

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 Germanischer Lloyd f- Certificate No. WP 1520029 HH (attached)

Physical Data		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	~10,500	~40	~2
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			
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/cm ³	1.21
Shore hardness	ISO 868	-	D 87
Impact resistance	ISO 179	kJ/m ²	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 (T_g)
- 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 SikaAxson standard cycle is used to ensure that the full T_g 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			
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 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

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Statement of Approval

DNV·GL

Approval No. **WP 1520029 HH**

The material described below complies with the applicable requirements as given in the Rules and Regulations of GL. On this basis the material is

approved as **Laminating Resin**

for the construction of components provided that the recommendations for use as specified by the producer are observed.

Type **Biresin CR144**

Description **Three Component Epoxy Resin System**

Producer **SIKA Deutschland GmbH
Stuttgarter Str. 139
72574 Bad Urach
Germany**

Normative Reference **GL Rules for Classification and Construction,
II - Material and Welding Technology
Part 2 Non-Metallic Materials**

This document consists of this page and a one-page annex which is integral part of the approval.

This Statement of Approval is valid until 2019-11-05.

Hamburg, 2015-11-06

DNV GL


i.d.
Guido Michalek


Joachim Rehbein

Statement of Approval

DNV·GL

ANNEX

Approval No. WP 1520029 HH

Date: 2015-11-06

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Reference Documents	Technical specifications deposited at DNV GL SE, Hamburg.
Assessed Documents	- Technical Data Sheet - Test Reports issued by IFB Stuttgart and witnessed by DNV GL. - Test Report No. 116370/15 issued by SKZ TeConA GmbH
Fields of Application	Construction of FRP laminates of components, on condition that the fibre reinforcements comply with the applicable requirements of GL and are compatible to the resin.
Approved Variants	Epoxy resin Biresin CR144 with following hardener/accelerator: - Biresin CH141 - Biresin CA144
Limitations	Any significant changes in design and/or quality of the material will render the approval invalid.
Remarks	None
End of Annex	

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