



# ADVANCED COMPOSITES SOLUTIONS

HIGH PERFORMANCE EPOXY AND POLYURETHANE SYSTEMS

# CREATING A STRONG FUTURE

Worldwide solutions in PUR and EP resins

## YOUR ADDED VALUE

### Reliability and Safety

Sika Advanced Resins is on your side as a strong global player. As an inherent part of the Swiss concern Sika AG you can rely on us.

### Quality and Innovation

Our clients expect high-quality end products. Benefit from over 75 years of intensive expertise in the development of high-quality PUR and EP resins. With innovative and coordinated PUR and EP product systems, we help you to achieve end user satisfaction.

### Flexibility and integrated solutions

As individual as your task. The comprehensive and integrated product range of Sika Advanced Resins offers you even more solutions for your applications.

### Professional global support worldwide

Local experts provide you with personal on-site support in all issues relating to product processing and plant technology.

### Global Availability

The consolidation of worldwide production sites, several development departments and our global dealer network maximizes the availability of our products – wherever you are located.



“As a global leader in Tooling and Composites it is our aim to provide our customers with best in class innovative and tailor made solutions. Being close to our customers is not only a word for us: Worldwide production and on-site support of our experts is the basis of our success. Every day, we are looking forward to create new and better solutions together with our customers.“

**MORTEN MUSCHAK**  
Head Sika Advanced Resins

## CUSTOMIZED SOLUTIONS FOR ...

- Foundry model making
- Automotive industry
- Transportation industry
- Sports and leisure
- Industrial applications
- Boat and yacht building industry
- Aviation industry
- Renewable energies
- Dielectrics

**WITH OVER 75 YEARS OF EXPERIENCE**, Sika Advanced Resins is the world leading provider and developer of high-performance resins, block materials and pastes for model and mould making. Sika Advanced Resins offers customized solutions for the composites industry – from the model to the shape and finished parts up to the fitting structural adhesive. In addition, Sika Advanced Resins offers casting resins and functional coatings for industrial filters and dielectrics. Sika Advanced Resins generates an annual turnover of € 150 million with 450 employees. Sika Advanced Resins is part of Sika AG, which is headquartered in Baar, Switzerland. Sika has subsidiaries in 101 countries worldwide, with more than 200 manufacturing sites. It has approx. 19,500 employees, who generated an annual turnover of CHF 7.1 billion in 2018.

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# BOARD MATERIALS AND PASTES FOR MODEL AND MOULD MAKING

We offer a wide range of application-oriented system solutions consisting of special model and tooling boards and appropriate adhesives and filler putties.

The boards are based on Polyurethane (PUR) and Epoxy (EP) and can be used for the construction of plugs and master models as well as for diverse moulds and other manufacturing tools. Especially for very big plugs or moulds, for example in the wind or the marine industry, we can also offer versatile model pastes based on EP and PUR for near net shape designs with completely joint-free surfaces.

## BOARD MATERIALS:

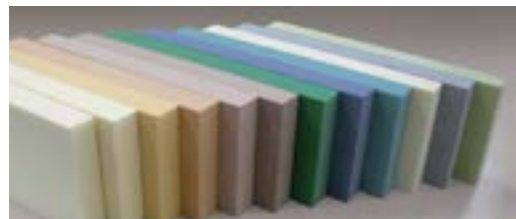
Depending on the required demands for a model or a mould it is possible to choose between different boards with densities from 0.08 up to 1.3 kg/dm<sup>3</sup>.

The wide range offering in densities enables to select suitable board in surface quality and mechanical properties.

EP boards offer particularly high heat resistance with excellent dimensional stability due to low CTE and can be used for prepreg applications.

## MODEL PASTES:

Model pastes are processed on 2-component mixing and metering machines. The cured resin systems are easy to finish to the correct dimensions by CNC-milling. The results are joint-free, smooth surfaces with a high level of precision.



Board materials available in different densities and performance qualities.



CNC-milling of a lightweight PUR board.



Low CTE offers a high dimensional stability.



High performance epoxy boards for prepreg tools and parts.



Biresin® M72 for large scale models.



CNC-milled model of a boat deck with a homogenous, jointless and smooth surface.



Good non sagging properties also on vertical surfaces.



CNC-milling of a boat deck made with epoxy extrudable paste SC175.

OVERVIEW BOARD MATERIALS						► Detailed Information see page 6/7
	Suitable for model making	Suitable for mould making	Density [g/cm <sup>3</sup> ]	Colour	Characteristics	
<b>PUR</b>						
Labelite 8CY SikaBlock® M80	○		0.08	grey yellowish	Low density boards with fine, dense non-powdery surface; easily workable with low dust formation when milled ► simple big models/moulds, backup/reinforcements constructions	
Labelite 25YW SikaBlock® M330	○		0.25	peach yellow siena		
Labelite 45PK	○	○	0.45	pink		
SikaBlock® M600	○	○	0.60	light brown	Medium density boards with fine, dense surface; good compressive strength and edge stability ► models and moulds for lower number of pieces	
SikaBlock® M700	○	○	0.70	light brown		
SikaBlock® M1000	○	○	1.0	white	Tooling boards with dense smooth surface, higher compressive strength and edge stability ► models and moulds for higher number of pieces	
SikaBlock® M945	○	○	1.35	green		
<b>EP</b>						
Lab 975 New	●	●	0.70	light green	Medium density EP-boards with fine, dense surface; high heat distortion temperature and low CTE ► models and moulds for Prepreg applications	
Lab 973	●	●	0.75	blue		

- highly recommended
- recommended
- conditionally possible

OVERVIEW MODEL PASTES					► Detailed Information see page 6/7
	Suitable for model making	Suitable for mould making	Density [g/cm <sup>3</sup> ]	Characteristics	
<b>PUR</b>					
Biresin® M72	●	○	0.9	Easily workable; fine, dense surface; offers various advantages especially in large scale modeling; low risk of cracks due to high flexibility	
<b>EP</b>					
SC 175	●	○	0.63	Very good surface aspect; good behaviour on vertical support up to 30 mm; high thermal resistance	
SC 380	●	○	0.82	Very good surface aspect; good behaviour on vertical support up to 30 mm; high thermal resistance and high mechanical properties; for large dimension tools/composite tooling and mocks-up production	
SC 390	○	●	1.06	Very good surface aspect; good behaviour on vertical support up to 30 mm; short hardening time even for 2 mm thickness; high using temperature; low CTE: good dimensional stability, especially suitable for prepreg tools	

- highly recommended
- recommended
- conditionally possible

# DETAILED INFORMATION: BOARD MATERIALS AND PASTES

BOARD MATERIALS												
	Density [g/cm <sup>3</sup> ]	Colour	Dimensions [mm]; [ltr.]	Adhesive	Shore hardness	E-Modulus [MPa]		Flexural strength [MPa]	Compressive Strength [MPa]	CTE, αT [1/K]	Thermal resistance °C	Characteristics
<b>PUR</b>												
<b>Labelite 8 GY SikaBlock® M80</b>	0.08	light grey yellowish	2,000 x 1,000 x 100; 200 2,000 x 1,000 x 200; 400	Labelite Glue or Kleber orange	A 28	-		1.0	0.7	40 x 10 <sup>-6</sup>	115*	Low density boards with fine, dense non-powdery surface; easily workable with low dust formation when milled ▶ simple big models/moulds, backup/reinforcements constructions
<b>Labelite 25YW SikaBlock® M330</b>	0.25	peach yellow siena	1,500 x 500 x 50; 37.5 1,500 x 500 x 100; 75 1,500 x 500 x 200; 150 2,000 x 1,000 x 100; 200 2,000 x 1,000 x 150; 300 2,000 x 1,000 x 200; 400		D 25	-		5.4	3.8	60 x 10 <sup>-6</sup>	75*	
<b>Labelite 45PK</b>	0.45	pink	1,500 x 500 x 50; 37.5 1,500 x 500 x 75; 56.25 1,500 x 500 x 100; 75 1,500 x 500 x 150; 112.5		D 45	-		12	10	55 x 10 <sup>-6</sup>	65*	
<b>SikaBlock® M600</b>	0.60	light brown	1,500 x 500 x 30; 22.5 1,500 x 500 x 50; 37.5 1,500 x 500 x 75; 56.25 1,500 x 500 x 100; 75 1,500 x 500 x 150; 112.5 1,500 x 500 x 200; 150	Kleber braun or Prolab Glue	D 58	750		18 - 20	16 - 18	55 x 10 <sup>-6</sup>	75 - 80**	Medium density boards with fine, dense surface; good compressive strength and edge stability ▶ models and moulds for lower number of pieces
<b>SikaBlock® M700</b>	0.70	light brown	1,500 x 500 x 30; 22.5 1,500 x 500 x 50; 37.5 1,500 x 500 x 75; 56.25 1,500 x 500 x 100; 75 1,500 x 500 x 150; 112.5		D 66	1,000		26	25	55 x 10 <sup>-6</sup>	90**	
<b>SikaBlock® M1000</b>	1.0	white	1,500 x 500 x 50; 37.5 1,500 x 500 x 75; 56.25 1,500 x 500 x 100; 75	Power Adhesive Thix	D 75	1,800		48	47	55 x 10 <sup>-6</sup>	85**	Tooling boards with dense smooth surface, higher compressive strength and edge stability ▶ models and moulds for higher number of pieces
<b>SikaBlock® M945</b>	1.30	green	1,500 x 500 x 30; 15 1,500 x 500 x 50; 25 1,500 x 500 x 75; 37.5 1,500 x 500 x 100; 50	Power Adhesive Thix or Kleber grün	D 83	3,400		100	95	65-70 x 10 <sup>-6</sup>	80**	
<b>EP</b>												
<b>Lab 975 New</b>	0.70	light green	1,500 x 500 x 50; 37.5 1,500 x 500 x 75; 56.25 1,500 x 500 x 100; 75 other dimensions on request	H8973/GC 15	D 75	2,500		30	50	35-45 x 10 <sup>-6</sup>	130*	Medium density EP-boards with fine, dense surface; high heat distortion temperature and low CTE ▶ models and moulds for Prepreg applications
<b>Lab 973</b>	0.75	blue	1,500 x 500 x 50; 37.5 1,500 x 500 x 75; 56.25 1,500 x 500 x 100; 75 other dimensions on request	H8973 / GC15	D 73	2,200		30	50	35-45 x 10 <sup>-6</sup>	125*	

MODEL PASTES															
A	B	Mixing ratio [g]		Density [g/cm <sup>3</sup> ]	Colour	Viscosity [mPas]			Potlife, after coating by machine [min]	Workable after [h]	Filler	Shore hardness	Flexural strength [MPa]	Tg value [°C]	Characteristics
		A	B			A	B	Mixture							
<b>PUR</b>															
<b>Biresin® M72</b>	M70	100	45	0.9	brown	15,000	175	pasty after 10-15 sec	10-15	> 8	Spachtel braun Neu	D 65	20	47	Easily workable; fine, dense surface; offers various advantages especially in large scale modeling; low risk of cracks due to high flexibility
<b>EP</b>															
<b>SC 175</b>	SC 175	100	100	0.63	off grey	pasty	pasty	pasty	180	on thickness 30 mm: > 24	Spachtel braun Neu	D 52	13	45	Very good surface aspect; good behaviour on vertical support up to 30 mm; high thermal resistance
<b>SC 380</b>	SC 380	100	100	0.82	grey	pasty	pasty	pasty	150	on thickness 25 mm: 24		D 65	24	50	Very good surface aspect; good behaviour on vertical support up to 30 mm; high thermal resistance and high mechanical properties; for large dimension tools/composite tooling and mocks-up production
<b>SC 390</b>	SC 390	100	100	1.06	grey	pasty	pasty	pasty	140	depending on thickness: 12 - 20		D 74	36	89	Very good surface aspect; good behaviour on vertical support up to 30 mm; short hardening time even for 2 mm thickness; high using temperature; low CTE: good dimensional stability; especially suitable for prepreg tools

\*Tg (°C) \*\*HDT (°C)

Information regarding products for surface (pre-)treatment like cleaner, sealer, release agents, filler and primer can be found in the respective product data sheets

# HIGH PERFORMANCE COMPOSITES SYSTEMS AND GELCOATS

Aimed for parts production as well as for mould making applications in versatile industries, these high performance composite resins are designed to meet the highest standards of production, process efficiency and end-use performance.

The systems are specially designed for different working temperatures ranging from 80 °C up to ~ 225 °C. Additionally it is possible to adjust the reactivity of the systems by using different hardeners.

Our composites matrix systems are specially formulated to give the optimal viscosity as well as other processing parameters to meet the different specific processes in the composites industry like Wet Lay-up, Vacuuminfusion, RTM, Pultrusion, Filament Winding, etc.

Suitable gelcoats for mould making can be found in the alongside box.

## GELCOATS

### SIKA

Our gelcoats are very easy to apply and specially formulated to suit the particular needs of moulds or tools for composites applications. They have the necessary resistance to external influences such as mechanical, thermal or chemical stress. Some of them can be polished to a high gloss to get a shiny surface on the final parts.

### OVERVIEW GELCOATS [▶ Detailed Information see page 10/11](#)

	Colour	Thermal resistance	Characteristics
<b>Biresin® S8</b>	black	136**	Polishable to high gloss; heat resistant, good styrene resistance
<b>Biresin® S12</b>	grey	> 100**	Abrasion resistant; heat resistant; good solvent and styrene resistance
<b>CC1 080</b>	blue/white/green	85*	Good solvent and styrene resistance. Could be sanded to glossy aspect
<b>Biresin® S19</b>	black	> 150*	Very high heat resistance

\*Tg (°C) \*\* HDT (°C)

### OVERVIEW COMPOSITE SYSTEMS [▶ Detailed Information see page 10-15](#)

	Wet Lay-Up (+ optional vacuum bagging)	Vacuum-infusion	RTM	Press Processes	Filament Winding	Pultrusion	Tg [°C]	Characteristics
<b>RSF816 G</b>	●						75	"Green", clear system for transparent laminates and good UV stability. Provides a glossy surface. (e.g. for surfboards)
<b>Biresin® CR80</b>	○	●	○				85-95	GL-approved, modular standard system for infusion and injection processes with 4 hardeners for a wide range of processing times and a Tg potential up to 95 °C
<b>Biresin® CR82</b>	●			○			80-90	GL-approved, modular standard system for wet lay-up with 4 hardeners for a wide range of processing times and a Tg potential up to 90 °C
<b>Biresin® CR83</b>		●	○				80-95	GL-approved, modular system with an extremely low viscosity and a low tendency to crystallize. Especially suitable for big and/or complex parts
<b>Biresin® CR84 / CH84-20, CH120-6</b>	○			○	●		80-105	With hardeners CH84-20 and CH120-6: Thixotropic GL-approved system for filament winding with very long processing times and very good non-draining properties.
<b>Biresin® CR84 / G30, S12</b>	○			●			95-110	With hardeners G30 and S12: Especially suitable for press processes to bond different substrates together (e.g. for ski and snowboard)
<b>Biresin® CR120</b>		●	○				110-115	GL-approved, modular standard system for infusion and injection processes with 2 hardeners and a Tg potential up to 115 °C.
<b>Biresin® CR122</b>	●	○	○	○			100-145	GL-approved, modular standard system for wet lay-up with excellent properties and with additional LBA/RHV approval to build gliders, motor gliders and ultralights.
<b>Biresin® CR132</b>	●						130-165	Basic system of a 130 °C product family with standard hardeners for a wide range of processing times. The same hardeners can be used for Biresin® CR132 FR and CR134 FR to use it as a flame retardant wet lay-up system or with Biresin® CR131 to use it for infusion or injection processes.
<b>Biresin® CR132 FR</b>	●			○			130-145	Flame retardant version of Biresin® CR132 with UL94 V-0 classification (with CH132-2) for the production of structural parts in wet lay-up.
<b>Biresin® CR134 FR</b>	●						125-135	Flame retardant version of Biresin® CR132 with UL94 V-0 classification (with CH132-5) for the production of visual parts in wet lay-up.
<b>Biresin® CR131</b>		●	○				125-140	Standard system for infusion and injection processes with 4 hardeners for a wide range of processing times and a Tg potential up to 140 °C. (e.g. for wind blade moulds)
<b>Epolam 2500</b>	●						100	Flame retardant system for wet lay-up with FAR25.853. Product meets the ECS2185.20 standard.
<b>Epolam 8064 / 2026</b>					●		140	System with a low viscosity and a long open time. Tg up to 140 °C
<b>Epolam 8064 / 8011, 8012</b>			●				120-140	Low viscosity RTM-system showing excellent flexibility and high reactivity.
<b>Biresin® CR135</b>			●				150	RTM-System, which supports a high surface quality of carbon parts (Class A)
<b>Biresin® CR170</b>			●		○		90-175	High Tg system for RTM processes, which provides short cycle times (< 3 min.) in variothermal processes and isothermal processes. Suitable for parts, which have to run through the cathodic dip coating process. Also suitable for continuous filament winding processes.
<b>Biresin® CR172</b>	●	○					170-175	Nontoxic high Tg system for wet lay-up. Can also be used for vacuum infusion in certain cases.
<b>Epolam 2092</b>	○	●					225	High temperature resistant system for infusion and injection processes with Tg 225 °C
<b>EP with Anhydride</b>								
<b>Biresin® CR141 / CH141 / CA141</b>						●	120-140	Anhydride cured system with GL-approval for the production of carbon fibre reinforced parts. Especially suitable for pultrusion processes (e.g. for printing rollers, pipes, high performance profiles)
<b>Biresin® CR144 / CH141 / CA144</b>						●	155	Anhydride cured system with GL-approval for the production of fibre reinforced parts. Especially suitable for pultrusion processes with glass fibres due to its high elongation at break. (e.g. for printing rollers, pipes, high performance profiles)
<b>Biresin® CR144 / CH141 / CA141</b>						●	140	Anhydride cured system for the production of carbon fibre reinforced parts. Especially suitable for pultrusion processes (e.g. for printing rollers, pipes, high performance profiles)
<b>PUR Hybrid</b>								
<b>Epolam 8180</b>			●				185	Hot curing urethane system for industrial composites applications by RTM

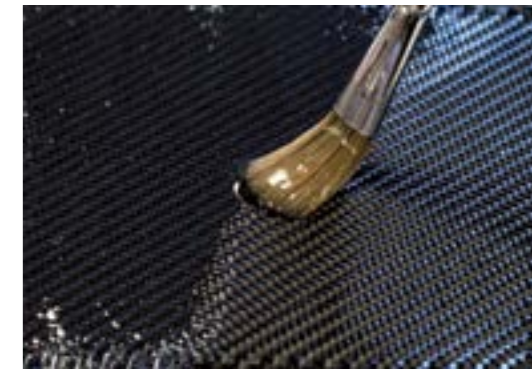
- highly recommended
- recommended
- conditionally possible

# DETAILED INFORMATION: WET LAY-UP SYSTEMS AND GELCOATS

## HIGH PERFORMANCE COMPOSITES SYSTEMS – WET LAY-UP

A	B	Mixing ratio [g]		Tg [°C]	Potlife, 100 g, RT [min]	Mixed viscosity, RT [mPas]	Impact resist. [kJ/m²]	Tensile E-Modulus [GPa]	Tensile strength [MPa]	Elongation at break [%]	Characteristics
		A	B								
<b>Wet Lay-up</b>											
<b>RSF816 G</b>	RSF 816	100	40	75	28*	500**	15	3.2***	60	5	"Green" system for clear laminates and good UV stability. Provides a glossy surface. (e.g. for surfboards)
<b>Biresin® CR82</b>	CH80-1	100	27	83	50	740	68	2.9	78	6.1	GL-approved, modular standard system for wet lay-up with 4 hardeners for a wide range of processing times and a Tg potential up to 90 °C
	CH80-2			90	80	600	70	2.9	78	6.5	
	CH80-6			83	220	400	55	2.9	84	6.4	
	CH80-10			85	330	390	56	2.9	82	6.2	
<b>Biresin® CR84</b>	CH84-20	100	30	81	600	575	76	3.6	89	5.7	With hardeners CH84-20 and CH120-6: Thixotropic GL-approved system for filament winding but also suitable for wet lay-up if a very long potlife or good non-draining properties are required.
	CH120-6	100	28	104	300	850	32	3.2	85	4.2	
	S12	100	20	100	60	1,600	31	3.0	86	5.5	With hardeners G30 and S12: Especially suitable for press processes (e.g. for ski and snowboard) to bond different substrates together
<b>Biresin® CR122</b>	G30	100	32	98	100	2,950	42	2.6	75	5.2	
	CH122-1	100	30	103	30	310	58	2.9	86	6.3	GL-approved, modular standard system for wet lay-up with excellent properties and with additional LBA/RHV approval to build gliders, motor gliders and ultralights.
CH122-3	114			90	370	47	2.8	84	5.4		
CH122-5	119			150	380	34	2.8	84	5.6		
<b>Biresin® CR132</b>	CH122-9	100	40	145	330	680	44	2.6	87	6.9	
	CH132-2	100	28	130	60	360	47	2.6	79	5.3	Basic system of a 130 °C product family with standard hardeners for a wide range of processing times. The same hardeners can be used for Biresin® CR132 FR, Biresin® CR134 FR and Biresin® CR131.
	CH132-5			135	150	550	32	2.7	88	6.2	
	CH132-7	100	32	135	210	550	33	2.4	78	5.7	
	CH122-9	100	38	162	480	940	25	2.4	68	3.9	Two hardener options for Tg potential > 150 °C and long pot life.
CH172-6	100	20	159	180	550	24	2.7	80	4.5		
<b>Biresin® CR172</b>	CH170-3	100	17	170	110	800	28	2.9	70	3.0	Nontoxic high Tg system for Wet Lay-up.
	CH172-6	100	19	174	260	810	26	2.8	76	3.9	
<b>Wet Lay-up – FR systems</b>											
<b>Biresin® CR132 FR</b>	CH132-2	100	20	132	60	1,330	15	3.6	52	1.6	Flame retardant version of Biresin® CR132 with UL94 V-0 classification (with CH132-2) for the production of structural parts in wet lay-up.
	CH132-5	100	20	142	160	2,100	10	3.6	43	1.4	
	CH132-7	100	23	133	200	1,900	12	3.5	42	1.4	
	CH172-6	100	28	157	460	2,100	15	3.1	48	1.8	
<b>Biresin® CR134 FR</b>	CH132-2	100	23	125	60	900	29	3.0	62	3.3	Flame retardant version of Biresin® CR132 with UL94 V-0 classification (with CH132-5) for the production of visual parts in wet lay-up.
	CH132-5	100	24	132	115	1,000	21	3.0	65	3.9	
	CH132-7	100	27	129	150	1,000	22	2.9	58	3.0	
<b>Epilam 2500</b>	2500	100	22	100	90*	3,500**	-	3.9***	-	-	Flame retardant system for wet lay-up with FAR25.853. Product meets the ECS2185.20 standard.

\* 500g, RT \*\* Brookfield LVT, RT \*\*\* Flexural E-Modulus [GPa]



Top-down:  
 ■ Motor glider produced by Schempp-Hirth with Biresin® CR122.  
 ■ Biresin® CR82 with optimized mixed viscosity for Wet Lay-up.



## GELCOATS

A	B	Mixing ratio [g]		Colour	Potlife, 500g, RT [min]	Density [g/cm³]	Shore hardness	Flexural strength [MPa]	Thermal resistance	Characteristics
		A	B							
<b>Gelcoats</b>										
<b>Biresin® S8</b>	S8	100	20	black	25	1.22	D 86	90	136 **	Polishable to high gloss, heat resistant, good styrene resistance
<b>Biresin® S12</b>	S12	100	8	grey	30	2.1	D 92	78	> 100 **	Heat resistant, abrasion resistant, good solvent and styrene resistance
<b>GC1 080</b>	GC 13	100	10	blue/white/green	20*	1.74	D 89	75	85 ***	Good solvent and styrene resistance, could be sanded to glossy aspect
<b>Biresin® S19</b>	S19	100	12	black	45 – 60	1.75	D 85	73	> 150 ***	High mechanical and heat resistance

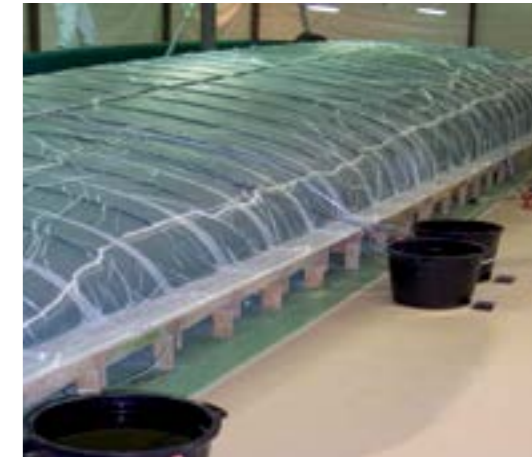
\* 300 g, RT \*\* HDT (°C) \*\*\* Tg (°C)

# DETAILED INFORMATION: INFUSION AND RTM SYSTEMS

## HIGH PERFORMANCE COMPOSITES SYSTEMS – INFUSIONS

	A	B	Mixing ratio [g]		Tg [°C]	Potlife, 100g, RT [min]	Mixed viscosity, RT [mPas]	Impact resist. [kJ/m²]	Tensile E-Modulus [GPa]	Tensile strength [MPa]	Elongation at break [%]	Characteristics
			A	B								
<b>Infusions</b>												
<b>Biresin® CR80</b>	CH80-1	100	30		88	45	400	84	2.9	78	7.1	GL-approved. Modular standard system for infusion and injection processes with 4 hardeners for a wide range of processing times and a Tg potential up to 95 °C.
	CH80-2			92	80	350	75	2.9	81	6.1		
	CH80-6			85	190	230	68	3.0	83	6.3		
	CH80-10			85	330	210	76	3.0	80	6.5		
<b>Biresin® CR83</b>	CH94-2	100	24		97	60	320	41	3.0	78	4.6	GL-approved. Modular system with an extremely low viscosity for infusion and injection processes and a low tendency to crystallize. Especially suitable for big and/or complex parts.
	CH83-2			84	60	155	93	3.0	84	4.7		
	CH83-6			80	180	170	84	3.2	91	8.4		
	CH83-10			81	300	155	83	3.1	86	7.9		
<b>Biresin® CR120</b>	CH120-3	100	30		113	90	240	55	2.8	80	5.8	GL-approved. Modular standard system for infusion and injection processes with 2 hardeners and a Tg potential up to 115 °C.
	CH120-6			115	180	250	50	2.7	80	6.1		
<b>Biresin® CR131</b>	CH135-4	100	32	26	138	160	540	27	2.8	89	5.7	Standard system for infusion and injection processes with 5 hardeners for a wide range of processing times and a Tg potential up to 150 °C. (e.g. for wind blade moulds)
	CH132-5			28	136	140	410	46	2.7	86	5.9	
	CH132-7			21	127	260	540	37	2.7	84	6.7	
	CH135-8			21	138	260	360	29	2.8	89	6.3	
	CH172-6			19	150	220	360	33	2.8	87	8.2	
<b>Epolam 2092</b>	2092	100	50		225	400*	550**	-	4.6	26	1.0	High Tg system for infusion with a Tg potential of 225 °C

\* 500g, RT \*\* Brookfield LVT, RT



Vacuuminfusion with Biresin® CR131.



## HIGH PERFORMANCE COMPOSITES SYSTEMS – RTM

	A	B	C	Mixing ratio [g]			Tg [°C]	Potlife, 100g, RT [min]	Mixed viscosity, RT [mPas]	Impact resist. [kJ/m²]	Tensile E-Modulus [GPa]	Flexural E-Modulus [GPa]	Tensile strength [MPa]	Elongation at break [%]	Characteristics
				A	B	C									
<b>RTM</b>															
<b>Epolam 8064</b>	8011	-	-	100	21	-	123	45	320	-	3.4	2.6	72	4	Low viscosity amine-cured laminating epoxy system showing excellent flexibility and high reactivity.
	8012	-	-		25	-	140	130	550	-	3.1	2.8	78	5	
<b>Biresin® CR135</b>	CH135-4	-	-	100	24	-	152	160	940	27	2.9	2.9	72	3.3	RTM-System which supports a high surface quality of carbon parts (Class A)
<b>Biresin® CR170</b>	CH125-1	-	-	100	25	-	116	24	1,250	91	2.4	2.5	77	8.1	
	CH170-3	-	-		16	-	172	90	1,250	28	2.8	2.8	69	6.1	
	CH135-4	-	-		24	-	153	140	2,000	24	2.8	2.9	91	6.0	
<b>Epolam 8180</b>	8180	8180	8180	49	100	1.25	185	25 - 30	200**	-	3.4	2.1	70	9	Hot curing urethane system for industrial composites applications (e.g. used for manhole covers)

\*\* Brookfield LVT, RT



f.i.t.r.:  
 ■ Biresin® CR80 offers ideal flowing properties and good wetting behaviour.  
 ■ Lightweight transporter made by Carbon Truck & Trailer.  
 ■ Monocoque of the lightweight transporter produced with Biresin® CR120.  
 ■ High performance - bobsleigh produced with Biresin® CR83.

# DETAILED INFORMATION: FILAMENT WINDING AND PULTRUSION SYSTEMS

HIGH PERFORMANCE COMPOSITES SYSTEMS – FILAMENT WINDING + PULTRUSION														
A	B	C	Chemistry	Mixing ratio [g]			T <sub>g</sub> [°C]	Potlife, 100g, RT [h]	Mixed viscosity, RT [mPas]	Impact resist. [kJ/m <sup>2</sup> ]	Tensile E-Modulus [GPa]	Tensile strength [MPa]	Elongation at break [%]	Characteristics
				A	B	C								
<b>Filament Winding + Pultrusion</b>														
<b>Biresin® CR84</b>	CH84-20	-	EP cured with amine	100	30	-	81	10	575	76	3.6	89	5.7	With hardeners CH84-20 and CH120-6: Thixotropic GL-approved system for filament winding. Amine cured system with very long processing time and very good non-draining properties.
	CH120-6	-	EP cured with amine	100	28	-	104	5	850	32	3.2	85	4.2	
<b>Epolam 8064</b>	2026	-	EP cured with amine	100	35	-	140	8-10	700	-	2.6	74	5	System with a low viscosity at RT and long pot life at elevated temperatures. The cured system shows excellent mechanical, dynamic and thermal (hot/wet) properties and good chemical resistance. T <sub>g</sub> up to 140 °C
<b>Biresin® CR141</b>	CH141	CA141	EP cured with anhydride + accelerator	100	90	2	139	> 24	600	18	3.2	78	3.3	Anhydride cured system with GL-approval for the production of carbon fibre reinforced parts. Especially suitable for pultrusion processes (e.g. for printing rollers, pipes, high performance profiles) with CH142 hardener it can be used as a two component system
	CH142	-	EP cured with anhydride + accelerator	100	100	-	119	> 24	320	14	3.6	73	2.2	
<b>Biresin® CR144</b>	CH141	CA141	EP cured with anhydride + accelerator	100	90	2	140	12	800	15	3.0	80	3.5	Anhydride cured system for the production of carbon fibre reinforced parts. Especially suitable for pultrusion processes (e.g. for printing rollers, pipes, high performance profiles)
<b>Biresin® CR144</b>	CH141	CA144	EP cured with anhydride + accelerator	100	90	1-4	155	> 24	800	15	2.9	98	6.4	Anhydride cured system with GL-approval for the production of fibre reinforced parts. Especially suitable for pultrusion processes with glass fibres due to its high elongation at break. (e.g. for printing rollers, pipes, high performance profiles)
<b>Biresin® CR201</b>	CH141	CA144	EP cured with anhydride + accelerator	100	115	0.5-2	201	> 24	82	8	2.85	50	1.9	Hot curing system with a very high T <sub>g</sub> potential up to 201 °C



Gas bottle from LUXFER GAS CYLINDERS made with EP0912.



f.i.t.r.  
 ■ Mae West Sculpture in Munich (Effnerplatz) produced with Biresin® CR84.  
 ■ Segment of a 40 m pipe used for the Mae West sculpture.





# ADHESIVES FOR COMPOSITES

## ADHESIVES

We have been formulating tailor-made polyurethane and epoxy adhesive systems for the past 70 years for a variety of highly demanding markets on a worldwide basis. Today, we offer high end value adhesive resins for composite in automotive, aerospace, marine, general industry and wind mill industries.

### Polyurethane – Structural bonding for dissimilar materials and high impact

We are offering a unique range of 2 component PUR adhesives offering a unique balance between structural properties and toughness. Polyurethane adhesives are used when dissimilar

material has to be join (CTE gap absorption), or when strong impact resistance is required.

### Epoxy – Structural bonding with high modulus or temperature resistance

Structural epoxy adhesives are suitable for assembly where stiffness is required. They also keep good performances with temperature increase and under chemical stress.

### Methacrylate – Multipurpose bonding

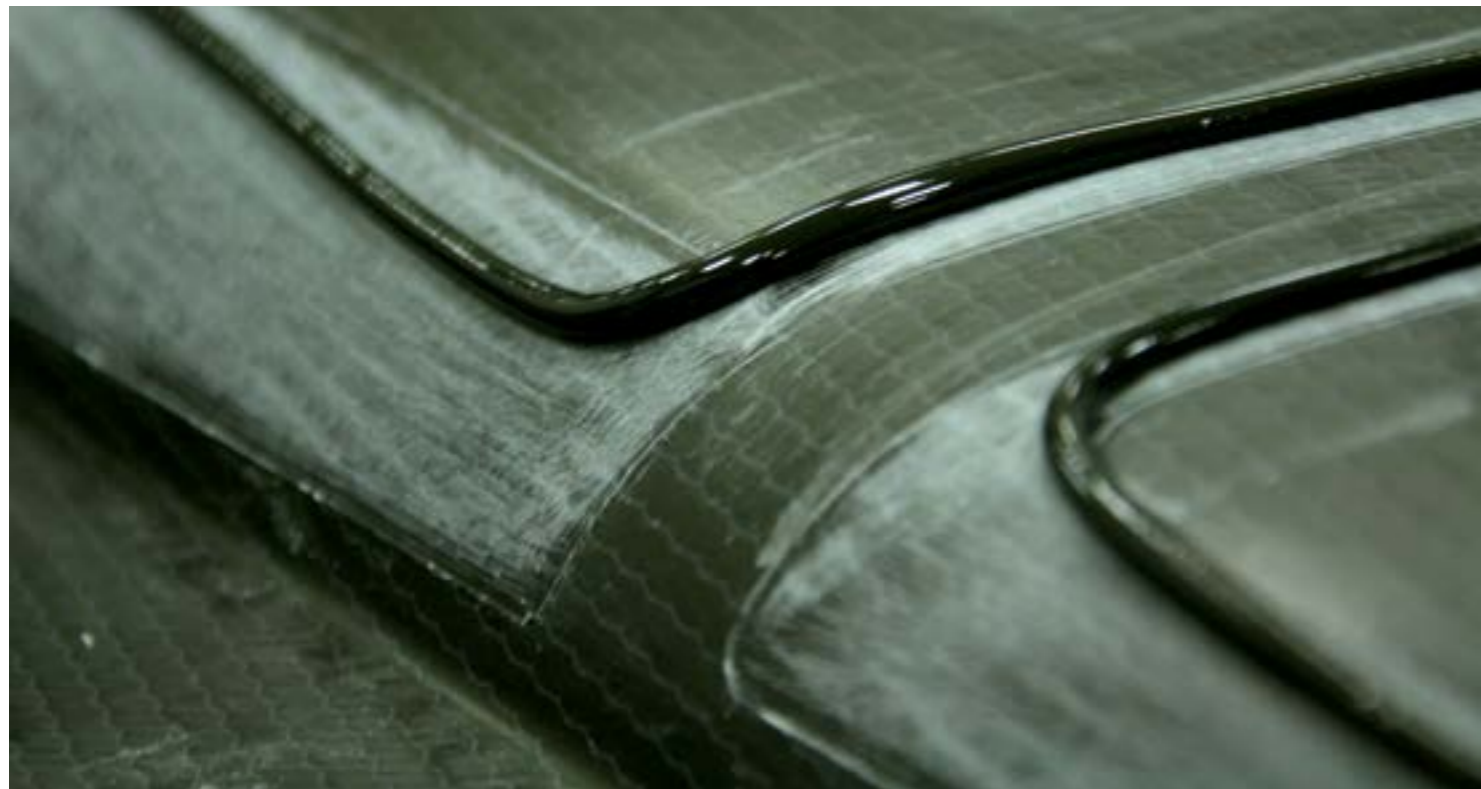
MMA-adhesives are recommended for bonding metal or plastic when operating conditions (like temperature) are not regulate. This specific chemistry allows a curing at low temperatures.

### Flexible and semi rigid structural adhesives:

- Combination of flexibility & structural performance.
- Wide range of viscosities adapted to your application.
- vertical, thick, high-speed, robotic, thin layers or gap-filling.
- Shock resistance, vibration absorption.
- Approved for their performance and the durability of the assembly by rail, automotive & aerospace industries.
- High peel resistance.

### High modulus and chemical resistant structural adhesives:

- Wide range of open times adjustable to the size of your parts & viscosities according to your application: vertical, thin layers or injection.
- Outstanding ageing resistance (humidity, temperature, solvent or UV).
- Manual or machine processes.



f.i.t.r.

- Carbon body sport car bonding. Adekit A252: structural 2 components PUR adhesive with high peel and elongation.
- Carbon part bonding.
- Bonding with H9952 on the skin on honeycomb (nomex or alu).



## OVERVIEW ADHESIVES

► Detailed Information see page 18/19

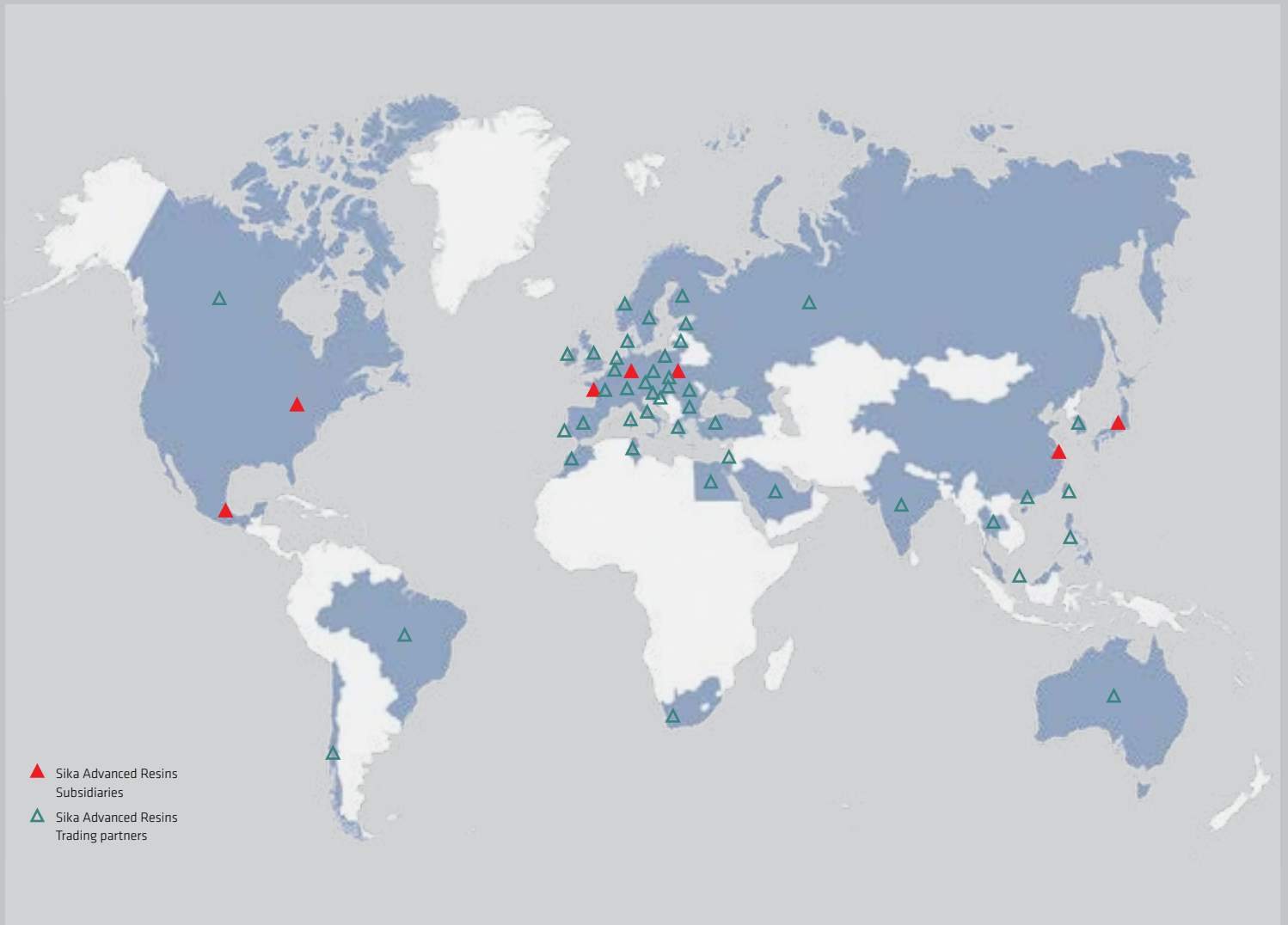
	Open time	LSS (MPa)	Peel (N/mm)	Elongation (%)	Characteristics
<b>PUR</b>					
A280 A290	10' 3'	16	12	95	Structural bonding of spoiler, metallic inserts/big head to composites. Vibration absorbing. Good chemical resistance. Short handling with limited heating. Impact Resist: 30 N/mm
A252	4'	12	9	300	Non sagging paste product suitable for vertical applications and to fill irregular joints. Fast setting product to reduce assembly time. High flexibility. Impact Resist: 50 N/mm
A257	5'	5	10	350	Recommended for the bonding of plastics sensitive to the phenomena of bond line witness marks (thermoplastic, composite). Low hardness. Flexible product. Short handling with limited heating. Impact Resist: 55 N/mm
A236	25' 120'	14	4	60	Allows production with gaps up to 40 mm and parts assembly with large dimensions (deck/hull, windmill). Available in various reactivity's and colours (white or grey). Lloyd's Register.
A730	6'	25	2	10	UV stable white PU. High modulus. For fast and stiff bonding.
H6235	30'	20	4	30	Large dimensions assembly. Gap filling capacity. Used in industry assembling big parts.
<b>MMA</b>					
A300-1 A310-1	5' 10'	24	9	30 35	Excellent mechanical and thermal performances up to 120 °C. Multipurpose product with thermoplastic aspect. Product able to bond dissimilar materials.
<b>EP</b>					
A130 A135	6'	17	1.5	3	Fast cure at room temperature. Suitable for injection. Bonding of substrates such as composites, metal, wood, concrete.
A140	40'	20	6	4	Multipurpose with very good mechanical features. Pasty non sagging Gap filler material. Impact Resist: 10 N/mm
A155	60'	35	3	8.5	Pasty constructive adhesive with long pot life. For large composite parts, repair and maintenance. Good mechanical performance & chemical and temperature resistance. Impact Resist: 15 N/mm
H9011	100'	24	5	9	Multipurpose liquid adhesive. Bond most of materials. For general industry and maintenance.
H9951 H9951T	50'	26	4	10	Non-filled adhesive for bonding large surfaces (ie panels) when mechanical and ageing as well as high peel resistance is needed. T for thixotropic product (hot cure process). Used in Railway.
H9952	120'	22	5	3	High shear/peel/ageing resistance. Filled with Nanoparticles. Short handling time with limited heating. Self extinguishable (EN45545 HL3 for R1, R2, R3, R6, R7, R17). Used in railway and aerospace applications.

# DETAILED INFORMATION: ADHESIVES

ADHESIVES																															
	Application, description	Colour	Liquid	Viscous	Pasty	Open time	Hardness (shore)	Viscosity (Pa.s)	Handling time	Lap shear strength (MPa)		Peel resistance (kN/m)	Elongation at break (%)	Substrates							Resistance					50ml	400ml	Other sizes	Industrial packages		
														Ferrous metals	Non ferrous metals	Composites, laminates	Thermo-plasts	Glass, ceramics	Foam materials (PUR, PS)	Elastomer, rubber	Polyurethane (hard)	Temperature	Chemically	Water	Shear stress					Peel stress	Ageing
<b>PUR</b>																															
<b>H6235</b>	Large dimensions assembly. Gap filling capacity. Used in industry assembling big parts.	grey			x	30'	45 D	70	4 h	20		6	5	++	++	++	+	0	++	0	+	+	0	++	++	+	+				Drum
<b>A236</b> <b>H6236</b>	Allows gaps up to 40mm and parts assembly with large dimensions (deck/hull, wind mill). Various reactivities and colours. Available in pail, cartridge and ready to use kit. Lloyd's Register.	grey / black / green / white			X	25' 120'	55 D	pasty	3,5 h 6 h	18		5	60	++	++	++	0	0	++	0	+	+	++	++	++	+	++		X		Drum
<b>A252</b>	Non sagging paste product suitable for vertical applications and to fill irregular joints. Fast setting product to reduce assembly time. High flexibility. Impact Resist: 50 N/mm	black			x	4'	75 A	600	60'	12		9	300	0	+	++	+	++	+	++	+	0	0	++	0	++	+	X	X		Drum: H 6252
<b>A257</b>	Recommended for the bonding of plastics sensitive to the phenomena of bond line witness marks (thermoplastic, composite). Low hardness. Flexible product. Short handling with limited heating. Impact Resist: 55 N/mm	black			x	5'	60 A	pasty	90'	5		10	350	+	+	++	++	++	++	0	+	+	+	++	+	++	++		X		Drum: H 6257
<b>A280</b> <b>A290</b>	Structural bonding of spoiler, metallic inserts/big head to composites. Vibration absorbing. Good chemical resistance. Short handling with limited heating. Impact Resist: 30 N/mm	beige / black			x	10' 3'	48 D	150	45' 10'	16		12	95	+	+	++	+	+	+	+	++	+	+	++	++	++	+	+	X	X	Drum: H 6280 Drum: H 6290
<b>A730</b>	UV stable white PU. High modulus. For fast and stiff bonding.	white		x		6'	85 D	20	30'	25		2	10	++	++	++	+	0	0	0	+	+	++	++	++	+	++		X		
<b>MMA</b>																															
<b>A300-1</b> <b>A310-1</b>	Excellent mechanical and thermal performances up to 120 °C. Multipurpose product with thermoplastic aspect. Product able to bond dissimilar materials.	light-brown			x	5' 10'	75 D	pasty	20' 40'	24		9	30 35	++	++	++	++	0	0	0	0	++	+	++	++	+	++	X	X		Drum
<b>Epoxies</b>																															
<b>A130</b> <b>A135</b>	Fast cure at room temperature. Suitable for injection. Bonding of substrates such as composites, metal, wood, concrete.	transparent		x		6'	80 D	45	15'	17		1.5	3	+	+	+	0	+	++	0	++	0	0	+	++	0	+	X		200ml	Kit & Drum: H 9930
<b>A140</b>	Multipurpose with very good mechanical features. Pasty non sagging Gap filler material. Impact Resist: 10 N/mm	light-brown / black			x	40'	80 D	430	4 h 30'	20		6	4	++	++	++	0	++	++	0	++	++	+	++	++	+	+	X	X		Kit & Drum: H 9940 / H 9945
<b>A155</b>	Pasty constructive adhesive with long pot life. For large composite parts, repair and maintenance. Good mechanical performance & chemical and temperature resistance. Impact Resist: 15 N/mm	white			x	60'	84 D	160	10 h	35		3	8.5	+	+	++	0	+	++	+	++	++	+	++	++	0	++		X		Drum: H 9955
<b>H9011</b>	Multipurpose liquid adhesive. Bond most of materials. For general industry and maintenance.	transparent	x			100'	75 D	45	7 h	24		5	9	++	++	++	+	+	++	+	+	+	+	++	++	+	++	X	X	200ml	Kit & Drum
<b>H9951</b> <b>H9951T</b>	Non-filled adhesive for bonding large surfaces (ie panels) when mechanical and ageing as well as high peel resistance is needed. T for thixotropic product (hot cure process). Used in Railway.	light-pink	x			40'	75 D	9	6 h	26		4	10	++	++	++	+	+	+	0	++	++	+	+	++	+	++				Kit & Drum
<b>H9952</b>	High shear/peel/ageing resistance. Filled with Nanoparticles. Short handling time with limited heating. Self extinguishable (EN45545 HL3 for R1, R2, R3, R6, R7, R17). Used in railway and aerospace applications. FAR 25.853, ABD 0031.	black			x	120'	85 D	230	8 h	22		5	3	++	++	++	+	0	++	0	+	++	++	++	++	+	++	X	X		Drum



Bonding of SMC parts with Adekit A280.



# GLOBAL SOLUTIONS – LOCAL SERVICE

Our most current General Sales Conditions shall apply.

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Actual Product Data Sheets and information about additional products please find in:  
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Subjects to alterations in the course of technical progress and also subject to error. Issue May 2019