Biresin® CR144

Composite resin system for heat curing

Product Description

Biresin® CR144 is a three component, anhydride cured, low viscosity epoxy resin system suitable for the production of high performance fibre reinforced composites.

Application Areas

Biresin® CR144 system is particularly suited to the filament winding and pultrusion processes due to its low viscosity, good fibre wetting capabilities and very long potlife.

Features / Advantages

- The reactivity of the system can be adjusted by modifying the level of the accelerator (C) Biresin® CA144
- Fast infiltration of dry fibres due to good wetting characteristics, low mixed viscosity and an elevated processing temperature
- An excellent combination of high Tg (150°C) and elongation to break (>5%)
- Approved by DNV GL- Certificate No. TAK00001Y1

Physical Data, approx. values		Resin (A)	Hardener (B)	Accelerator (C)
Individual Components		**Biresin® CR144**	**Biresin® CH141**	**Biresin® CA144**
Mixing Ratio, parts by	**Weight**	100	90	1 - 4
Mixing Ratio, parts by	**Volume**	100	87	1.1 - 4.5
Colour		translucent	transparent	amber
Viscosity, 25°C	mPas	~12,000	~40	<10
Density, 25°C	g/ml	1.16	1.20	1.03
			Mixture	
Potlife, 100 g / RT, approx. values		h	> 24	
Mixed viscosity, 25°C, approx. values		mPa.s	800	

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.
- Before demoulding precuring of at least 2 h at 90°C is recommended.
- 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”.

Typical Mechanical Properties of Cured Neat Resin, after 3 hr / 80°C + 3 hr / 120°C + 3 hr / 140°C, approx. values			
Biresin® CR144 resin (A)	with **Biresin® CH141** hardener (B) and **Biresin® CA144** accelerator (C)		
Tensile strength	ISO 527	MPa	90
Tensile E-Modulus	ISO 527	MPa	2.750
Elongation at break	ISO 527	%	5.4
Flexural strength	ISO 178	MPa	140
Flexural E-Modulus	ISO 178	MPa	3,000
Compressive strength	ISO 604	MPa	120
Density	ISO 1183	g/cm³	1.21
Shore hardness	ISO 868	-	D 87
Impact resistance	ISO 179	kJ/m²	20

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

The specific postcure should be adapted to the required technical and economic requirements.
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 question is reached.

Typical Thermal Properties of Cured Neat Resin, after 3 hr / 80°C + 3 hr / 120°C + 3 hr / 140°C, approx. values			
Biresin® CR144 resin (A)	with **Biresin® CH141** hardener (B) and **Biresin® CA144** accelerator (C)		
Heat distortion temperature	ISO 75B	°C	147
Glass transition temperature	ISO 11357	°C	151

Packaging (net weight, kg)				
Biresin® CR144 resin (A)	1,000	200		10
Biresin® CH141 hardener (B)	1,100	220		9
Biresin® CA144 accelerator (C)			10	0.2

Storage

- Minimum shelf life of Biresin® CR144 resin (A) is 24 month and of Biresin® CH141 hardener (B) and CA144 accelerator (C) is 12 month under room conditions (18 - 25°C), when stored in original unopened containers.
- After prolonged storage at low temperature, crystallisation of resin (A) may occur. This is easily removed by warming up for a sufficient time at a minimum of 60-80°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 safetyrelated 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.

Further information available at:

Sika Deutschland GmbH
Subsidiary Bad Urach
Stuttgarter Str. 139
D - 72574 Bad Urach
Germany

Tel: +49 (0) 7125 940 492
Fax: +49 (0) 7125 940 401
Email: tooling@de.sika.com
Internet: www.sika.com

DNV·GL

Certificate No:
TAK00001Y1

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Epoxy Systems

with type designation(s)
Biresin CR144

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 **2020-10-01**
This Certificate is valid until **2025-09-20**.
DNV GL local station: **Augsburg**

Approval Engineer: **Joachim Rehbein**

for **DNV GL**

Thorsten Lohmann
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Job Id: **262.1-032648-1**
Certificate No: **TAK00001Y1**

Product description

Epoxy resin Biresin CR144 with following hardener/accelerator:
- Biresin CH141 (hardener)
- Biresin CA144 (accelerator)

Material Properties

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

Property	Test Method	Unit	CR144
Tensile Strength	ISO 527-2	MPa	81
Fracture Elongation	ISO 527-2	%	5,28
HDT (A)	ISO 75-2	°C	129
DSC[2]	ISO 11357	°C	134[3]
Water Absorption[1]	ISO 175	mg	61
Curing procedure used for type testing: 3h at 80°C + 8h at 140°C			

Notes:
[1]: Water absorption after 168h
[2]: Material test by Sika Deutschland GmbH, dated 2020-08-14; curing 2h 90°C + 6h 120°C
[3]: Onset temperature, second run

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* and *type designation, 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