	
		CRYLCOAT® 2490-0 93/7 ratio (69°C)			
Next Generation Hybrid [NGH] Resins					
50/50	60/40	70/30	80/20		
CRYLCOAT® 1573-0 Cure @ 180°C	CRYLCOAT® 1626-0 Cure @ 180°C	CRYLCOAT® 1771-0 Cure @ 180°C	CRYLCOAT® E04143 Cure @ 200°C		
CRYLCOAT® 1593-0 Cure @ 160°C	CRYLCOAT® 1627-0 Cure @ 180°C	CRYLCOAT® 1781-0 Cure @ 180°C			
	CRYLCOAT® E04236 Cure @ 170°C	CRYLCOAT® 1750-0 Cure @ 160°C			

	Flow	Chemical Resistance	Overbake Resistance	Hardness
<i>Hybrid</i>	CRYLCOAT® 1671-0	CRYLCOAT® 1506-0	CRYLCOAT® 1514-0	CRYLCOAT® 1658-5
<i>TGIC</i>	CRYLCOAT® 2437-0	CRYLCOAT® 2490-0	CRYLCOAT® 2490-2	CRYLCOAT® 2414-0
<i>HAA</i>	CRYLCOAT® 2698-3	CRYLCOAT® 2671-0	CRYLCOAT® 2618-3	CRYLCOAT® 2626-2
<i>Urethane</i>	CRYLCOAT® 2883-0	CRYLCOAT® E04174	CRYLCOAT® 2890-0	CRYLCOAT® E04076
	Low Temperature Cure	Weathering Resistance (Florida Exposure)	Storage Stability	Non-Blooming
	CRYLCOAT® E37704 Hybrid – Cure @ 140°C	CRYLCOAT® 4488-0 (13 years)	CRYLCOAT® 1627-0	CRYLCOAT® 1750-0
	CRYLCOAT® 1680-6 Hybrid – Cure @ 150°C	CRYLCOAT® 4430-0 (11 years)	CRYLCOAT® 1781-0	CRYLCOAT® 2494-6
	CRYLCOAT® 2494-6 TGIC – Cure @ 160°C	CRYLCOAT® 4890-0 (10 years)	CRYLCOAT® 2425-0	CRYLCOAT® 2437-0
	CRYLCOAT® E04155 HAA – Cure @ 160°C	CRYLCOAT® 4659-0 (8 years)	CRYLCOAT® 2490-0	CRYLCOAT® 4659-0

Regarding the use of Cytec polyester resins and additives in FDA applications:

The Cytec Product Stewardship and Regulatory Affairs department can provide a certification letter verifying which CRYLCOAT® resins may be used in contact with food. The certificate for CRYLCOAT® resins is limited for applications to articles used in repeated-use applications such as: kitchen appliances, refrigerator shelving, commercial food processing equipment, potable water tanks and food-preparation surfaces.

This provision holds true if the coatings are not used in contact with alcoholic foods and beverages and these coatings meet applicable end tests identified in 21 C.F.R. § 175.300 (c). The following table lists CRYLCOAT® resins that may be used in the type of repeated-use applications described here in full compliance with the Federal Food, Drug, and Cosmetic Act and all applicable regulations regarding food contact coatings, including 21 C.F.R. § 175.300 (“Resinous and polymeric coatings”).

CRYLCOAT® Polyester Resins that Qualify Under 21 C.F.R. § 175.300

50/50 Hybrids	60/40 Hybrids	70/30 Hybrids	TGIC Resins	HAA Resins	OH Resins
1510-0	1620-0	1701-0	2414-0	2620-2	2818-0
1514-2	1622-0	1702-0	2425-0	2621-2	2839-0
1540-0	1626-0	1721-0	2432-0	2689-0	2883-0
1544-4	1627-0	1750-0	2437-0	2691-2	2890-0
1573-0	1660-0	1770-0	2440-2	2695-0	2920-0
	1671-0	1771-0	2441-2	4642-3	4890-0
	E04236	1783-0	2450-2	4659-0	
			2471-4		
			2494-6		
			4430-0		
			4488-0		

Cytec Powder Coating Additives that Qualify For C.F.R. Title 21

MODAFLOW® and ADDITOL® powder products may be used in certain indirect food applications. These applications are regulated by the U.S. Food and Drug Administration (FDA), under Title 21 of the Code of Regulations, CFR sections listed here:

Product	175.105	175.300	177.1010
MODAFLOW® Powder III	Yes	Yes	Yes
MODAFLOW® Powder 2000	Yes	Yes*	Yes
MODAFLOW® Powder 6000	Yes	Yes	Yes
ADDITOL® P 896	Not determined	Yes	Not determined

* Provided the can coating complies with end test specifications of both 175.300 and 177.1010

Toxicity

CRYLCOAT® polyester products are solid, non-flammable resins with minimal toxicity. MODAFLOW® 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 ground 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®, SYNTHACRYL®, and ADDITOL® 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 40°F (4°C) and 100°F (38°C). 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 or 1,000 kg are available upon request. MODAFLOW® powder products are typically provided in 150 lb (68 kg) fiber drums. Upon special request, 1,000 lb (454 kg) polypropylene bulk bags are available.



2 Glossary of Terms

Key Word	Description
Acid Value	The amount of KOH, reported in mg, necessary to neutralize the acid functional groups in 1 gram of polyester
Blooming	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
Curing Temperature	The metal or object temperature required to fully cure the powder coating system in 10 minutes
Florida Exposure	Standard outdoor exposure test to approximate the natural weathering performance of a coating under severe conditions. The test panels are exposed in south Florida
Glass Transition Temperature (Tg)	The characteristic temperature in °C of an amorphous polymer corresponding to the change from a solid to liquid state as measured by DSC
Gloss	Degree to which a surface reflects light
Hydroxyl Value	The amount of KOH, reported in mg, equivalent to the hydroxyl content of 1 gram of polyester
Hardener	Powder coating raw material that reacts with polyester resin to create cured coating
Matte	A coating surface that inconsistently reflects light to the eye. This causes coating to have non-glossy appearance
Overbake Resistance	Ability of powder coating to withstand high or extended heating with minimal change
Polyester:Hardener Ratio	Weight ratio between the polyester resin and the hardener recommended for optimal properties
Semi Crystalline	Amorphous resins with crystalline functionality to allow for coatings with better flow
Storage Stability	The ability of powder coatings to maintain uniform powder flow properties after being subjected to a specified storage condition
Superdurable	A polyester resin that exhibits extended outdoor weathering characteristics, typically maintaining >50% gloss after 5 years
Viscosity	The melt viscosity of the polymer, measured with a Brookfield ¹ viscometer in mPa.s at a specified temperature
Wetting	The ability of a raw material to incorporate into the finished powder coating during processing. Can also refer to the ability of the coating to flow out the substrate
Wrinkle	A unique, special effect finish characterized by closely associated ridge-like structures

¹ Trademark of Brookfield Engineering Laboratories

Product Designation	Supplier
Acrylic Powder Coating Resin	Cytec
Acrylic Resin – Additive	Cytec
Alftalat® Resin	Cytec
Additol® Resin	Cytec
Beckopox™ Resin	Cytec
Beta Hydroxyakyl Amide	EMS, Evonik, and other suppliers
Carboxyl Polyester Resin	Cytec
Crylcoat® Resin	Cytec
Epoxy Powder Resin	Dow, Huntsman, and other suppliers
Glycoluril Resin	Various
Hydroxyakyl Amide	EMS, Evonik, and other suppliers
Hydroxyl Polyester Resin	Cytec
Modaflow® Powder	Cytec
Polyester Resin	Cytec
Polyanhydride Hardener	Cytec
Polyurethane Hardener	Cytec or Degussa
Superdurable Resin	Cytec
Synthacryl® Resin	Cytec
TGIC (triglycidyl isocyanurate)	Huntsman
Uvecoat® Resin	Cytec
Viaktin™ Resin	Cytec