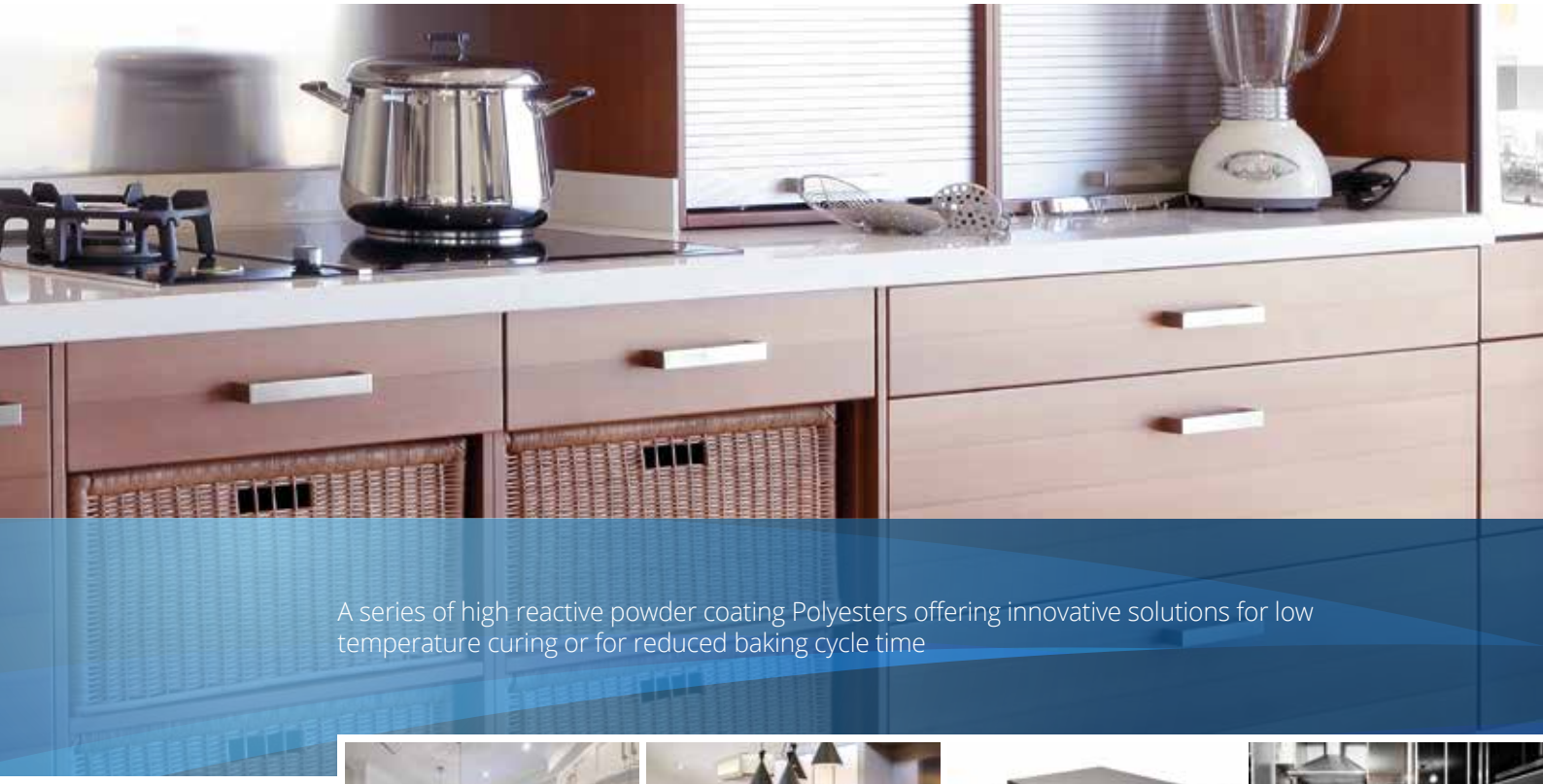
LOW TEMPERATURE CURING

Powder coatings system for new applications and robust process efficiency



A series of high reactive powder coating Polyesters offering innovative solutions for low temperature curing or for reduced baking cycle time




Polyesters can be used with four different types of hardeners including:

Epoxy (Hybrid, Epoxy resins with EEW of 680 to 800 gr/eq)
Hydroxyl-Alkylamide HAA (e.g. Primid XL 552*)
Triglycidylisocyanurate TGIC (e.g. ARALDITE® PT 810*)
Glycidylester (ARALDITE® PT 910 / PT 912*)

*Trademarks : Primid® of EMS-Chemie ARALDITE® of Huntsman

Value Proposition

- Raise productivity
- Save energy
- Coat heavy goods
- Coat heat-sensitive substrates
- Increase production process robustness

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allnex
The Coating Resins Company

The allnex sales range can offer today a wide choice of low bake COOH-Polyesters
Polyesters would allow customers to formulate powders with lower curing-temperatures, this will grant new possibilities for powder application on heat-sensitive substrates and heavy objects, while also saving energy costs and facilitating the coating operation.

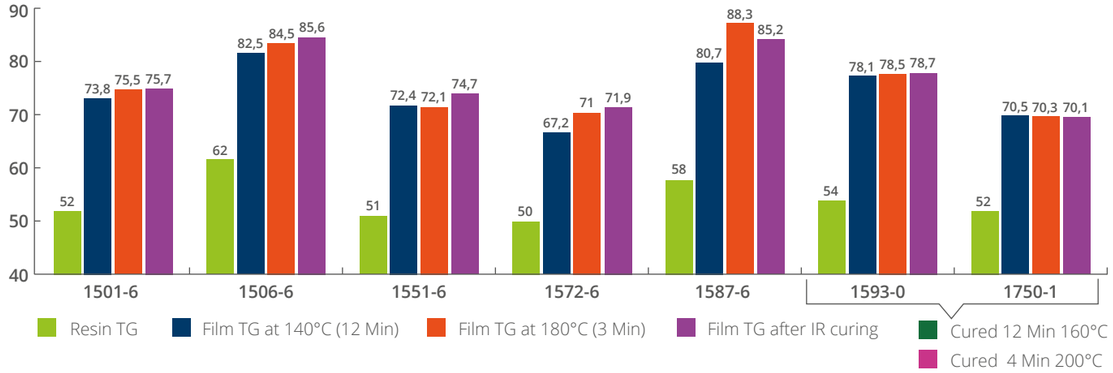
Polyester Powder Coating	New Opportunity	Application
EPOXY POLYESTERS (Hybrid), cure temperatures below 150°C	Heat sensitive non-metallic substrates	MDF, HDF, paper labels, Gypsum cardboard, plastics.
	Pre-assembled goods with temperature sensitive parts	Electromotor.
	Products with limited temperature acceptance	Aluminium/Magnesium car wheels.
HYDROXYALKYLAMIDE POLYESTERS, cure temperatures below 160°C	Heavy substrates with long heat times	Steel bars.
	Heat sensitive products, plastic combined metal profiles	Modern Aluminium windows with insulation features.
GLYCIDYL POLYESTERS, cure temperatures between 150-240°C	Heat sensitive substrates	Clear coats on paper labels.
	Products with limited temperature acceptance	Clear coats on Aluminium /Magnesium car wheels.
	High speed applications	Coil coating.
TGIC POLYESTERS, cure temperatures between 140-240°C	Heat sensitive substrates	Clear coats on paper labels.
	Products with limited temperature acceptance	Clear coats on Aluminium/Magnesium car wheels.
	High speed applications	Coil coating.

Reactive COOH-Polyester resins for Hybrid-formulations for indoor applications suitable for formulating textures or showing improved scratch-resistance.

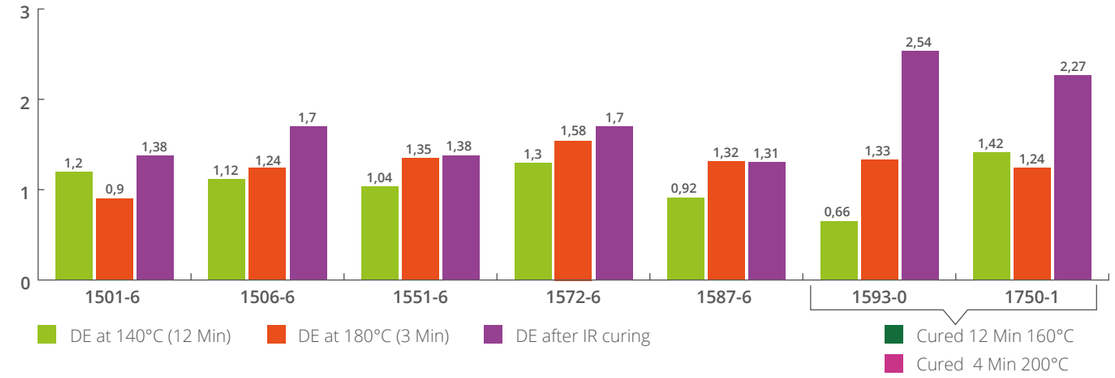
CRYLCOAT®	Acid value ASTM D 1613 [mg KOH/g]	Brookfield viscosity at 175°C [mPa.s]	Glass transition temperature DSC [°C]	Characteristics 50 / 50 Hybrid-PE resins, reactive for curing at object T 10 Min 140°C or 1 Min 180°C
1501-6	69	5500	52	Reactive good flow, suitable for smooth finishes
1506-6	69	9000	62	Reactive high TG, best for texture finishes
1545-6	72	8200	66	Tin-free high reactive with good mechanical properties
1551-6	71	5000	51	Reactive best flow, for smooth finishes, enhanced over-bake resistance.
1572-6	71	4000	50	High reactive
1581-6	64-74	4500-6500	52	Tin-free high reactive combining good flow with high gloss and chemical resistance
1582-6	70	5000	51	High reactive, suitable for improved scratch-resistance.
1587-6	74	5600	58	Reactive tin-free, suitable for textured finishes.
1593-0	70	3500 (200°C)	54	Reactive for 160°C.
1750-1	35	4500 (200°C)	52	Reactive non-blooming.



The following chart reports the film-TGs of some low bake Hybrid-Polyesters on 0,8 mm steel-panels, when cured at 12 Min 140°C, 3 Min 180°C or 1 Min IR-curing.



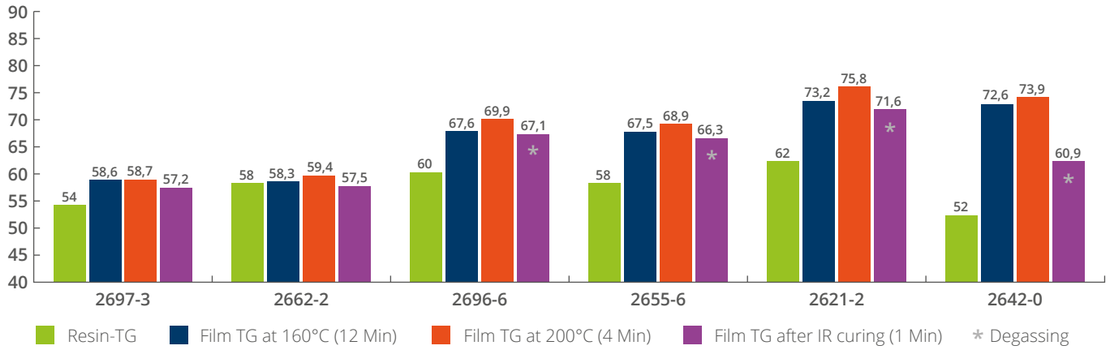
The over-baking resistance, ie the tendency to yellow (major contribution to DE) of low bake Hybrid-Polyesters remains at a relative stable level with applied cure temperatures. IR-curing results in some instances worse than with convection oven curing. This can be expected as the energy density of IR is much higher and can easily provoke more yellowing if the energy-dose is not applied precisely.



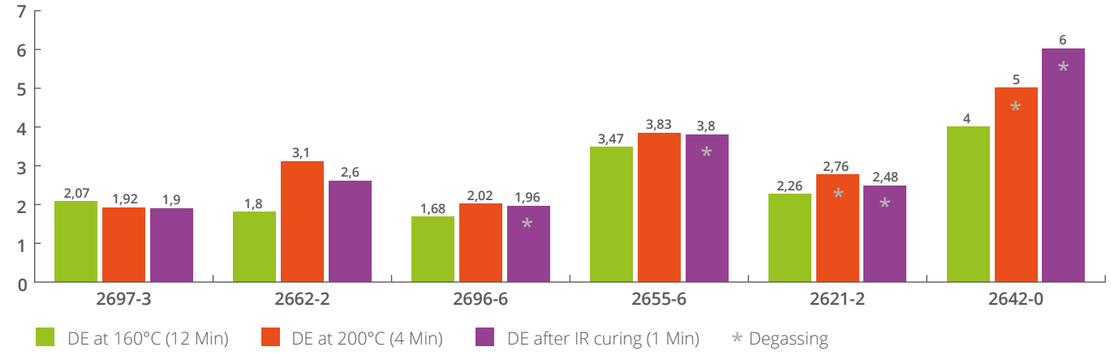
Reactive COOH-Polyester resins for HAA* curing agents for outdoor industrial applications

CRYLCOAT®	Acid value ASTM D 1613 [mg KOH/g]	Brookfield viscosity at 200°C [mPa.s]	Glass transition temperature DSC [°C]	Characteristics HAA-PE resins, reactive for curing at object T 10 Min 140°C or 1 Min 180°C
2697-3	25	5000	54	Low HAA content, tribo active, over-bake and gas oven resistant for dry-blend semi-matte.
2662-3	31	4000	58	Good flow, tribo-active, over-bake and gas oven resistant.
2668-6	18	12000 (200°C)	60	Low bake, tribo active, for matt system in combination with Crylcoat 2693-6.
2693-6	54	11000 (200°C)	60	Low bake, tribo active, for matt system in combination with Crylcoat 2668-6.
2696-6	38	4500	60	High TG, tribo active, over-bake and gas oven resistant. Blooming-free.
2655-6	48	5800	58	Tribo active, over-bake and gas oven resistant, for smooth finishes and degassing friendly.
2621-2	73	9000 (175°C)	62	Reactive high TG, over-bake resistant for dry-blend semi-matte.
2642-0	72	2500	52	Reactive low TG, for dry-blend matte.

The following chart reports the film-TGs of the low bake HAA-Polyesters on 0,8 mm aluminum-panels, cured at 12 Min 160°C, 4 Min 200°C or 1 Min IR-curing.



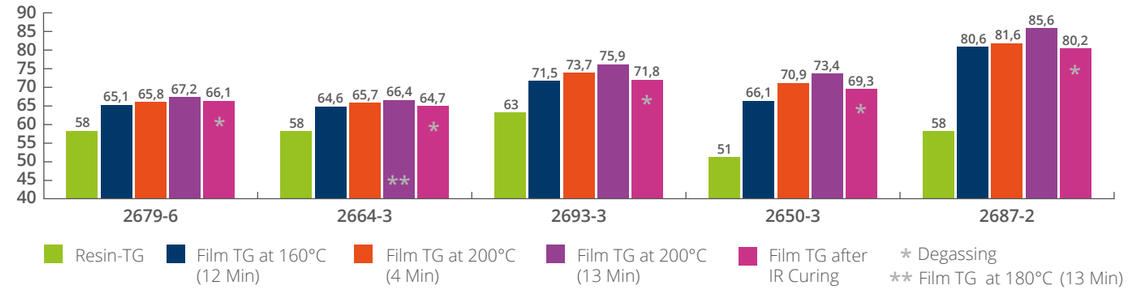
The over-baking resistance, ie the tendency to yellowing (major contribution to DE), of low bake HAA-Polyesters remains comparable at different temperatures. The yellowing of the powders depend to a large extent on the concentration of the HAA in the formulation. IR-curing is with most Polyesters not possible, as the film shows degassing issues due to the release of H2O. This degassing effect can also be noticed with the high acid-functional resins at 200°C in convection oven.



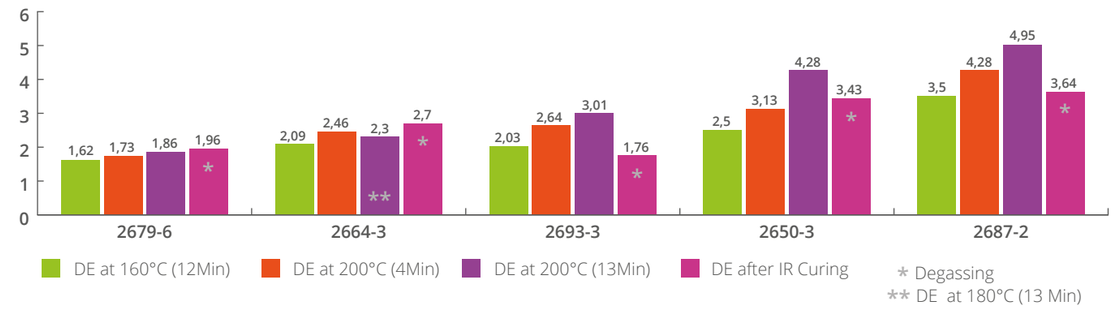
Reactive COOH-Polyester resins for HAA* curing agents for outdoor architectural applications

CRYLCOAT®	Acid value ASTM D 1613 [mg KOH/g]	Brookfield viscosity at 200°C [mPa.s]	Glass transition temperature DSC [°C]	Characteristics HAA-PE resins, reactive for curing at object T 10 Min 140°C or 1 Min 180°C
2679-6	31	4800	58	Tribo active, reactive, over-bake and gas oven resistant.
2664-3	32	3100	58	Tribo-active, reactive, over-bake and gas oven resistant, blooming-reduced.
2693-3	53	6200	63	Tribo active, reactive, over-bake and gas oven resistant for semi-matte dry blend.
2650-3	70	6200 (175°C)	51	Tribo active, reactive, over-bake and gas oven resistant, for matte dry blend.
2687-2	90	3500	58	High reactive, over-bake and gas oven resistant for 1-shot matte.

The following chart reports the film-TGs of the low bake HAA-Polyesters on 0,8 mm aluminum-panels, cured at 12 Min 160°C, 4 Min 200°C or 1 Min IR-curing.



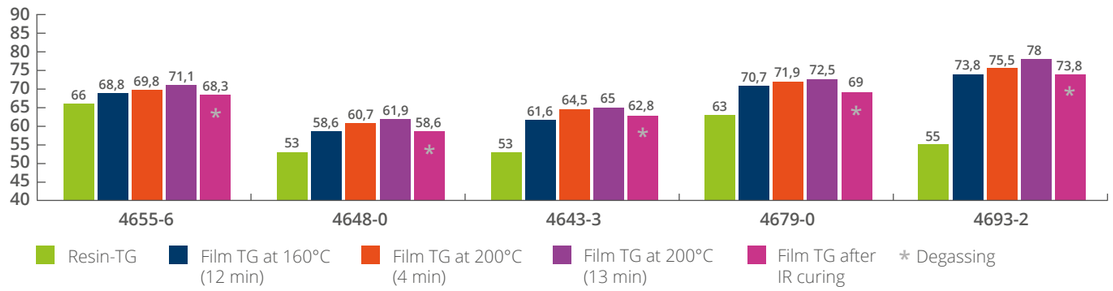
The following chart reports the over-bake resistance of the low bake HAA-Polyesters on 0,8 mm aluminum-panels, cured at 12 Min 160°C, 4 Min 200°C or 1 Min IR-curing.



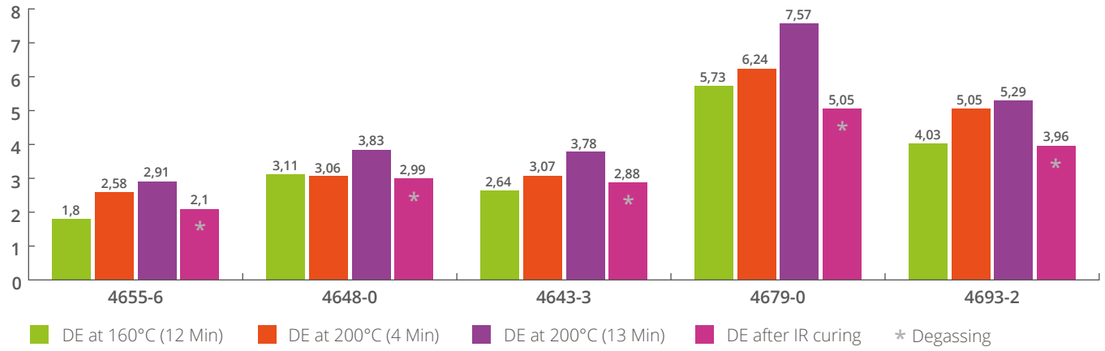
Reactive outdoor Super Durable Polyester resins for HAA* curing agents

CRYLCOAT®	Acid value ASTM D 1613 [mg KOH/g]	Brookfield viscosity at 175°C [mPa.s]	Glass transition temperature DSC [°C]	Characteristics
4655-2	31	7500 (200°C)	66	High Tg, over-bake and gas oven resistant.
4648-0	38	7500	50	Tribo-active, reactive, over-bake and gas oven resistant.
4643-3	50	1800 (200°C)	62	Tribo active, reactive, over-bake and gas oven resistant, excellent flow.
4679-0	70	7500	63	Reactive, suitable for matte dry blend.
4693-2	90	3500 (200°C)	58	High reactive, over-bake and gas oven resistant for 1-shot matte.
4694-2	85	1500 (200°C)	55	Reactive for one-shot matte coatings.

The following chart reports the film-TGs of the low bake HAA-Polyesters on 0,8 mm aluminum-panels, cured at 12 Min 160°C, 4 Min 200°C, 13 Min 200 °C or 1 Min IR-curing.



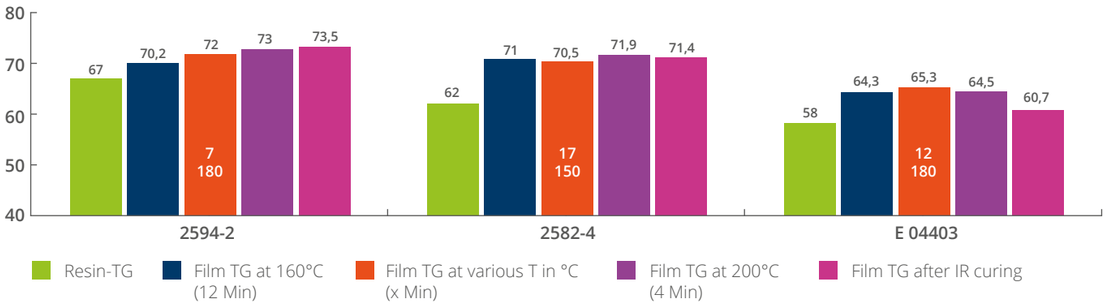
The following chart reports the over-bake resistance of the low bake HAA-Polyesters on 0,8 mm aluminum-panels, cured at 12 Min 160°C, 4 Min 200°C or 1 Min IR-curing.



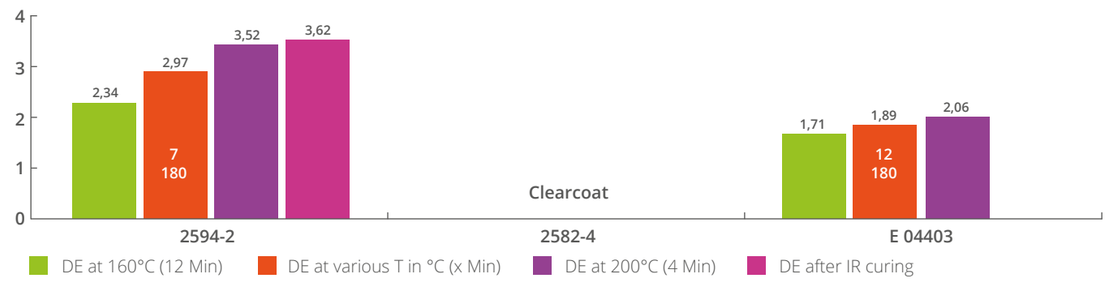
Reactive COOH-Polyester resins for Araldite* PT 910 / PT 912 curing agents

CRYLCOAT®	Glass transition temperature DSC [°C]	Brookfield viscosity at 200°C [mPa.s]	Acid value ASTM D 1613 [mg KOH/g]	Characteristics
2594-2	67	4500	34	Industrial resin with high reactivity for pigmented blooming-free powders with good flow.
2582-4	62	4500	33	Architectural resin with flow-promoter for excellent transparency in clear – coats. Good flow and blooming-free.
E 04403	58	8000	24	Super-durable resin with improved flexibility.
E 04356	55	2800	26	Super-durable resin with improved corrosion resistance.
E 04507	62	6500	25	Super-durable resin, high TG, with improved corrosion resistance.
E 04692	63	4100	34	High reactive resin with good flow, good mechanical properties and excellent outdoor durability.

The following chart reports the film-TGs of the low bake Araldite PT910/PT912-Polyesters on 0,8 mm aluminum-panels, cured at 12 Min 160°C, 4 Min 200°C or 1 Min IR-curing.



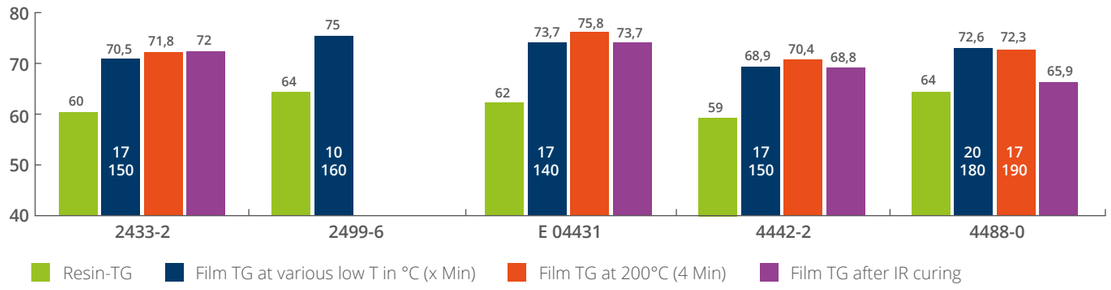
The following chart reports the over-bake resistance of the low bake Araldite PT910/PT912-Polyesters on 0,8 mm aluminum-panels, cured at 12 Min 160°C, 4 Min 200°C or 1 Min IR-curing.



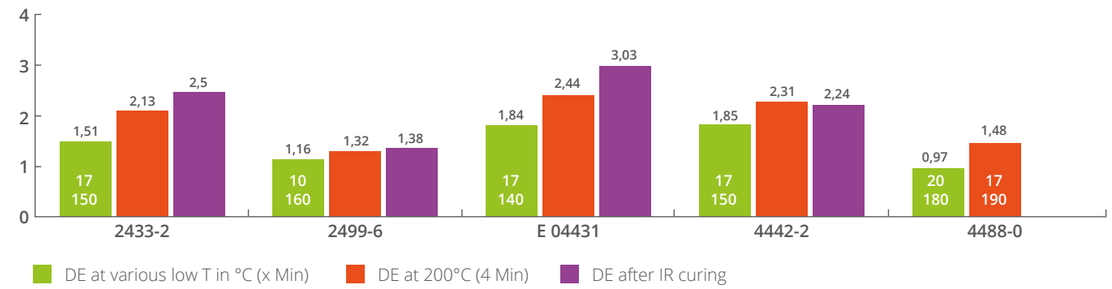
Reactive COOH-Polyester resins for TGIC curing agents

CRYLCOAT®	Glass transition temperature DSC [°C]	Brookfield viscosity at 200°C [mPa.s]	Acid value ASTM D 1613 [mg KOH/g]	Characteristics
2433-2	60	3500	33	Architectural resin with good flow and flexibility.
2429-6	61	3400	34	Industrial resin exhibit good flow and outstanding degassing properties
2451-6	53	1800	40	Resin combining excellent flexibility, adhesion, gloss and film hardness. At 93/7 ratio is curing 10 min at 150°C, while at 92/8 ratio is curing 15 min at 120°C
2499-6	64	4800	30	Architectural resin with good storage and reactivity.
E 04431	62	3500	33	Industrial resin with very high reactivity.
4442-2	59	1600	30	Super-durable resin with improved corrosion resistance. Not available in Europe.
4488-0	64	5500	30	Super-durable resin basic grade for curing 10 min 200 °C (object T).

The following chart reports the film-TGs of the low bake TGIC-Polyesters on 0,8 mm aluminum-panels, cured at 12 Min 160°C, 4 Min 200°C or 1 Min IR-curing.



The following chart reports the over-bake resistance of the low bake TGIC-Polyesters on 0,8 mm aluminum-panels, cured at 12 Min 160°C, 4 Min 200°C or 1 Min IR-curing.



Low temperature curing polyester resins for reduce baking time and/or to be used on sensitive substrates available now for customers in Europe, Middle East, Africa (EMEA), Asia Pacific regions and Americas.

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