Biresin® CR81
Composite resin system

Product Description

Biresin® CR81 is an epoxy resin system with extremely low viscosity designed specifically for the infusion process for the production of high performance fibre reinforced composites parts and moulds. The system has thermal properties up to 80°C.

Application Areas

Biresin® CR81 is especially suited to the infusion and injection processes due to its low viscosity range allowing fast wet out of dry fabrics and non-wovens. It can be used in the marine and general industrial composite areas.
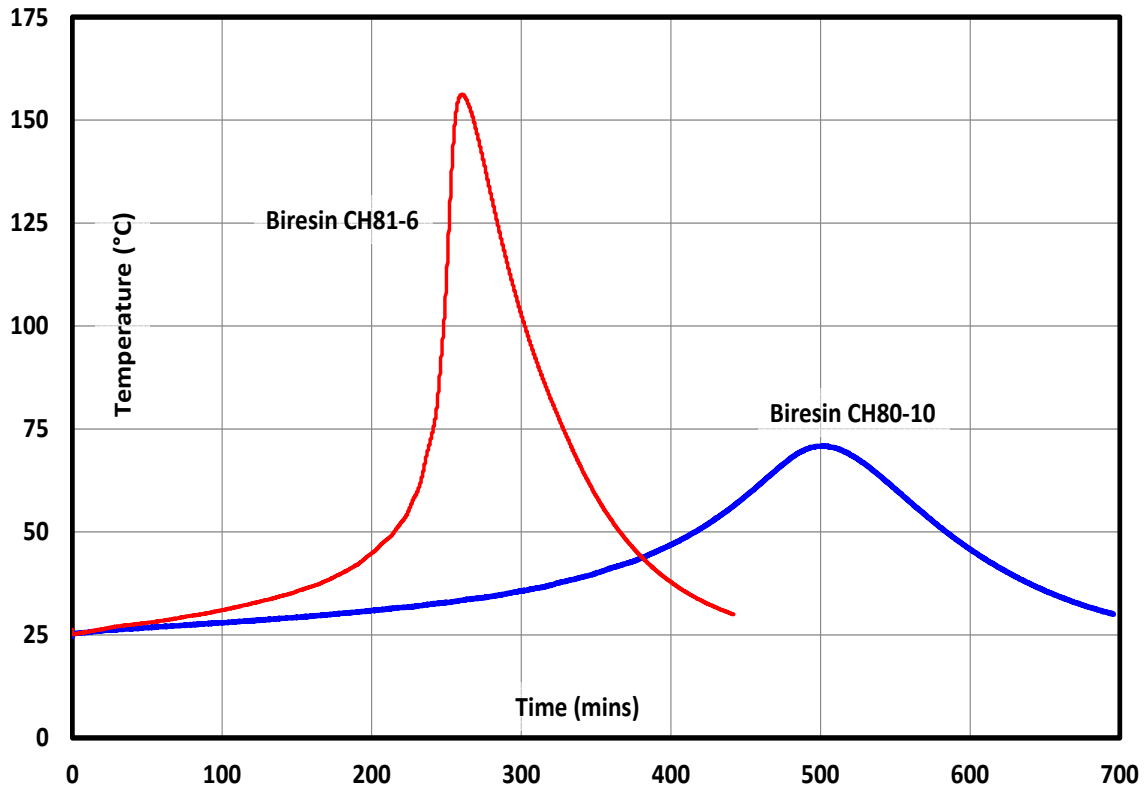
Features / Advantages

- The reactivity can be adapted by mixing the hardeners (B)
- Fast infusion and good wet-out of fabrics and non-wovens due to low viscosity and good wetting characteristics even at low temperatures
- Biresin® CR81 with Biresin® CH81-6 is approved by DNV GL, Certificate No. TAK00001YA
- Glass transition temperatures up to 80°C dependent on curing conditions
- Uniform mixing ratio of 100:30

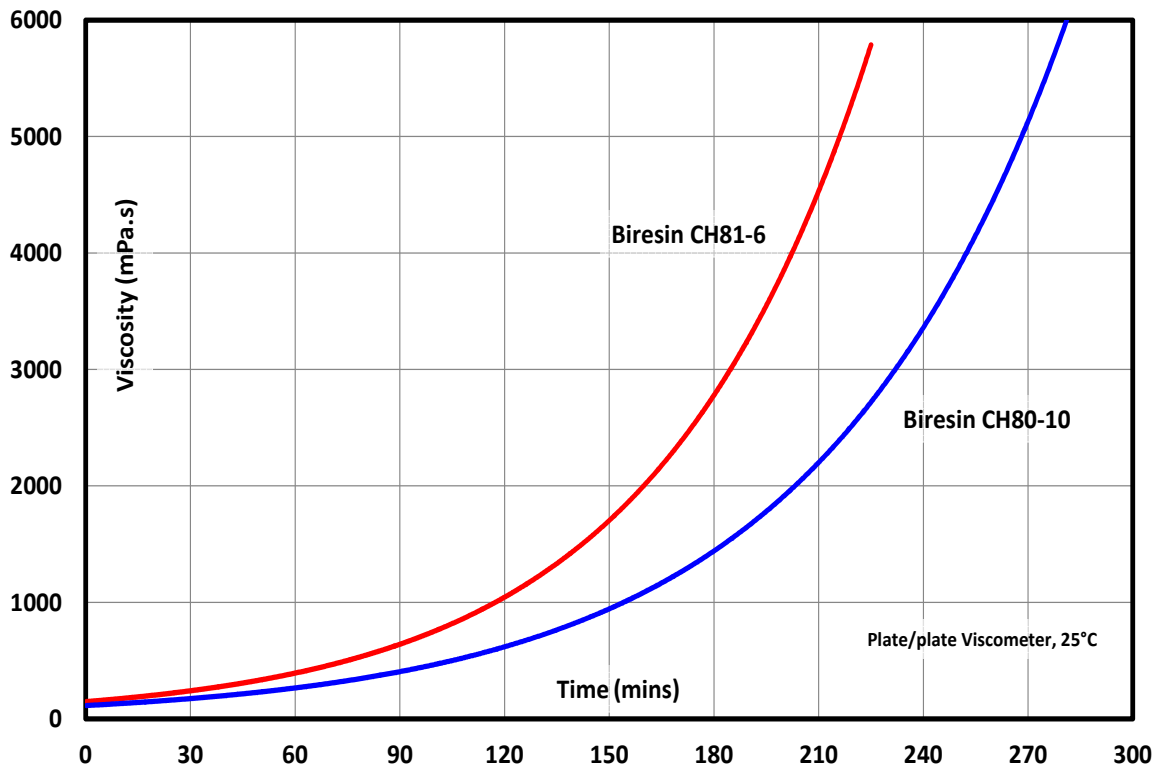| Physical Data		Resin (A)	Hardener (B)	
Individual Components		Biresin® CR81	Biresin® CH81-6	Biresin® CH80-10
Mixing ratio, parts by **weight**		100	30	
Mixing ratio, parts by **volume**		100	36	35
Colour		translucent	colourless to yellowish	
Viscosity, 25°C	mPas	~440	~10	< 10
Density, 25°C	g/ml	1.12	0.94	0.95
Potlife, 100 g / RT, approx. values	min		260	500
Mixed viscosity, 25°C, approx. values	mPa.s		150	130

Processing

- The material and processing temperatures should be in the range 18 - 35°C.
- The mixing ratio must be followed accurately to obtain best results. Deviating from the correct mix ratio will lead to lower performance.
- The final mechanical and thermal values are dependent on the applied postcuring cycles.
- It is recommended to clean brushes or tools immediately after use with Sika Reinigungsmittel 5.
- Additional information is available in "Processing Instructions for Composite Resins".

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Development of Exotherm of Biresin® CR81 Resin (A) -Hardener (B) Mixtures, 100g / RT, insulated

Biresin CH81-6

Biresin CH80-10

Temperature (°C)

Time (mins)

Development of Viscosity of Biresin® CR81 Resin (A) -Hardener (B) Mixtures, 25°C

Biresin CH81-6

Biresin CH80-10

Plate/plate Viscometer, 25°C

Viscosity (mPa·s)

Time (mins)

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Mechanical Data, neat resin specimen at different post curing conditions				
Part 1: approx. values after 12 h / 55°C + 8 h / 70°C (source: accredited testing institute)				
Biresin® CR81 resin (A) with hardener (B) **Biresin®**			**CH81-6**	**CH80-10**
Tensile strength	ISO 527	MPa	67	-
Tensile E-Modulus	ISO 527	MPa	3,200	-
Elongation at maximum tensile strength	ISO 527	%	4.0	-
Flexural strength	ISO 178	MPa	117	-
Flexural E-Modulus	ISO 178	MPa	3,200	-
Elongation at max. flexural strength	ISO 178	%	5,3	
Density	ISO 1183	g/cm³	1.15	-
Water absorption	ISO 175	%	0.4	-

Part 2: approx. values after 12 h / 80 °C (source: Sika internal)				
Biresin® CR81 resin (A) with hardener (B) **Biresin®**			**CH81-6**	**CH80-10**
Tensile strength	ISO 527	MPa	81	79
Tensile E-Modulus	ISO 527	MPa	3,000	3,050
Elongation at maximum tensile strength	ISO 527	%	6.0	5.4
Flexural strength	ISO 178	MPa	121	118
Flexural E-Modulus	ISO 178	MPa	2,950	2,950

Postcuring

The suitable cure cycle and the attainable mechanical and thermal values depend on various factors, such as laminate thickness, fibre volume, reactivity of the resin system etc.

An appropriate cure cycle could look as follows:

- Heat-up rate of ca. 0.2°C/Minute until approx. 10°C below the required glass transition temperature (Tg)
- Followed by a dwell at that temperature of between 2 and 12 hours.
- Part(s) should then be cooled at ~0.5°C per minute

To measure the mechanical performance of the resin system a Sika Advanced Resins standard cycle is used to ensure that the full Tg potential of the system in questionis reached.

Thermal data of neat resin specimen					
Biresin® CR81 resin (A) with hardener (B) **Biresin®**				**CH81-6**	**CH80-10**
	Post curing conditions				
Heat distortion temperature	12 h/55°C + 8 h/70°C	ISO 75A	°C	67	-
	12 h/80°C	ISO 75B	°C	81	70
Glass transition temperature		ISO 11357	°C	82	65

Packaging (net weight, kg)			
Biresin® CR81 resin (A)	200		10
Biresin® CH81-6 hardener (B)	180	20	3.0
Biresin® CH80-10 hardener (B)	180	25	3.0

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Storage

- Minimum shelf life of Biresin® CR81 resin (A) is 24 month and of Biresin® CH81-6 and CH80-10 hardener (B) is 12 month under room conditions (18 - 25°C), when stored in original unopened containers.
- After prolonged storage at low temperature, crystallisation of resin may occur. This is easily removed by warming up for a sufficient time to at least 60°C.
- Containers must be closed tightly immediately after use. The residual material needs to be used up as soon as possible.

Health and Safety Information

For information and advice on the safe handling, storage and disposal of chemical products, users shall refer to the most recent Safety Data Sheet (SDS) containing physical, ecological, toxicological and other safety related data.

Disposal considerations

Product Recommendations: Must be disposed of in a special waste disposal unit in accordance with the corresponding regulations.
Packaging Recommendations: Completely emptied packagings can be given for recycling. Packaging that cannot be cleaned should be disposed of as product waste.

Value Bases

All technical data stated in this Product Data Sheet are based on laboratory tests. Actual measured data may vary due to circumstances beyond our control.

Legal Notice

The information, and, in particular, the recommendations relating to the application and end-use of Sika products, are given in good faith based on Sika's current knowledge and experience of the products when properly stored, handled and applied under normal conditions in accordance with Sika's recommendations. In practice, the differences in materials, substrates and actual site conditions are such that no warranty in respect of merchantability or of fitness for a particular purpose, nor any liability arising out of any legal relationship whatsoever, can be inferred either from this information, or from any written recommendations, or from any other advice offered. The user of the product must test the product's suitability for the intended application and purpose. Sika reserves the right to change the properties of its products. The proprietary rights of third parties must be observed. All orders are accepted subject to our current terms of sale and delivery. Users must always refer to the most recent issue of the local Product Data Sheet for the product concerned, copies of which will be supplied on request.

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TYPE APPROVAL CERTIFICATE

This is to certify:

That the Epoxy Systems

with type designation(s)
Biresin CR81 / CH81-6

Issued to
Sika Deutschland GmbH
Bad Urach, Baden-Württemberg, Germany

is found to comply with
DNV GL class programme DNVGL-CP-0089 – Type approval – Epoxy resin systems
DNV GL rules for classification – High speed and light craft
DNV GL rules for classification – Yachts

Application :

Laminating resin for construction of laminates made of fibre reinforced plastics

Issued at **Hamburg** on **2020-10-05**

This Certificate is valid until **2025-10-04**.

for **DNV GL**

DNV GL local station: **Augsburg**

Approval Engineer: **Joachim Rehbein**

Thorsten Lohmann
Head of Section

Product description
Epoxy resin Biresin CR81 with following hardener:
- Biresin CH81-6

Material Properties
The following properties (mean value) have been verified by initial type testing:

Property	Test Method		CR81/ CH81-6
Tensile Strength[1]	ISO 527-2	MPa	73
Tensile Modulus[1]	ISO 527-2	MPa	3134
Fracture Elongation[1]	ISO 527-2	%	6.8
HDT (A)	ISO 75-2	°C	70.5
DSC[2]	ISO 11357	°C	62.5
Water Absorption[3]	ISO 175	mg	45
Curing procedure used for type testing: 16h at 55ºC			

Notes:
[1]: Material test by Sika Deutschland GmbH, dated 2020-08-14
[2]: Onset temperature, second run
[3]: Water absorption after 168h

Application/Limitation
The resin complies with the applicable requirements of DNV GL and is compatible to the fibres, adhesives and core materials. Any significant changes in design and / or quality of the material will render the approval invalid.

Type Approval documentation

Marking of product
Product shall be marked with *manufacturer's name*, *place of production*, *type designation* and *batch number*.

The marking is to be carried out in such a way that it is visible, legible and indelible. The marking of product is to enable traceability to the DNV GL Type Approval Certificate.

Assessed production sites
SIKA Deutschland GmbH
Stuttgarter Str. 117
72574 Bad Urach
Germany

Periodical assessment
Periodical assessments for type approvals with a validity period of five years will be required after 2 years and after 3.5 years.
If an approval of manufacturer certificate which is still valid for at least one year is available, an exemption from the obligation concerning retention and renewal surveys listed in the class programme will apply.

END OF CERTIFICATE