CYTEC

Resins and Additives for the Coating of Plastic

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, plastics and water treatment.

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.

Contents

Introduction – A Myriad of Solutions...

...for a myriad of substrates collectively known as "plastic"

As with all substrates, the reasons for coating plastic ultimately come down to protection and decoration. For protection the coating must have specific adhesion and durability characteristics. For decoration, it means reproducible levels of gloss, colour, haptics, filling capability, leveling and flow. However, unlike many other substrates, it is possible to produce these without the need to coat. With that in mind it is reasonable to ask the question why coat plastic?

One overriding factor has to be in the desire to add value in the form of aesthetic appeal!

At **Cytec** we believe the utilization of a coating brings ***added value and luxury*** to an otherwise relatively cheaply perceived plastic component or article.

The choice of coating and therefore the choice of resin, for a particular plastic substrate, depends on the exact nature of the substrate itself, the specific application involved, as well as the technical requirements at play. Herein lies the main challenge for the plastic coating formulator as there is a myriad of plastics (and blends of plastic) which require coating in todays market for use in an equally broad range of applications.

Commonly used plastic substrates are thermosets such as SMC, BMC & GRP or thermoplastics such as ABS, PMMA, PVC, HIPS, PPO/PPE, PC, PA, PP, PBT, or blends thereof. Interestingly the continued escalation in substrates is not driven so much by new polymers as by the ever more varied blending of existing types. It is worth noting even a small change in blend ratio can have a significant effect on the adhesion characteristics of the coating employed.

Typical areas of application for coated plastic are automotive bodies and components (both interior and exterior), electronics, industrial vehicles and machinery, appliances, furniture, sports goods, packaging, flooring, CD/DVD and fabrics.

With such a wide variety of application areas and substrate characteristics, the coating formulator is faced with an array of performance requirements which cannot possibly be met by one coating system. For that reason many coating technologies are commonly used today for coating plastic.

At **Cytec** we have an outstanding and broad range of conventional, water-based, radiation curing and powder resins as well as additives designed for use in the coating of plastics. As ***an innovation leader in Coating Resins and Additives*** we continue to innovate and develop new coating solutions to help you succeed.

The tables in this brochure are set out to illustrate this product range and provide some general guidance on technical parameters of specific grades which we hope will assist in the selection of the right solution for you. Therefore we are confident that **Cytec** has the best resin technology from which you can produce the optimum plastic coating, specific to the particular substrate and application requirements at hand.

So let us help you forget it's plastic…

6 Water-based and Solvent-based Resins

Within our broad range of liquid coating resins there are a number of products – both water- and solvent-based – which are particularly suited for formulating plastic coatings. The table below summarizes these and gives some data on the coated resin characteristics in terms

Products	Curing cond.		Drying time at ambient temp. [h]	Physically drying	Self-X-linking	Isocyanate-X-linking	Shear stability	Humidity resistance	Hardness	Scratch resistance	Flexibility	Chemical resistance (EtOH-DR)	Interior / exterior (as coating system)	Main application			
	Ambient temp. / 40 – 70rH	80 °C / 30min												Primer	Basecoat	Topcoat	Clearcoat
W/b Polyurethane Dispersions *DAOTAN*®																	
DAOTAN VTW 1210/40WANMP	●	●	>8	●		●	●	●●	●●●●	●●●	●●●	<10	I/E	●		●	●
DAOTAN VTW 1225/40WA	●	●	<8			●	●	●●●●	●●●	●●●	●●●●	>1000	I/E	●		●	●
DAOTAN VTW 1235/36WANMP	●	●	<5	●			●	●●	●●		●●●●	<10	I/E	●			
DAOTAN VTW 1236/40WANMP	●	●	>8	●			●	●●	●		●●●●	<100	I/E	●	●		
DAOTAN VTW 1237/32WANMP	●	●	<8	●			●	●●	●		●●●●	<10	I/E	●	●		
DAOTAN VTW 1262/35WA	●	●	>8	●		●	●	●●	●		●●●●	<10	I/E	●	●		
DAOTAN VTW 1265/36WA	●	●	<1	●	●		●	●●●●	●●●●	●●●	●●●	<100	I/E	●		●	●
DAOTAN VTW 1267/36WA	●	●	<1	●	●		●	●●	●●●		●●●	<10	I/E	●	●		
DAOTAN VTW 1270/40WANMP	●	●	<5	●		●	●	●●●●	●●●●	●●●●	●●●	<100	I/E	●		●	●
DAOTAN VTW 2229/40WANMP		●	<5			●	●	●●●●	●●●		●●●	<500	I/E	●			
DAOTAN VTW 2275/32WA	●	●	<5	●		●	●	●●●●	●●		●●●●	>1000	I/E	●	●		
DAOTAN TW 6431/45WA	●	●	<1	●		●	●	●●●	●	●●●	●●●●●	<500	I/E	●		●	
DAOTAN VTW 6462/36WA	●	●	<1	●	●	●	●	●●●●	●●●		●●●	<500	I/E	●	●		
DAOTAN VTW 6463/36WA	●	●	<1	●		●	●	●●●●	●●●		●●●	<100	I/E	●	●		
DAOTAN TW 6472/45WA	●	●	<1			●	●	●●●●	●	●●●●	●●●●	>1000	I/E			●	●
W/b Polyester Resins *RESYDROL*®																	
RESYDROL VAN 6113w/42WALG		●	>8	●			●	●●	●●●●	●●●●	●●●	<500	I	●	●	●	●
RESYDROL AY 241w/40WA	●		<5	●	oxid.		●	●●●	●●●		●●	<100	I/E	●			
RESYDROL AZ 6608w/43WA		●	<8			●	●	●●●●	●●	●●●●	●●●●	>1000	I/E			●	●
W/b Acrylic Emulsions *VIACRYL*®																	
VIACRYL VSC 6295w/45WA	●	●	<1	●	●		●	●●●	●●●●	●●●	●●	<500	I/E	●		●	●
VIACRYL VSC 6265w/40WA	●	●	<1	●			●	●●	●●●	●●	●●	<10	I/E	●		●	●
VIACRYL VSC 6288w/35WA	●	●	<1			●	●	●●●●	●●●		●●●	<1000	I/E	●			
W/b Acrylic Emulsions *MACRYNAL*®																	
MACRYNAL VSM 2521w/42WAB	●	●	<5			●	●	●●●●●	●●●●●	●●●●	●	>1000	I/E			●	●
MACRYNAL VSM 6285w/43WABDG	●	●	<5			●	●	●●●●●	●●●●	●●●●	●●	>1000	I/E			●	●
MACRYNAL VSM 6299w/42WA	●	●	<5			●	●	●●●●●	●●●●	●●●●	●	>1000	I/E			●	●
MACRYNAL SM 6810w/42WA	●	●	<5			●	●	●●●●●	●●●●	●●●●	●	>1000	I/E			●	●

* Adhesion on PP can be achieved only after pre-treatment: flaming, plasma-, corona pre-treatment
*1 in combination with ***DAOTAN VTW 1225/40WA***,

of curing mechanism and conditions, coating properties, main application layer as well as resin specification. We also provide a brief guide in terms of direct adhesion onto specific plastic types.

Resins specification data								Substrate / Direct adhesion								
PUD (NCO-Type)	Basic polymer	NV [%w/w]	% Solvent / Co-Solvent type	% / Neutralizing agent/type	Dynamic viscosity at 23 °C [mPa.s] (DIN EN ISO 3219)	pH (DIN ISO 976)	OH number [mg KOH/g NVC] (DIN EN ISO 4629)	ABS	PA6	PC	PMMA	PP (*pre-treatment)	PS	PVC	Rubber	UP/FRP
Aliph.	PE	40	13,2/NMP	1,2/TEA	50–800	7,0–8,0	–	✓	✓	✓				✓		
Aliph.	PE	40	6,5/NMP	1,9/DMEA	100–800	6,7–7,7	47	✓	✓	✓		✓		✓		✓
Arom.	PE	36	13,6/NMP	0,9/TEA	10–400	7,0–8,5	–	✓	✓	✓		✓		✓		
Aliph.	PC	40	14,7/NMP	1,1/TEA	1000–2000	7,0–9,0	–	✓		✓		✓		✓		
Aliph.	PE	32	12/NMP	0,75/TEA	10–60	7,3–8,6	–	✓	✓	✓		✓		✓		
Aliph.	PC	35	–	0,5/DMEA	5–50	7,5–8,4	32	✓		✓	✓					
Aliph.	PE	36	–	0,9/DMEA	10–150	7,0–8,0	24	✓	✓	✓	✓	✓		✓		
Aliph.	PE	36	–	0,9/DMEA	20–400	7,0–8,0	11	✓		✓				✓		
Aliph.	PE	40	8,3/NMP	2,5/DMEA	1000–3000	6,5–7,0	66	✓	✓			✓		✓		
Arom.	PE	40	8,2/NMP	2,1/DMEA	500–1200	7,0–7,6	43	✓	✓			✓		✓		✓
Aliph.	PE	32	6,7/NMP	0,75/TEA	2–50	6,8–9,5	–			✓		✓		✓		
Aliph.	PBD	45	–	1,2/TEA	50–1500	8,0–9,0	–								✓	
Aliph.	PE	36	–	0,8/DMEA	25–120	7,4–8,4	36	✓	✓	✓	(✓)	✓		✓		✓
Aliph.	PE	36	–	0,8/DMEA	50–500	7,4–8,4	36	✓	✓	✓	✓	✓		✓		✓
Aliph.	PC/PBD	45	–	0,6/TEA; 0,5/DMEA	200–2000	6,7–7,7	12	✓		✓					✓	✓
–	PE	42	11/LG	Na	500–3000	3,0–5,0	25	✓	✓	✓			✓	✓		
–	AC/AK	40	6,4 BG	0,4 / NH3	3000–6000	8,0–9,5	–	✓	✓	✓			✓	✓		
–	PE	43	5/LG	1,1/DMEA	100–1500	7,5–8,5	160	✓		✓				✓		
–	AC	45	–		30–200	6,5–7,8				✓						
–	AC	40	–	0,1/NH3	200–1300	8,0–9,0		✓		✓	✓			✓		
–	AC	35	4/BG		20–90	7,4–8,1	65	✓*1	✓*1	✓*1		✓*1		✓*1		✓*1
–	AC	42	7/Bu	1,8/DMEA	1000–4000	7,6–8,0	140							✓		✓
–	AC	43	7,4/LG	2,2/DMEA	400–2000	8,0–9,5	110					(✓)				✓
–	AC	42	4/LG	1,3/DMEA	800–4000	7,0–8,5	135			(✓)				✓		✓
–	AC	42	5/BP	1,2/DMEA	200–1200	8,2–9,0	140			✓		✓		✓		✓

Water-based and Solvent-based Resins
(continued)

Products	Curing cond.		Drying time at ambient temp. [h]	Physically drying	Self-X-linking	Isocyanate-X-linking	Shear stability	Humidity resistance	Hardness	Scratch resistance	Flexibility	Chemical resistance (EtOH-DR)	Interior /exterior (as coating system)	Main application			
	Ambient temp. / 40 – 70rH	80 °C / 30min												Primer	Base coat	Top coat	Clear coat
S/b Acrylic Resins *MACRYNAL*®																	
MACRYNAL SM 516/70BAC	●	●	>8			●		●●●●●	●●●●●	●●●●●	●	>1000	I/E			●	●
MACRYNAL SM 518/55LG	●	●	<8			●	●	●●●●●	●●●●●	●●●●●	●	>1000	I/E			●	●
MACRYNAL SM 540/60X	●	●	>8			●	●	●●●●●	●●●●	●●●●	●●	>1000	I/E	●	●	●	●
MACRYNAL VSM 2570/70BAC	●	●	>8			●	●	●●●●●	●●●●	●●●●	●●	>1000	I/E	●		●	●
S/b Acrylic Resins *VIACRYL*®																	
VIACRYL SC 133/45WS	●	●	<1	●			●	●●●●●	●●●	●●●	●●●	<100	I/E	●		●	●
VIACRYL SC 200/40X	●	●	<1	●			●	●●●●●	●●●●		●●●	<10	I	●			
VIACRYL SC 262/41XIBAC	●	●	<1	●		●	●	●●●●●	●●●●	●●●●	●●●	<100	I/E	●	●	●	●
VIACRYL VSC 5709/50BAC	●	●	<1	●			●	●●●●●	●●●●●	●●●●	●	>1000	I/E	●		●	●
VIACRYL VSC 5741/50XMPAC	●	●	<1	●			●	●●●●●	●●●●	●●●	●●	<10	I/E	●		●	●

* Adhesion on PP can be achieved only after pre-treatment: flaming, plasma-, corona pre-treatment

Resins specification data								Substrate / Direct adhesion								
PUD (NCO-Type)	Basic polymer	NV [%w/w]	% Solvent / Co-Solvent type	% / Neutralizing Agent/Type	Dynamic viscosity at 23 °C [mPa.s] (DIN EN ISO 3219)	pH (DIN ISO 976)	OH number [mg KOH/g NVC] (DIN EN ISO 4629)	ABS	PA6	PC	PMMA	PP (* pre-treatment)	PS	PVC	Rubber	UP/FRP
–	AC	70	BAC	–	7000 – 11000	–	150							✓		
–	AC	55	LG	–	4000 – 7000	–	150		✓			✓				
–	AC	60	X/4/BAC	–	1400 – 2400	–	45	✓	(✓)		✓	✓	(✓)	✓		
–	AC	70	BAC	–	2200 – 3800	–	80	✓	✓		✓	✓		✓		
–	AC	45	WS	–	6000 – 10000	–	–	✓					✓	✓		
–	AC	40	X	–	1000 – 2500	–	–	✓			✓		✓	✓		
–	AC	41	XIBAC	–	10000 – 35000	–	43	✓			✓			✓		
–	AC	50	BAC	–	150 – 500	–	–		✓							
–	AC	50	XMPAC	–	600 – 1250	–	–	✓			✓		✓	✓		(✓)

Abbreviations

AC Acrylic
AK Alkyd
Aliph. Aliphatic
Arom. Aromatic
EP Epoxy Resins / Crosslinking
MF Melamine Crosslinker
NCO Polyisocyanate Crosslinker
Oxid. Oxidative drying/curing
PBD Polybutadiene
PC Polycarbonate
PE Polyester
Phys. Physically drying
Self. Self-Crosllinking

Energy Curable Resins

Energy curable resins, also known as radiation curable resins, are typically cured under UV light. Energy curable coatings provide superior performance, allow high coating speeds and are friendly to the environment. Energy curable coatings have been used for more than 20 years for coating plastic, specically in automotive interior and exterior, sports goods, cosmetic packaging, window films and many other applications. Energy curable resins can be used in 100 % solids systems (after cure), diluted in solvents or as a waterborne system. The coating can be applied as a single coat system, as a primer or as a top coat.

The tables in this section show the adhesion to plastics (in case the coating is directly applied onto the plastic), the product performance and characteristics of oligomers as well as energy curable water-based resins and diluting acrylates.

Adhesion to Plastic Substrates

Adhesion promoting resins

Products	PC	PE	PP	PMMA	PVC	ABS	PS	PET	SMC/ BMC
EBECRYL® 436*		●	●			●	●		
EBECRYL 438		●	●			●	●		
EBECRYL 584		●	●			●			
EBECRYL 740–40 TP		●	●				●		
EBECRYL 745		●	●				●		
EBECRYL 767		●	●				●		
EBECRYL 3703		●							

Adhesion promoting diluting acrylates

DPGDA				●				●	
EBECRYL 40	●	●	●	●	●	●	●	●	●
EBECRYL 114	●								
EBECRYL 160	●			●	●	●			
EBECRYL 1039	●								
EBECRYL 7100		●						●	
HDDA	●				●	●		●	●
IBOA					●				
ODA-N		●	●						
PETIA	●	●	●	●	●	●	●	●	●
TPGDA	●							●	
UCECOAT® 7770*	●				●				
UCECOAT 7772	●		●		●				
UCECOAT 7773	●		●		●				
UCECOAT 7825	●				●				
UCECOAT 7849	●				●				

* ***EBECRYL UV*** curable resins and diluting oligomers
* ***UCECOAT*** waterbased UV curable resins

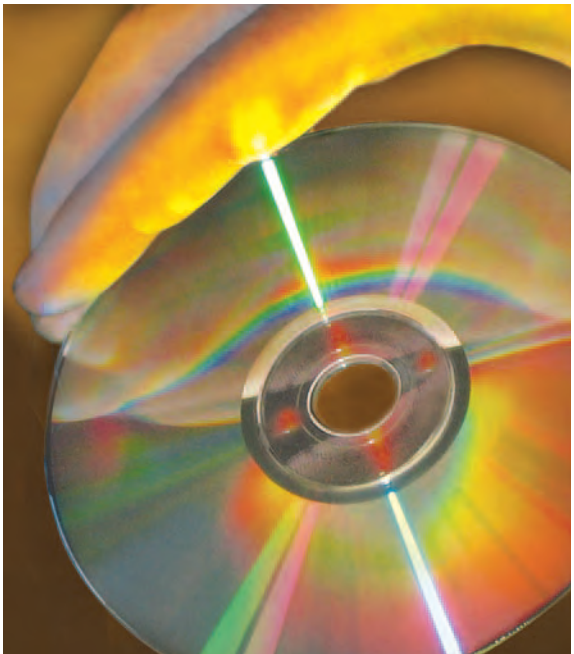
● = Recommended for use

Product Performance

Products	Flexibility	Reactivity	Stain resistance/PVC	Outdoor resistance	Scratch resistance/PC (steel wool)
DPHA	●	●●●●	●●●●	●●	●●●●
*EBECRYL®*230*	●●●●	●	●	●●	●
EBECRYL 264	●	●●●	●●●	●●	●●●
EBECRYL 284	●●	●●	●●	●●●●	●●●
EBECRYL 294–25 HD	●	●●●	●●●	●●●●	●●●
EBECRYL 1200	●●●●	●●●●	●●●●	●●●●	●●●
EBECRYL 1290	●	●●●●	●●●●	●●	●●●●
EBECRYL 3703	●●	●●●●	●●●	●	●●●
EBECRYL 3708	●●●●	●●●●	●●●●	●	●●●
EBECRYL 4820	●●	●	●●●●	●●●●	●●
EBECRYL 4858	●	●●	●●●	●●●●	●●
EBECRYL 5129	●	●●●●	●●●●	●●	●●●●
EBECRYL 8210	●	●●●●	●●●●	●●	●●●●
EBECRYL 8402	●●	●●	●●	●●●●	●●●
EBECRYL 8405	●●●	●●●	●●●●	●●●●	●●●
EBECRYL 8406	●●●●	●●	●●	●●	●●
*UCECOAT®*7571*	●●●	●●●	●●●●	●●	●●
UCECOAT 7773	●●●	●●●	●●●●	●●	●●
UCECOAT 7825	●●●●	●●●	●●●	●●	●●
UCECOAT 7849	●●●●	●●●	●●●	●●●●	●●

* ***EBECRYL UV*** curable resins and diluting oligomers
* ***UCECOAT*** waterbased UV curable resins

● = low
●● = moderate
●●● = good
●●●● = very good



Abbreviations

ABS	acrylonitrile butadiene styrene
BMC	blow moulded compound
PC	polycarbonate
PE	polyethylene
PET	polyethylene terephtalate
PMMA	polymethylmethacrylate
PP	polypropylene
PS	polystyrene
PVC	polyvinylchloride
SMC	sheet moulded compound

Product Characteristics of Oligomers

Urethane Acrylates

Products	Product description	Dilution	Viscosity 25 °C	Viscosity 60 °C	Colour	Density
EBECRYL®* 230	Aliphatic urethane acrylate		40000		150A	1,08
EBECRYL 264	Aliphatic urethane acrylate	15 HDDA	45000		2	1,12
EBECRYL 284	Aliphatic urethane acrylate	12 HDDA		2100	2	1,18
EBECRYL 294/25 HD	Aliphatic urethane acrylate	25 HDDA		7000	2	1,10
EBECRYL 1290	Aliphatic urethane acrylate			2000	1	1,19
EBECRYL 4820	Aliphatic urethane acrylate	35 HDDA	3300*		1	1,08
EBECRYL 4858	Aliphatic urethane acrylate		7000		3	1,14
EBECRYL 5129	Aliphatic urethane acrylate			700	2	1,18
EBECRYL 8210	Aliphatic urethane acrylate		4500		2	1,12
EBECRYL 8402	Aliphatic urethane acrylate		12500		2	1,16
EBECRYL 8405	Aliphatic urethane acrylate	20 HDDA		4000	2	1,13
EBECRYL 8406	Aliphatic urethane acrylate	35 DPGDA	17000*		6	1,11

* ***EBECRYL UV*** curable resins and diluting oligomers

Key to the tables

Colour data are maximum values espressed in Gardner. Where specified (A), the maximum colour value is expressed in APHA units.

Density expressed in g per cm^3.

Dilution parts of diluent in 100 parts of product.

Func. functionality, expressed as number of acrylic double bonds per molecule.

MW molecular weight.

Viscosity Höppler viscosity or where specified with (*) dynamic viscosity (DIN EN ISO 3219, 20 1/s). Data are indicative values expressed in mPa.s, measured at 25 °C or 60 °C.

Abbreviations

BuAc Butyl acetate

DPGDA Dipropylene glycol diacrylate

HDDA 1,6-Hexanediol diacrylate

MW	Func.	Benefits
5000	2	Used to improve flexibility and adhesion.
2000	3	General purpose, excellent abrasion and scratch resistance.
1200	2	Good exterior durability.
1500	3	Best stain and abrasion resistance, excellent exterior durability, good thermal stability.
1000	6	High scratch resistance.
1900	3	Good exterior durability.
450	2	Excellent exterior durability, excellent scratch and impact resistance.
800	6	Combines good scratch and abrasion resistance with improved flexibility.
600	4	OH-Functionalized urethane acrylate for dual cure application.
1000	2	Excellent exterior durability and resistance to crack formation.
2700	4	Good exterior durability and reactivity.
5100	2	Excellent flexibility and abrasion resistance.

Energy curable Resins
(continued)

Polyether/Polyester Acrylates

Products	Product description	Dilution	Viscosity 25 °C	Viscosity 60 °C	Colour	Density
EBECRYL®* 436	Chlorinated polyester resin	40 TMPTA		1500	5	1,28
EBECRYL 438	Chlorinated polyester resin	40 OTA 480		1500	5	1,26
EBECRYL 584	Chlorinated polyester resin	40 HDDA	2000		3	1,32
DPHA	Dipentaerythritol penta/hexa acrylate		16000		3	1,18

Epoxy Acrylates

EBECRYL 3703	Epoxy acrylate			4250	5	1,17
EBECRYL 3708	Epoxy acrylate			3450	1,5	1,16

Acrylic Acrylates

EBECRYL 740–40 TP	Acrylic oligomer	40 TPGDA		8500	3	
EBECRYL 745	Acrylic oligomer	50 blend TPGDA/HDDA	20000		3	
EBECRYL 767	Acrylic oligomer	30 IBOA		8500	3	
EBECRYL 1200	Acrylic oligomer	45 BuAc	3000*		5	

* ***EBECRYL UV*** curable resins and diluting oligomers

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Density expressed in g per cm^3.

Dilution parts of diluent in 100 parts of product.

Func. functionality, expressed as number of acrylic double bonds per molecule.

MW molecular weight.

Viscosity Höppler viscosity or where specified with (*) dynamic viscosity (DIN EN ISO 3219, 20 1/s). Data are indicative values expressed in mPa.s, measured at 25 °C or 60 °C.

Abbreviations

BuAc Butyl acetate
DPGDA Dipropylene glycol diacrylate
HDDA 1,6-Hexanediol diacrylate
IBOA Isobornyl acrylate
TMPFA Trimethylolpropane formal acrylate
TPGDA Tripropylene glycol diacrylate
TMPTA Trimethylolpropane triacrylate
OTA 480 Acrylated glycerol derivative

Acid value	MW	Func.	Benefits
25			Primer for plastics.
25			Primer for plastics.
25			Primer for plastics.
10	520	5	Very good scratch resistance.
5	850	2	Enhanced adhesion to plastics. Fast UV cure response.
1,7		2	Very good flexiblity. Fast UV cure response.
			Excellent primer for difficult substrates.
			Excellent primer for difficult substrates.
			Excellent primer for difficult substrates.
			Excellent primer for difficult substrates. Physically drying. Suitable for exterior applications.

Energy curable Resins
(continued)

Product Characteristics of Energy Curable Water-based Resins

Products	Product description	Solid content	Viscosity 25°C	pH	Particle size	Film formation temp.
UCECOAT®* 7571	Aliphatic acrylated polyurethane dispersion, anionic stabilized.	35	<200	7,5	100	<0
UCECOAT 7770	Aliphatic acrylated polyurethane dispersion, anionic stabilized.	35	<200	7,5	150	<0
UCECOAT 7772	Aliphatic acrylated polyurethane dispersion, anionic stabilized.	40	<200	7,5	150	<0
UCECOAT 7773	Aliphatic acrylated polyurethane dispersion, anionic stabilized.	39	<200	7,5	150	<0
UCECOAT 7825	Aliphatic acrylated polyurethane dispersion, anionic stabilized.	35	<200	7,5	150	<0
UCECOAT 7849	Aliphatic acrylated polyurethane dispersion, anionic stabilized.	35	<200	7,5	100	<0

Product Characteristics of Diluting Acrylates

Products	Product description	Viscosity 25 °C	Colour	Density
EBECRYL®* 114	Phenoxyethyl acrylate	10	200A	1,10
EBECRYL 1039	Urethane monoacrylate	25	100A	1,07
IBOA	Isobornyl acrylate	9	100A	0,98
ODA-N	Octyl/decyl acrylate	3	3	0,88
DPGDA	Dipropylene glycol diacrylate	10	150A	1,06
HDDA	1,6-Hexanediol diacrylate	10	40A	1,03
TPGDA	Tripropylene glycol diacrylate	15	50A	1,05
EBECRYL 160	Trimethylolpropane ethoxy triacrylate	80	200A	1,09
PETIA	Mixture of pentaerythritol tri- and tetraacrylate	1100	200A	1,18
EBECRYL 40	Polyether tetraacrylate	160	2	1,15
EBECRYL 7100	Amino functional acrylate	1200 max	4	

* ***EBECRYL UV*** curable resins and diluting oligomers
* ***UCECOAT*** waterbased UV curable resins

MW	Co-solvent	Benefits
10000	none	Excellent stain resistance, good flexibility and hardness. No irritant labelling. Tack-free before UV cure.
10000	none	Recommended for adhesion on PVC and PC Good stain resistance. Good hardness. Tack-free before UV cure.
10000	none	Recommended for adhesion on PC, PVC and corona treated PP. Excellent stain resistance. Tack-free before UV cure.
10000	none	Recommended for adhesion on plastics. Recommended for topcoat on plastics. Excellent stain resistance, high hardness. Tack-free before UV cure.
10000	none	Recommended for adhesion on plastics Good stain resistance. High flexibility. Tack-free before UV cure.
10000	none	Recommended for high gloss coatings on plastics. Good stain and outdoor performance. No irritant labelling. Tack-free before UV cure.

Acid value	Benefits
1	Excellent adhesion to plastics.
	Best compromise for a monofunctional diluent.
1	High Tg.
1	Good adhesion on non-polar substrates.
1	
1	High diluting power, good weathering properties.
1	
1	Good compromise of properties.
10	High degree of crosslinking.
	Low shrinkage.
	Improved chemical and thermal resistance.

Key to the tables

Acid value expressed in mg KOH per g. Data are maximum values.

Colour data are maximum values espressed in Gardner. Where specified (A), the maximum colour value is expressed in APHA units.

Density expressed in g per cm^3.

Film form temp. min. film formation temperature expressed in °C.

MW molecular weight.

Particle size max. average particle size expressed in nm.

pH measured using a conventional glass electrode.

Solid content measured by gravimetry and expressed as the percentage of solid residue remaining after complete drying of the waterborne dispersion for 2 hours at 120 °C.

Viscosity Höppler viscosity (indicative value) or where specified Brookfield viscosity (B) (max value) expressed in mPa.s, measured at 25 °C.

Photoinitiators and Stabilizers

Cytec has been the global leader in radiation curing chemicals for many years. Monomers, oligomers and reactive diluents for both graphic arts and industrial coatings applications have been supplied. In order to service customers better, **Cytec** has now added photoinitiators and stabilizers to the already extensive portfolio of radiation curable products.

While focus for innovation and technical service remains on monomers and oligomers, **Cytec** provides ***ADDITOL***® photoinitiators of excellent quality and stabilizers for pigmented coating and printing inks.

The ***ADDITOL*** photoinitiators product range includes the most commonly used photo-initiators in graphic arts and industrial coatings as well as materials improving long term stability of pigmented systems. The tables show the typical application areas for each ***ADDITOL*** additive.

Products	Product description	State
Photoinitiators		
ADDITOL® BCPK*	Benzophenone 1-hydroxy-cyclohexylphenyl-ketone liquid mixture	L
ADDITOL BDK	2,2-dimethoxy-1,2diphenylethan-1-one	S
ADDITOL BP	Benzophenone	S
ADDITOL CPK	1-hydroxy-cyclohexyl phenyl ketone	S
ADDITOL EHA	2-ethylhexyl-4-dimethylamino benzoate	L
ADDITOL EPD	Ethyl-4-dimethylamino benzoate	S
ADDITOL HDMAP	2-hydroxy-2-methyl-1-phenyl propanone	L
ADDITOL ITX	Isopropyl thioxanthone (2 and 4 isomer mixture)	S
ADDITOL MBF	Methyl benzoylformate	L
ADDITOL PBZ	4-phenyl-benzophenone	S
ADDITOL TPO	2, 4, 6-trimethylbenzoyl diphenyl phosphinoxide	S
Stabilizers		
ADDITOL S 100	Stabilizer blend	P
ADDITOL S 110	Stabilizer blend	P
ADDITOL S 120	Stabilizer blend	L
ADDITOL S 130	Stabilizer blend	L

* ***ADDITOL*** photoinitiators

Clear wood	Pigmented wood	Clear plastics / metal	Pigmented plastics / metal	Over Print varnish	Inks	Non yellowing	Synergist needed	Key features
●●	●	●●	●	●●	●	●	●●	Combines surface and through cure Also suitable for water-based formulations.
●●	●	●●	●	●	●			Multipurpose photoinitiator.
●●	●	●●	●	●●	●		●●	Multipurpose photoinitiator, good surface cure with amine synergist.
●●	●	●●	●	●●		●●		Non yellowing systems.
	●		●		●●			Amine synergist, mainly for ink.
	●		●		●●			Amine synergist, mainly for ink.
●●	●	●●	●	●	●	●		Multipurpose photoinitiator.
	●		●		●●			Curing of pigmented systems (other than white).
●●	●	●●		●●	●	●		Mild odour liquid giving very good surface cure.
●●	●	●		●	●●	●	●●	Low odour and high reactivity.
	●●	●●	●●		●	●●		Efficient cure of white pigmented and thick clear coatings.
	●●		●●		●●	●●	NA	Especially suited for grinding and in-can stability of white and light colors. No negative impact on reactivity.
	●●		●●		●●		NA	Very efficient for grinding and in-can stability of a wide variety of pigmented systems. No negative impact on reactivity.
●●	●●	●●	●●		●●	●●	NA	Very universal use for grinding and in-can stability of pigmented systems and clear coatings. No negative impact on reactivity.
●●	●●	●●	●●		●●	●●	NA	Very universal use for grinding and in-can stability of pigmented systems and clear coatings. No negative impact on reactivity. Suitable for metallic inks.

●● = highly recommended
● = used in combination with other photoinitiators
S = solid
L = liquid
P = paste
NA = not applicable

Acrylic powders can be used as a primer for SMC for automotive industry or to coat SMC for other applications (Electrical, ACE, ...).

ADDITOL® P 791 is a crosslinker for GMA acrylic and ***ADDITOL P 827*** is a flow master batch.

Acrylic Resins

Crosslinker for GMA-Acrylic Resins

Products	T, °C	Tm, °C	IAC, mg KOH/g	Characteristics
ADDITOL® P 791	140 (30')	90	315	Aliphatic polyanhydride crosslinker for use with GMA-acrylic resins. It gives coatings with improved flow and scratch resistance.

Flow master batch for Acrylic Powder Formulation

Products	Tg, °C	EEW, g/eq	Viscosity	Characteristics
ADDITOL P 827	50	600	2200 (170 °C)	Flow promoter master batch with 15% active substance.

UV powder can be used on plastic for 2 major applications: as a coating for SMC (electrical applications, ACE, ..) and as a protective coating for PVC resilient flooring. The high thickness is attractive for stain and abrasion resistance.

Polymer Resins for UV-Powder Coating

Resin for SMC

Products	Tg, °C	Viscosity	Characteristics
UVECOAT®* 2300	53	2700	The product gives coating with a high flow out adhesion on SMC.

Resins for Resilient Flooring Applications

UVECOAT 3003	49	3500 (175 °C)	Excellent scratch and chemical resistances coatings. Suitable for low gloss formulations. To be used with Uvecoat 9010 for achieving the high flexibility.
UVECOAT 9010	85 Tm	350 (100 °C)	Semi-crystalline resin to improve coating flexibility.

* ***UVECOAT*** UV powder resins

Key to the tables

EEW Epoxy equivalent weight
IAC Acid index
Tg Glass transition temperature
Tm Melting temperature

Cytec offers a broad range of specialty resins and additives for the formulation of coatings and provides a complete tool box to customers. Additives are an important ingredient in high performance coatings for protective and decorative applications. The product range of performance ingredients includes additives for industrial, architectural, automotive and specialty coatings, products for binding and other technical resins applications. Additives for

Additive		Radcure	Characteristics	A/M [%]
Wetting and Dispersing Agents				
ADDITOL®* XL 204	sw		Silicone containing phosphoric acid ester; anionic.	55
ADDITOL XL 250	sw		Phosphoric acid ester, neutralized by amine; anionic; low molecular.	55
ADDITOL XL 255 N	sw		Modified alkyd resin; neutralized.	55
ADDITOL VXL 6237	s		Wetting/dispersing agent; cationic; high molecular.	30
ADDITOL XL 6509	s		Copolymer with acidic groups.	65
ADDITOL VXW 6394	w		High molecular weight polymer; nonionic.	40
ADDITOL VXW 6208	w		Nonionically stabilized polymer; diluted in water.	50
Leveling Agents				
ADDITOL VXL 4930	sw		Polyether-modified silicone.	40
ADDITOL XL 123 N	sw		Modified silicone.	50
MODAFLOW® 9200	s	Yes	Modified acrylic copolymer; low molecular weight; crosslinkable.	100
MODAFLOW Resin	s		Acrylic copolymer; high molecular weight; FDA-approved.	100
ADDITOL VXL 6230	s	Yes	Fluoro-modified acrylic copolymer.	70
ADDITOL VXW 6396	w	Yes	Highly fluoro-modified acrylic copolymer; neutralized by amine; low molecular weight.	55
ADDITOL VXW 6503	w		Silicone tenside.	50
ADDITOL VXW 6508	w		Acrylic copolymer; neutralized by amine; silicone-free.	44
MODAFLOW®*AQ3025	w		Acrylic copolymer; neutralized by amine; silicone-free.	25
Defoamers and Air Releasers				
ADDITOL VXL 6501	s	Yes	Degassing/defoaming polymers; silicone containing.	100
ADDITOL VXL 4951	s		Fluoro-modified silicone.	20
ADDITOL XL 6507	s	Yes	Degassing/defoaming polymers; silicone-free.	100
ADDITOL VXW 6210	w		Modified silicone; blend of hydrocarbons.	100
ADDITOL VXW 6500	w		Degassing polymers; hydrocarbons; silicone-free.	100
ADDITOL VXW 4973	w		Mineral oil, waxes.	100
ADDITOL VXW 6386	w		Hydrocarbons, waxes.	100
ADDITOL VXW 6399	w	Yes	Hydrocarbons; hydrophobic solid particles.	100
Rheology Modifiers				
ADDITOL XL 270	sw		Modified silicone; amine neutralized.	55
ADDITOL VXW 6360	w	Yes	Polyurethane thickener.	30
ADDITOL VXW 6388	w		Polyurethane thickener.	35
ADDITOL VXW 6387	sw		Special fatty acids; amine neutralized; silicone-free.	50

* ***ADDITOL*** additives
* ***MODAFLOW*** resins flow modifiers

s solvent-borne sw solvent- and waterborne w waterborne

solvent-borne, high solids, waterborne and powder coating systems are in the company's portfolio. The ***ADDITOL***® and ***MODAFLOW***® products enhance performance by modifying rheological properties, improving flow and leveling, reducing foam, improving pigment dispersability, increasing gloss, and improving adhesion.

Description/Benefits	Dosage
Prevents floating and Bénard cells; reduces dispersing time.	0,5–6,0 % pigment
Reduces dispersing time; enhances flow, gloss and colour strength; for inorganic pigments.	0,5–5,0 % pigment/extender
Reduces dispersing time; enhances flow, gloss and colour strength; for organic pigments.	1,0–5,0 % org. pigment
For high quality lacquers based on organic pigments and pigment concentrates.	10–50% org. pigment
Dispersing agent for inorganic pigments, fillers and matting agents.	5–10 % inorg; 30–60 % matting agent
Especially for preparation of stable pigment concentrates; prevents flocculation.	10–30 % inorg., 30–75 % org.
For inorg./org. pigments and pigment concentrates/pastes.	3–10% inorg., 15–50% org.
Highly effective; good spray mist absorption; prevents orange peel; no foam stabilization.	0,05–0,3 % total
Excellent slip and scratch resistance; degassing; thermostable up to 400 °C.	0,05–0,5 % total
Reduces surface defects; good compatibility; for high gloss applications.	0,1–2,0 % total
Highly effective leveling agent; good wetting behaviour; degassing properties.	0,5–3,0 % binder
Excellent leveling and wetting properties; good re-coatability.	0,1–1,0 % total
Excellent leveling and wetting properties; no foam stabilization; good re-coatability.	0,1–1,0 % total
Excellent substrate wetting; no foam stabilization; good re-coatability.	0,1–1,0 % total
Enhances flow and leveling; prevents surface defects; crosslinkable.	0,1–1,0 % total
Optimizes flow and gloss; enhances degassing; facilitates pigment wetting.	1,0–2,0 % total
Highly effective in industrial and 2K-systems, anti-corrosion lacquers, PE- and UV-systems.	0,1–1,5 % total
Very effective; prevents foam and blister formation during processing and application.	0,05–1,0 % total
Highly effective in industrial and 2K-systems, anti-corrosion lacquers, PE- and UV-systems.	0,1–1,5 % total
Heavy duty defoamer; recommended for preparation of pigment concentrates.	0,05–0,5 % total
Very good de-aerating in forced drying and stoving systems; easy to incorporate; for clear coats.	0,3–3,0 % total
Very effective, very compatible; easy to incorporate.	0,1–0,6 % total
For high quality lacquers; good compatibility. Homogenize well prior to use.	0,5–1,5 % total
For high quality systems, especially UV-PUDs; excellent compatibility.	0,5–1,0 % total
Suitable for high gloss systems; prevents floating and sedimentation.	0,1–2,0 % pigment
Modifies rheology and flow; easy to incorporate.	0,1–3,0 % total
Highly effective at low and medium shear-stress; prevents sedimentation and sagging.	0,1–3,0 % total
Prevents pigment sedimendation; reduces sagging; improves storage stability.	0,1–5,0 % pigment

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