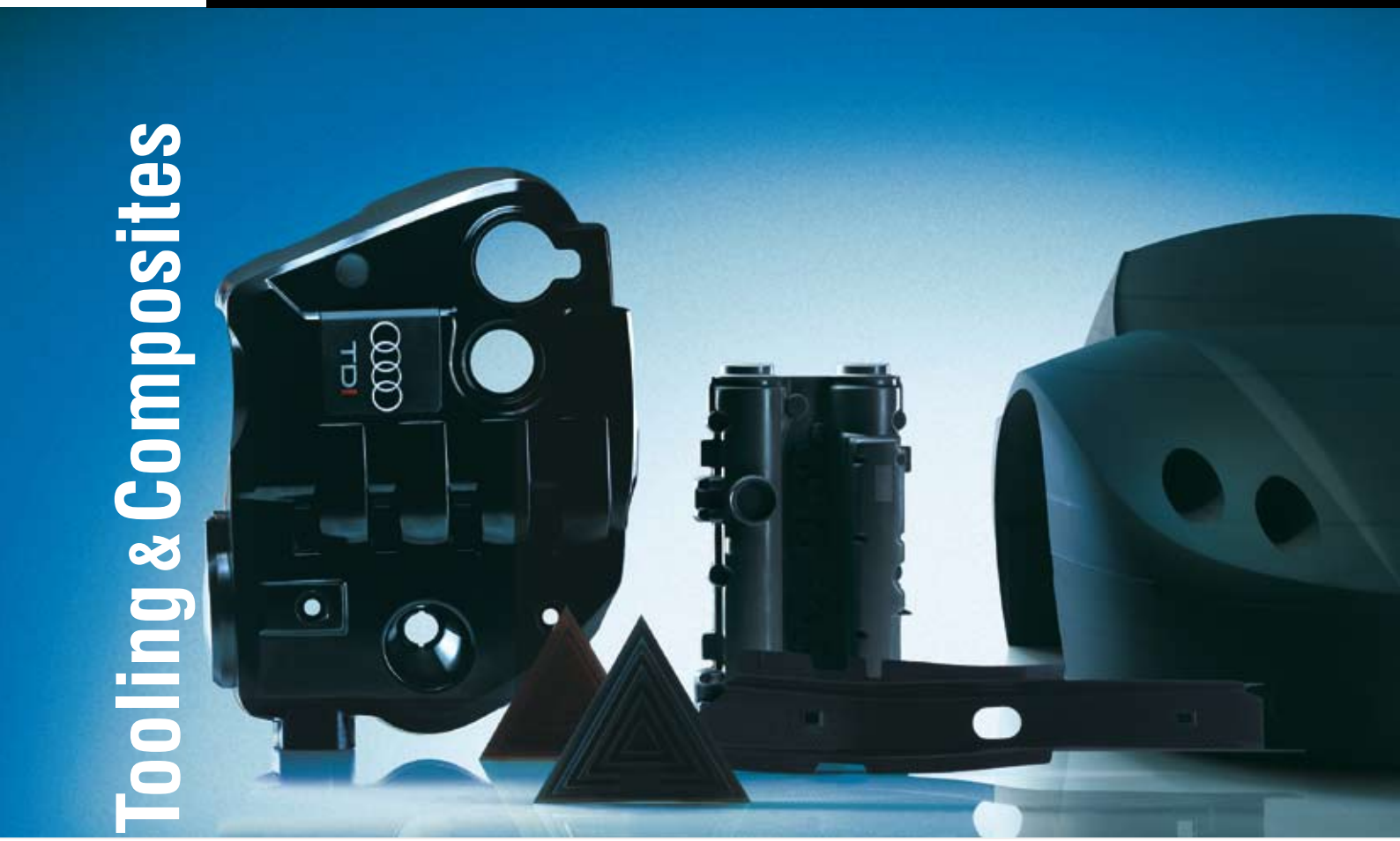
# Tooling & Composites



Innovation & Consistency | since 1910

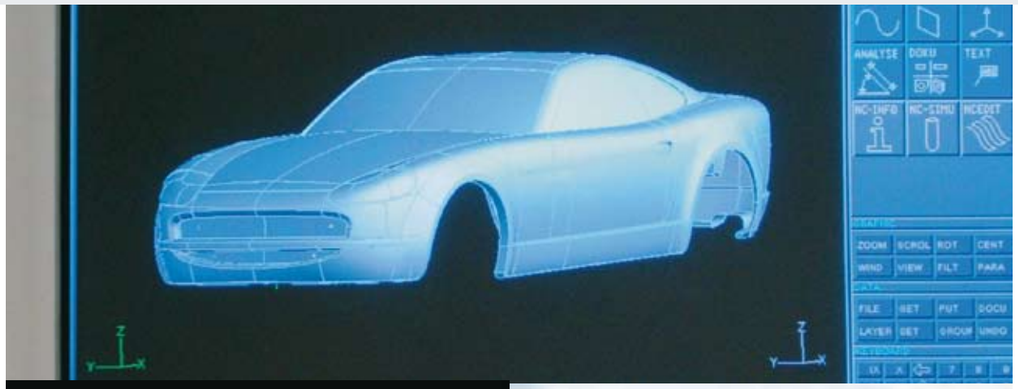
# Ideas take Shape

In the 100 years since the company was established by Kaspar Winkler in 1910, Sika has developed into a globally operating company for specialist chemicals. More than 12,000 employees all round the world work with our customers to create innovative products and solutions in the areas of construction chemicals and industry. Sika achieves a turnover of CHF 4.5 Billions per year.


As an integral part of this strong association but nevertheless operating independently, the company's Tooling & Composites division develops and produces customized products for pattern and mould construction, foundry systems, rapid production and composite production. All the core functions such as research and development, production, marketing/sales, and technical service, are gathered together at one location – in Bad Urach at the foot of the Schwäbische Alb. Customer requirements can thus be met quickly and efficiently and this is backed up by the possibility of exploiting the know-how of over 600 developers world-wide.

Our customers and their satisfaction are the focal point of our activities. For you, this means:

- Expert on-site consulting provided by our staff
- Training and technical support by a service team composed of experienced model makers and technicians
- A complete range of PUR- and EP-systems for the area of Tooling & Composites.
- World-wide availability of materials through a network of competent trading partners




# SikaBlock® and Biresin® – Our Product Groups


**Block materials and Model pastes**

The suitable system for any application.

- Model and Tooling boards
- Suitable Adhesive and Filler systems
- Model and mould making pastes

A wide range of application-oriented system solutions consisting of special SikaBlock® board materials and the associated Biresin® Adhesives and Fillers can be used for many applications in the construction of master-, design, styling and cubing models as well as for diverse moulds, foundry patterns and other manufacturing tools.

Biresin® Model pastes are tailor-made products for making joint-free design, styling and cubing models and diverse moulds in high quality.

**Vacuum Casting resins and RIM-systems**

Complicated mouldings quickly made.

- Vacuum Casting systems
- Low pressure RIM-systems

For classic rapid prototyping our Biresin® Vacuum Casting systems based on polyurethane are suitable. They are simulating the majority of characteristics of the thermoplastic series materials.

The same applies for the product group of the Biresin® Low pressure RIM-systems, which are processed with the help of 2-component-mixing and metering machines.
Because of very short demoulding times the LP-RIM-casting is suitable above all for serial production.

**Composite and laminating systems**

Together they are strong.

- High Performance Composite systems
- Gelcoats
- Laminating and Multipurpose resins

Biresin® Composite resins are specially designed for the production of high performance composites also giving good wetting of difficult carbon fibres, variable viscosity for different production processes and application temperature ranges from 80 to 170°C.

Excellent processing and good resistance to external influences are the deciding features of Biresin® gelcoats.

The Biresin® Laminating systems can be used in different stages of manufacture in the construction of models, negatives, moulds and tools.

**EP- and PUR-Casting systems**

Everything made in one casting.

- Fastcast resins
- EP-Casting resins
- Heat-resistant Casting resins
- PUR- and Backfill-Casting systems

The large range of Biresin® Tooling resins can be used in many different ways. They are suitable for the quick and inexpensive manufacture of production equipment such as foam-, RIM- and vacuumforming moulds or foundry patterns and metal sheet forming tools.

There are also suitable casting resins for making auxiliary items such as master and core models or negatives.

The system selected depends on the casting procedure in question, e.g. mass casting, backfill or facecasting.

**Elastomeric Casting resins**

Flexible also with regard to possible applications.

- Elastomeric Casting resins for mould making
- Elastomeric Casting resins for foundry pattern making

The range of elastomeric Biresin® PUR-Casting resins includes high-quality synthetic resin systems with a variety of shore hardness levels (Shore A40 – D70) and possible applications.

The soft elastic types are used for making flexible moulds and mouldings.

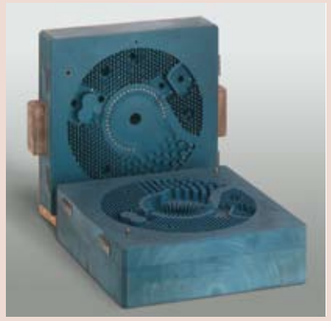
The tough elastic and tough hard types are suitable for shock resistant parts and abrasion resistant liners in foundry pattern making and special mechanical engineering.

# SikaBlock® Model and Tooling boards

Whether design or data control model, whether gauge or core box – SikaBlock® board materials are the optimum products for all applications. There are 12 different board types with densities of 0.08 to 1.2 kg/dm$^3$. They are available in different dimensions and thicknesses of up to 2500 x 1200 x 200 mm.
In accordance with requirements, the materials also differ in respect of their structure, as well as their mechanical and thermal characteristics.
Numerous quality checks help to monitor compliance with these standards.
For us, certification to DIN EN ISO 9001 is a natural expression of our attitude towards quality.

When it comes to development and product updates, we place special value on the following characteristics:

- Physiological harmlessness
- Easy to work material with little wear on tools
- Low levels of dust and smell
- Very small tension levels and therefore low deformation
- Low coefficient of thermal expansion and therefore dimensionally stable
- Homogeneous structure and dense surface quality
- Sufficient strength and heat resistance



## SikaBlock® Model Boards

| SikaBlock® | M80 | M150 Neu | M330 | M440 | M650 | M700 |
|---|---|---|---|---|---|---|
| Density [g/cm³] | 0.08 | 0.15 | 0.24 | 0.35 | 0.58 | 0.7 |
| Colour | yellowish | light green | siena | apricot | reddish brown | light brown |
| Characteristics | fine, dense surface; easily workable; low dust formation when milled | | excellent surface quality; very good milling behaviour with low dust formation | | easily workable; fine, dense surface; good compressive strength and edge stability, high heat distortion temperature; good solvent resistance | |
| Applications | styling models; design studies and test milling; substructure for design, styling and clay models | | design and styling models; substructure for cubing and DCM; simple laminating moulds | | master models, cubings, DCM, moulds and tools for lower number of pieces (low pressure RIM, vacuum forming, etc.) | |
| **Processing data** (approx. values) | | | | | | |
| Dimensions [mm]; *[ltr.]* | 2000 x 1000 x 100; *200*<br>2000 x 1000 x 200; *400*<br>other dimensions on request | 2000 x 1000 x 100; *200*<br>2000 x 1000 x 200; *400*<br>other dimensions on request | 2000 x 1000 x 50 ; *50*<br>2000 x 1000 x 100 ; *100*<br>2000 x 1000 x 200 ; *200*<br>1500 x 500 x 50 ; *37.5*<br>1500 x 500 x 100 ; *75*<br>1500 x 500 x 200 ; *150* | 1500 x 500 x 50 ; *37.5*<br>1500 x 500 x 75 ; *56.25*<br>1500 x 500 x 100 ; *75*<br>1500 x 500 x 200 ; *150* | 1500 x 500 x 30 ; *22,5*<br>1500 x 500 x 50 ; *37.5*<br>1500 x 500 x 75 ; *56.25*<br>1500 x 500 x 100 ; *75*<br>1500 x 500 x 150 ; *112.5*<br>1500 x 500 x 200 ; *150* | 1500 x 500 x 30 ; *22,5*<br>1500 x 500 x 50 ; *37.5*<br>1500 x 500 x 75 ; *56.25*<br>1500 x 500 x 100 ; *75*<br>1500 x 500 x 150 ; *112.5* |
| Adhesive **Biresin®**<br>Mixing ratio<br>Potlife<br>Setting time | **Foam Adhesive**<br>**1-component, humidity curing**<br>open time: 10 min<br>6-8 h | | **Kleber orange**<br>**100 : 65**<br>20 min<br>6-8 h | | **Kleber braun**<br>**100 : 65**<br>20 min<br>8-10 h | |
| Filler **Biresin®**<br>Mixing ratio<br>Potlife<br>Setting time | **Spachtel orange**<br>**100 : 2**<br>5 min<br>> 20 min | | | | **Spachtel braun**<br>**100 : 2**<br>5 min<br>> 20 min | |
| **Physical data** (approx. values) | | | | | | |
| Shore-hardness | - | - | D 25 | D 38 | D 58 | D 66 |
| Flexural strength [MPa] | 1.0 | 2.2 | 5 | 9 | 18 | 26 |
| CTE, $\alpha_T$ [1/K] | 50 x $10^{-6}$ | 65 x $10^{-6}$ | 65 x $10^{-6}$ | 65 x $10^{-6}$ | 55 x $10^{-6}$ | 55 x $10^{-6}$ |

## SikaBlock® Tooling Boards

| SikaBlock® | M940 | M960 | M970 | M980 | M1000 | M1050 |
|---|---|---|---|---|---|---|
| Density [g/cm³] | 1.2 | 1.2 | 1.2 | 1.35 | 1.0 | 1.0 |
| Colour | green | blue | turquoise | blue | white | grey |
| Characteristics | very abrasion resistant, excellent milling properties, very high strength | very abrasion resistant, excellent milling properties, impact resistant | extremely abrasion resistant, excellent milling properties, very high strength | very abrasion resistant, excellent milling properties, very high strength | low density, good compressive strength and edge stability, low thermal expansion and high dimensional stability | |
| Applications | foundry patterns and core boxes, metal sheet forming tools, mouldings and master models | | | | gauges, moulds, foundry and master models | |
| **Processing data** (approx. values) | | | | | | |
| Dimensions [mm]; *[ltr.]* | 1000 x 500 x 30 ; *15*<br>1000 x 500 x 50 ; *25*<br>1000 x 500 x 75 ; *37.5*<br>1000 x 500 x 100 ; *50* | | | | 1500 x 500 x 50 ; *37.5*<br>1500 x 500 x 75 ; *56.25*<br>1500 x 500 x 100 ; *75* | |
| Adhesive **Biresin®**<br>Mixing ratio<br>Potlife<br>Setting time | **Power Adhesive Thix**<br>**100 : 33**<br>30 min<br>16 hrs | | alternative | **Kleber grün**<br>**100 : 50**<br>~7 min<br>6 h | | |
| **Physical data** (approx. values) | | | | | | |
| Shore-hardness | D 82 | D 78 | D 84 | D 86 | D 75 | D 76 |
| Flexural strength [MPa] | 105 | 80 | 110 | 145 | 48 | 50 |
| HDT [°C] | 95 | 80 | 78 | 85 | 85 | 90 |
| CTE, $\alpha_T$ [1/K] | 82 x $10^{-6}$ | 85 x $10^{-6}$ | 68 x $10^{-6}$ | 60 x $10^{-6}$ | 50-55 x $10^{-6}$ | 50-55 x $10^{-6}$ |

# Biresin® Model and Mould Making Pastes

The manufacture of high-quality, completely joint-free design, styling and cubing models as well as moulds is the domain of Biresin® Model pastes.
They are mainly processed on 2-component mixing and metering machines. The cured resin systems are easy to finish to their correct dimensions by mechanical means. The results are joint-free, smooth surfaces with a high level of precision which can then be covered with layers of paint.

**Biresin® M72 –**
**the fastest model paste in the market**

- Low inherent stress allows application to largest areas
- Good adhesion on EPS without previous laminate layer
- Milling possible after 8 hours
- Very low dust when milling
- Resin Biresin® M72 Classic with better flowability
- Resin Biresin® M72 with increased thixotropy

**Biresin® M73 –**
**high heat distortion temperature, e.g. for wind power blades**

- Tg value 65°C without postcuring
- Heat resistance even without postcuring on the equivalent to postcured epoxy pastes – this saves time and money
- Excellent milling behaviour: very fine and dense surface
- Requires heat resistant substructures

**Biresin® M75 –**
**the mould making paste**

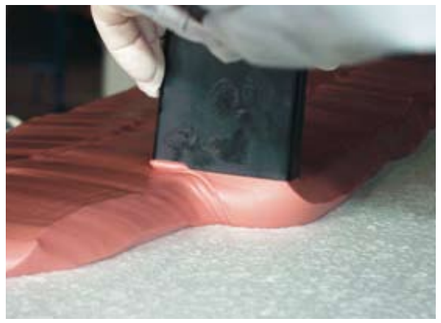
- Very fine and dense surface
- Very good resistance against chemical attack (such as polyester)
- In practice more than 80° C heat resistance
- No postcuring of the mould required

**Biresin® M82 –**
**the paste for large scale models**

- Very fine and dense surface
- Interruptions of working process possible at every time
- No postcuring of the mould required
- Postcuring increases temperature resistance

## Biresin® Model and Mould Making Pastes

| Biresin® | | M60 | | | M72 | M72 Classic | M73 | M75 | M82 |
|---|---|---|---|---|---|---|---|---|---|
| | B | M60 | S10 | F4 | M70 | | M70 | M70 | M82 |
| Mixing ratio [g] | A | 100 | | | 100 | | 100 | 100 | 100 |
| | B | 30 | 15 | 12,5 | 45 | | 56 | 48 | 100 |
| Colour | | brown | | | brown | | brown | grey | grey |
| Characteristics | | EP paste, high edge stability, easily workable, low shrinkage | | | PUR paste, easily workable, fine, dense surface, easy to varnish | | PUR paste, easy workable, fine dense surface, high thermal resistance, for heat resistant substructures | PUR paste, high thermal resistance, easy workable, very fine and dense surface | EP paste, easily workable, fine, dense surface, easy to varnish |
| Applications | | hand applicable paste with hardener M60, with F4 also castable, with S10 as adhesive | | | machine paste coating on substructure for the production of design, styling and cubing models | | | machine paste coating on substructure for the production of models and laminating moulds | machine paste coating on substructure for the production of design, styling and cubing models |
| **Processing data** (approx. values) | | | | | | | | | |
| Viscosity [mPas] | A | pasty | | | 15,000 | 9,000 | 18,000 | 15,000 | 70,000 |
| | B | pasty | 4,000 | < 10 | 175 | | 175 | 175 | 150,000 |
| Mixture | | pasty | pasty | castable | pasty | | pasty | pasty | pasty |
| Potlife [min] | | 30 | 15 | 20 | 10 - 15 (after coating) | | | | 20 - 30 ( after coating) |
| Workable after [h] | | > 16 | > 12 | > 16 | > 8 | | > 8 | > 8 | > 24 |
| Filler<br>Biresin®<br>Mixing ratio<br>Potlife<br>Setting time | | Spachtel braun<br>100 : 2<br>5 min<br>> 20 min | | | | | | recommendation:<br>Polyesterspachtel<br>Supermetall<br>(Hohnen & Co.) | |
| **Physical Data** (approx. values) | | | | | | | | | |
| Density [g/cm³] | | 0.77 | 0.7 | 0.75 | 0.9 | | 0.9 | 1.3 | 0.78 |
| Shore-hardness | | D 65 | D 69 | D 67 | D 65 | | D 70 | D 79 | D 59 |
| Flexural strength [MPa] | | 25 | 32 | 28 | 20 | | 32 | 61 | 19 |
| Tg value [°C] | | - | - | - | 47 | | 65 | 70 | 52 / 65* |



* after appropriate thermal treatment (refer to Product Data Sheet)

# Biresin® Vacuum Casting Systems

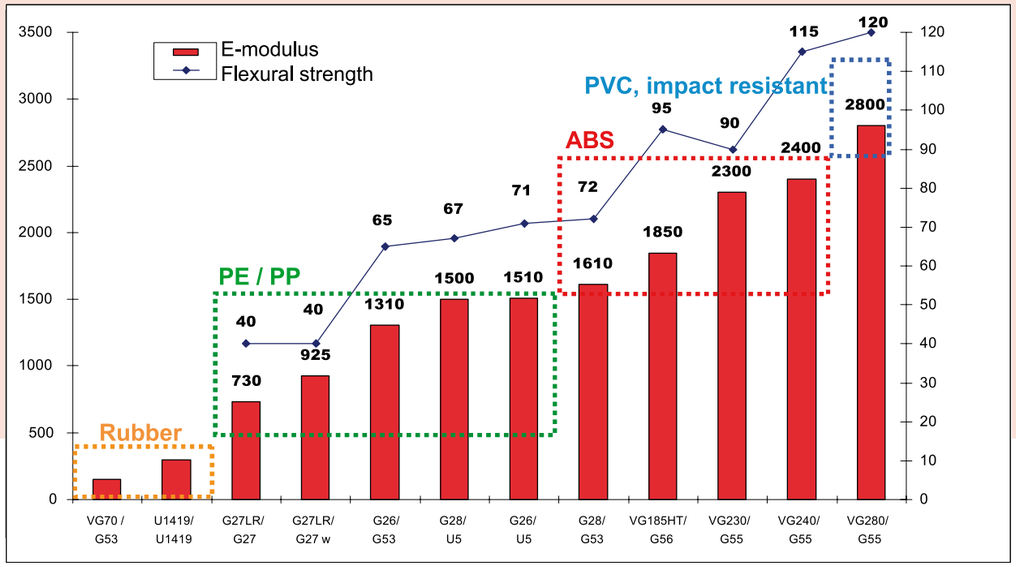
Application:

- Fast and cost-effective production of high-quality prototypes and short run parts
- Simulation of materials as used in serial production (like rubber, soft-PVC, polyethylene, polypropylene, ABS, PVC and others) in stage of development and preproduction for automotive industry, consumer goods and other technical parts
- Processing by easy hand casting or by means of vacuum casting equipment

Range of application:

- Modular assembly system with universal hardeners offers a wide range of E-moduli and further characteristics
- Biresin® VG70 and Biresin® U1419: Flexible systems with good elongation characteristics
- The fast setting fastcast resins with special hardeners present high-quality materials with an excellent price-performance ratio in this E-modulus area of PE, PP and ABS
- Biresin® VG185 HT in use for impact resistant ABS-housings of high heat resistance
- Biresin® VG230 and Biresin® VG280 excel by higher stiffness and strength at simultaneously high impact resistance. Adding of Biresin® G48 resin extends the potlife

**Biresin® Vacuum Casting systems**




## Biresin® Vacuum Casting Systems

| Biresin® | | VG 70 | U1419 | | G27 LR | | G 26 | | G 28 | | VG185 HT | VG230 | VG240 | VG280 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | | | | | | | | | | | | | |
| | B | G53 | U1419 | | G27 | G27 weiß | G53 | U5 | U5 | G53 | G56 | G55 | G55 | G55 |
| Mixing ratio [g] | A | **100** | **100** | | **100** | | **100** | | **100** | | **80** | **90** | **57** | **80** |
| | B | **18** | **16** | | **100** | **100** | **75** | **67** | **67** | **75** | **100** | **100** | **100** | **100** |
| Colour | | black | yellowish-transparent | | beige | white | beige | | beige | | black | yellowish-translucent | yellowish-translucent | yellowish-translucent |
| Characteristics | | flexible, simulates rubber, soft-PVC | high tear strength, high rebound elasticity, simulates PE, PP | | impact resistant, simulates PE, PP | | heat resistant, simulates PE, PP | | heat resistant, simulates PE, PP, ABS | | impact resistant, high heat distortion tempera-ture, simulates ABS | stiff, very impact resistant, simulates ABS | stiff, very impact resistant and high flexural strength | very stiff, high flexural strength, impact resist., simulates ABS, PVC |
| Applications | | sealing, bellows etc. | tough-hard mouldings | | thinwalled parts with complex structure | | thinwalled parts of good heat resistance | | thinwalled parts of good heat resistance | | impact and high heat resistant housings, thinwalled parts with complex structure | very impact resistant housings, covers and other mouldings | very impact resistant housings | very stiff housings and covers of high strength and impact resistance |
| **Processing data** (approx. values) | | | | | | | | | | | | | | |
| Mixed viscosity | [mPas] | 900 | 2,700 | | 50 | 30 | 120 | 110 | 120 | 150 | 1,500 | 900 | 950 | 600 |
| Potlife | [min] | 6 | 6-7 | | 4-5 | 4-5 | 2 | 1'40'' | 4 | 5 | 6-7 | 4 | 8 | 4 |
| Demoulding time | [min] | 45-60* | > 60* | | 60-90 | 60-90 | > 20 | > 20 | 60-90 | 60-90 | > 45* | 60* | 60* | 60-90* |
| **Physical data** (approx. values) | | | | | | | | | | | | | | |
| Density | [g/cm³] | 1.1 | 1.1 | | 1.1 | | 1.1 | | 1.1 | | 1.2 | 1.1 | 1.2 | 1.1 |
| Shore-hardness | | A 70 | A 100 (D 54) | | D 70 | D 70 | D 75 | D 77 | D 79 | D 79 | D 83 | D 82 | D 83 | D 84 |
| E-Modulus | [MPa] | - | - | | 730 | 925 | 1,310 | 1,510 | 1,500 | 1,610 | 1,850 | 2,300 | 2,400 | 2,800 |
| Tear strength | [N/mm] | 9 | 68 | | - | - | - | - | - | - | _ | - | - | - |
| Flexural strength | [MPa] | - | - | | 40 | 40 | 65 | 71 | 67 | 72 | 95 | 90 | 115 | 120 |
| Elongation at break | [%] | 200 | 375 | | - | - | - | - | - | - | - | - | - | - |
| Impact strength | [kJ/m²] | - | - | | 40 | 70 | 30 | 25 | 25 | 25 | 50 | > 100 | > 100 | > 100 |
| HDT | [°C] | - | - | | 75 | 70 | 95* | 105* | 102* | 95* | 120* | 70 | 90* | 80 |



*

# Biresin® Low Pressure RIM-Systems

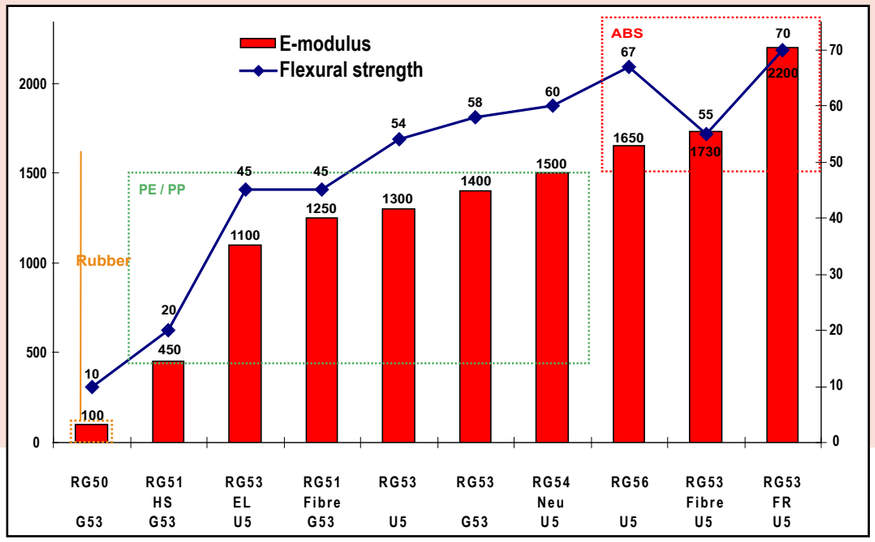
Application:

- Curing PUR resins for use on 2-component mixing and metering machines for the manufacture of individual parts or series manufacture of several thousand pieces
- Simulation of materials of serial production (like rubber, polyethylene, polypropylene, ABS, PVC, and others) in stage of development and preproduction for automotive industry, for household appliances, for rail vehicles, in aviation, in boat building and for other technical parts
- For small parts (< 0.1 ltr.) to big volume parts (appr. 20 ltr.)

Range of application:

- Unit assembly system with only two general-purpose hardeners:
  Biresin® U5 – hardener for higher temperature resistance
  Biresin® G53 – hardener for higher mechanical properties
- Natural (colourable) and coloured resins
- Biresin® RG51 Fibre and Biresin® RG53 Fibre as fibre filled products with very high impact resistance and stiffness for special applications, e. g. in automotive industry

**Biresin® Low Pressure RIM-Systems**




| Biresin® Low Pressure RIM-Systems | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Biresin®** | A | **RG50** | **RG51 HS** | **RG53 EL** | **RG51 Fibre** | **RG53** | | **RG54 Neu** | | **RG56** | **RG53 Fibre** | **RG53 FR** |
| | B | G53 | G53 | U5 | G53 | U5 | G53 | U5 | | U5 | U5 | U5 |
| Mixing ratio | A | **100** | **100** | **100** | **100** | **100** | | **100** | | **100** | **100** | **100** |
| [g] | B | **18** | **50** | **70** | **40** | **75** | **80** | **70** | | **80** | **60** | **54** |
| [ltr.] | B | **15** | **43** | | | **62** | **66** | | | | **58** | **52** |
| Colour | | black | black / beige | black | black | black / beige | | beige | | black | black | black |
| Characteristics | | very flexible, simulates rubber, soft-PVC | high impact resistant, wear resistant, simulates PE, PP | very impact resistant, thermal resistant, simulates PE, PP | very impact resistant, thermal resistant, simulates PE, PP | very impact resistant, thermal resistant, simulates PE, PP | | good impact resistance, long potlife, simulates PE, PP | | stiff, high flexural and impact strength, thermal resistant, simulates ABS | very impact resistant, thermal resistant, simulates ABS | flame-resistant (UL-test) thermal resistant, simulates ABS |
| Applications | | sealing, bellows etc. | shock-resistant housings and covers | housings and covers of medium stiffness | stiff housings and covers | housings and covers of medium stiffness | | big housings and covers | | housings and covers with high mechanical properties | stiff housings and covers | stiff housings and covers with UL94 V-0 |
| **Processing data (approx. values)** | | | | | | | | | | | | |
| Viscosity (Resin) | [mPas] | 1,200 | 1,300 | 2,000 | 2,600 | 2,200 | | 1.600 | | 2,900 | 6,000 | 3,500 |
| Potlife | [sec] | 100 | 60 | 60 | 45-50 | 60 | | 480 | | 50 | 50 | 70 |
| Demoulding time | [min] | 15 | > 10 | 5 - 10 | > 10 | > 10 | | 120 - 480 | | 4 - 6** | > 10 | > 10 |
| **Physical data (approx. values)** | | | | | | | | | | | | |
| Density | [g/cm³] | 1.1 | 1.15 | 1.2 | 1.25 | 1.2 | | 1.2 | | 1.18 | 1.2 | 1.27 |
| Shore hardness | | A 70 | D 65 | D 77 | D 75 | D 78 | D 80 | D 80 | | D 82 | D 81 | D 84 |
| E-Modulus | [MPa] | - | 450 | 1,100 | 1,250 | 1,300 | 1,400 | 1,500 | | 1,650 | 1,730 | 2,200 |
| Flexural strength | [MPa] | - | 20 | 45 | 45 | 54 | 58 | 60 | | 67 | 55 | 70 |
| Impact strength | [kJ/m²] | - | no break | 80 | 90 | 95 | 90 | 100 | | 60 | 48 | 35 |
| Notched bar impact strength | [kJ/m²] | - | 75 | - | 15 | - | - | - | | - | - | - |
| HDT | [°C] | - | 62 | 66 / 100* | 105** | 120* | 110* | 50 / 60* | | 100 / 125* | 127* | 110* |



* after appropriate thermal treatment (refer to Product Data Sheet) ** at 60°C tool temperature

* after appropriate thermal treatment (refer to Product Data Sheet)

# Biresin® High Performance Composite Systems

Aimed at part production and mould making applications in the transport, marine, wind energy and other industries, these high performance composite resins are designed to meet the highest standards of production process efficiency and end-use performance.
For infusion processes lower viscosity resins are available and for wet lay up, pultrusion and filament winding there are resins with optimized viscosity.
With different hardeners the potlife can be varied.
The resin/hardener systems are specially designed for the three application temperature ranges of 80-100°C, 120°C and 170°C.
Suitable gelcoats for mould making and parts production please find on pages 15/16.

**High performance composite resins with low viscosity for RTM and infusion**

- **Biresin® CR80, CR81** and **CR83** for temperature range up to 80°C
- **Biresin® CR120** for temperature range up to 120°C
- **Biresin® CR170** for temperature range up to 160°C and processing at elevated temperatures

- **Biresin® CR81** and **CR83** especially for processing of large and complex parts at low temperatures

- **Biresin® CR80, CR83** and **CR120** (all hardeners) and **Biresin® CR81** (hardener **Biresin®CH81-6**) have Germanischer Lloyd Approval as laminating resin for the construction of components

- In each product series the hardeners have the same mixing ratio so they can be blended easily for customized potlife
- High mechanical properties
- Good and fast wettabilty

**High performance composite resins with optimized viscosity for wet lay-up processing and filament winding**

- **Biresin® CR82** for temperature range up to 80°C (wet lay-up)
- **Biresin® CR84** for temperature range up to 80°C (filament winding)
- **Biresin® CR122** for temperature range up to 120°C and with good demoulding properties after room temperature curing
- **Biresin® CR132** for temperature range up to 130°C
- **Biresin® CR174** for temperature range up to 170°C

- **Biresin® CR82, CR84** and **CR122** (all hardeners) approved by Germanischer Lloyd as laminating resin for the construction of components
- **Biresin® CR122** with **Biresin® CH122-3** and **CH122-5** approved by Luftfahrt-Bundesamt (German Aeronautics Federal Office) as resin system for GRP-, CRP- and SRP parts for glider and power glider
- In each product series the hardeners have the same mixing ratio so they can be blended easily for customized potlife
- Excellent mechanical properties
- Very good wettability
- At elevated temperatures also suitable for injection processes

**Heat cured high performance composite resin for pultrusion and filament winding**

- **Biresin® CR141,** 3C-anhydride system for temperature range up to 140°C

- High mechanical properties
- Good and fast wettabilty
- Adjustment of the potlife via the accelerator component **Biresin® CA141**

## Biresin® High Performance Composite systems

| Biresin® | | CR80 | | | | CR81 | | | CR83 | | | CR120 | | CR170 | | CR82 | | | | CR84 | CR122 | | | CR132 | | CR141 | CR174 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | CH80-1 | CH80-2 | CH80-6 | CH80-10 | CH81-1 | CH81-6 | CH80-10 | CH83-2 | CH83-6 | CH83-10 | CH120-3 | CH120-6 | CH170-3 | | CH80-1 | CH80-2 | CH80-6 | CH80-10 | CH84-20 | CH122-1 | CH122-3 | CH122-5 | CH132-2 | CH132-5 | CH141 | CH174 |
| Mixing ratio [g] | A | **100** | | | | **100** | | | **100** | | | **100** | | **100** | | **100** | | | | **100** | **100** | | | **100** | | **100** | **100** |
| | B | **30** | | | | **30** | | | **30** | | | **30** | | **16** | | **27** | | | | **30** | **30** | | | **28** | | **90** | **40** |
| Characteristics | | good impregnation and fast wetting | | | | | | | | | | | | | | good impregnation, good non draining properties | | | | | | | | | | | |
| Applications | | RTM and infusion | | | | | | | | | | | | | | wet lay-up | | | | filament winding | wet lay-up | | | wet lay-up | | pultrusion, filament winding | wet lay-up and infusion |
| **Processing data (approx. values)** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Potlife, RT [min] | | 45 | 80 | 190 | 330 | 45 | 260 | 500 | 60 | 180 | 300 | 130 | 180 | 90/RT resp. 12/60°C | | 50 | 80 | 220 | 330 | 600 | 30 | 150 | 190 | 60 | 150 | > 24* | 240 |
| Mixed viscosity [mPas] | | 400 | 350 | 230 | 210 | 180 | 150 | 130 | 155 | 170 | 155 | 240 | 250 | 1,250 | | 740 | 600 | 400 | 390 | 575 | 310 | 370 | 380 | 360 | 550 | 600 | 700-1.000 |
| **Physical data (approx. values)** | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Postcuring conditions for mechanical values | | 12 h / 80°C | | | | 12 h/ 80°C | | | 8 h / 70°C | | | 12 h / 120°C | | 4 h / 160°C | | 12 h / 80°C | | | | 8 h / 70°C | 8 h / 100°C | 12 h / 80°C | | 8 h / 140°C | 12 h / 125°C | 3 h / 140°C | 8 h / 150°C |
| Tensile-E-Modulus [MPa] | | 2,900 | 2,900 | 3,000 | 3,000 | 2,900 | 3,000 | 3,050 | 2,960 | 3,200 | 3,100 | 2,800 | 2,700 | 2,800 | | 2,900 | 2,900 | 2,900 | 2,900 | 3.550 | 2.900 | 2,800 | 2,800 | 2,650 | 2,700 | 3,200 | 2,900 |
| Tensile strength [MPa] | | 78 | 81 | 83 | 80 | 79 | 81 | 79 | 129 | 134 | 131 | 80 | 80 | 69 | | 78 | 78 | 84 | 82 | 89 | 86 | 84 | 84 | 79 | 88 | 78 | 63 |
| Elongation at break [%] | | 7.1 | 6.1 | 6.3 | 6.5 | 6.4 | 6.0 | 5.4 | 4.7 | 8.4 | 7.9 | 5.8 | 6.1 | 6.1 | | 6.1 | 6.5 | 6.4 | 6.2 | 5,7 | 6.3 | 5.4 | 5.6 | 5.3 | 6.2 | 3.3 | 2.9 |
| Impact resistance [kJ/m²] | | 84 | 75 | 68 | 76 | - | - | - | 93 | 84 | 83 | 55 | 50 | 28 | | 68 | 70 | 55 | 56 | 76 | 58 | 47 | 34 | - | - | 18 | - |
| **Tg [°C]** | | **88** | **92** | **85** | **85** | **75** | **82** | **65** | **84** | **80** | **81** | **113** | **115** | **172** | | **83** | **90** | **83** | **85** | **81** | **103** | **114** | **119** | **130** | **135** | **139** | **174** |

* Adjustment of potlife via accelerator

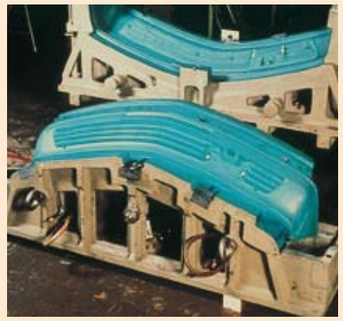
# Biresin® Gelcoats and Laminating Systems

## Gelcoats

Biresin® Gelcoats are very easy to apply and specially formulated. In accordance with their particular application, they have the necessary resistance to external influences such as mechanical, thermal or chemical stress. In other cases, the fact that they are easy to work and colour plays an important role. The gelcoats are used in the construction of models, moulds and tools as well as in composite applications.

## Laminating and Multipurpose resins

Biresin® Laminating and Multipurpose resins offer very good wetting behaviour of reinforcing fibres and fillers. The results are high-grade laminates with excellent strength. Their low viscosity allows bonding of large amounts of grainy filling materials for backfill stamping. They are also used for coupling layers. Biresin® Laminating pastes enable time-saving manufacture of reinforcing layers. Here, layers several centimetres thick can be built up in a single stage of work.



## Biresin® Laminating and Multipurpose Resins

| Biresin® | | A | LS | | | | L80 | | | L74 | L84 | | | L89 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | B | LS | F4 | S10 | S12 | l80 | L80 R | S12 | L74 | L84 | S12 | L84 T | L89 |
| Mixing ratio | [g] | A | 100 | | | | 100 | | | 100 | 100 | | | 100 |
| | | B | 12 | 18 | 22 | 16 | 25 | 25 | 12 | 17 | 25 | 20 | 24 | 14 |
| Colour | | | yellowish-transparent | | | | white | | | yellowish-transparent | yellowish-transparent | | | blue |
| Characteristics | | | all-purpose, variable potlife and viscosity | | | | filled, very high dimensional accuracy | | | high heat resistance after post curing | all-purpose, high mechanical strength and heat resistance | | | fibre reinforced, high dimensional accuracy, heat resistant |
| Applications | | | ordinary laminates, coupling layers and backstampings | | | | true-to-size laminates for gauges and models | | | injection moulds and other heat resistant moulds | laminating moulds, vacuumforming moulds, heat resist. backstampings | | | lam. paste for reinforcement of big negatives, models, moulds and tools |
| **Processing data** (approx. values) | | | | | | | | | | | | | | |
| Mixed viscosity | [mPas] | | 830 | 350 | 3,500 | 1,230 | 3,400 | 2,500 | 2,000 | 780 | 390 | 1,090 | 590 | pasty |
| Potlife | [min] | | 55 | 80 | 10 | 60 | 40 | 45 | 70 | 120-150 | 40 | 20 | 60 | 60 |
| Demoulding time | [h] | | 12 | 16 | 8 | 12 | 20-24 | 20-24 | 16-20 | 24 + post curing | 24 | 24 | 24 + p. c. | 24 |
| **Physical data** (approx. values) | | | | | | | | | | | | | | |
| Density | [g/cm³] | | 1.2 | | | | 1.3 | | | 1.1 | 1.1 | | | 1.0 |
| Shore-hardness | | | D83 | D 80 | D 83 | D 82 | D 86 | D 87 | D 85 | D 85 | D 82 | D 84 | D 86 | D 75 |
| Flexural strength | [MPa] | | 87 | 88 | 108 | 96 | 72 | 76 | 78 | 120* | 76 | 130 | 131* | 40 |
| HDT | [°C] | | 48 | 46 | 82* | 72* | 48 | 49 | 80* | 150* | 100* | 91* | 110* | 60 |

## Biresin® Gelcoats

| Biresin® | | A | S5 | | S8 | S10 | | | S12 | S15 | | S16 | S19 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | B | P7 | S15 | S8 | S10 | | | S12 | S15 | S15 R | S16 | S19 |
| Mixing ratio | [g] | A | 100 | | 100 | 100 | | | 100 | 100 | | 100 | 100 |
| | | B | 20 | 13 | 20 | 10 | | | 8 | 7 | 10 | 10 | 12 |
| Colour | | | transparent | | black | white | blue | | grey | green | | blue-grey | grey |
| Characteristics | | | good wetting, mechanical resistant | | polishable to high gloss, heat resistant, good styrene resistance | good spreading properties and easily workable | | | heat resistant, abrasion resistant, good solvent and styrene resistance | workable, good chemical resistance | | high abrasion and mechanical resistance | high heat resistance |
| Applications | | | transparent gelcoat for CFRP-mouldings | | vacuumforming moulds, master models, moulds for composite production | master models, gauges, negatives | | | vacuumforming moulds, foundry patterns, moulds for composite production | polyester, foam and LP-RIM-moulds, moulds for composite production | | foundry patterns, match plates | vacuumforming moulds, injection moulds, moulds for composite production |
| **Processing data** (approx. values) | | | | | | | | | | | | | |
| Potlife | [min] | | 20 | 37 | 30 | 35 | | | 30 | 60 | 25 | 20 | 45-60 |
| Geltime | [min] | | > 30 | 75 | 60 | 60 | | | 45 | 150 | 50 | 45 | 150-180 |
| Demoulding time | [h] | | 12-24 | 24 | 16-24 | 12-24 | | | 16-24 | 16 | 16 | 16 | 24 |
| **Physical data** (approx. values) | | | | | | | | | | | | | |
| Density | [g/cm³] | | 1.15 | | 1.22 | 1.5 | | | 2.1 | 1.55 | | 1.8 | 1.75 |
| Shore hardness | | | D 85 | | D 86* | D 88 | | | D 92 | D 88 | | D 87 | D 85 |
| Flexural strength | [MPa] | | 103 | 131 | 90* | 63 | | | 78 | 89 | 83 | 95 | 73 |
| HDT | [°C] | | 102* | 92* | 136* | 48 | | | > 100* | 103* | 100* | 96* | > 150* |

* after appropriate thermal treatment (refer to Product Data Sheet)



* after appropriate thermal treatment (refer to Product Data Sheet)

# Biresin® Fastcast Resins

- Biresin® Fastcast resins

Biresin® Fastcast resins offer high flowability, a quick curing and this result in quick demoulding. They are easily workable. The wide range of products is characterised by filled and unfilled systems.

- Filled Biresin® Fastcast resins

Filled Biresin® Fastcast resins are especially suitable for making e.g. master and core models and negatives with large dimensions and are characterized by low shrinkage.

- Unfilled Biresin® Fastcast resins

The unfilled Biresin® Fastcast resins are usually used for making detailed models and mouldings with thin walls due to their excellent flowability. They can, however, be casted for thicker layers by adding filling materials to them.

## Biresin® Fastcast Resins - Filled

| Biresin® | | G21 | G24 | G25 |
|---|---|---|---|---|
| | B | G21 | G24 | G24 |
| Mixing ratio [g] | A | **100** | **100** | **100** |
| | B | **15** | **100** | **100** |
| Colour | | light grey / black | blue | green-beige |
| Characteristics | | easily workable, short demoulding time, very fine structure, low shrinkage | easily workable, good flowability, very low shrinkage | |
| Applications | | master and core models, negatives and mouldings of medium size | master and core models, negatives and mouldings of larger dimensions | |
| **Processing data** (approx. values) | | | | |
| Mixed viscosity [mPas] | | 2,100 | 600 | 700 |
| Potlife [min] | | 5-6 | 8 | 4-5 |
| Demoulding time [min] | | 30 | > 120 | 30 |
| **Physical data** (approx. values) | | | | |
| Density [g/cm³] | | 1.7 | 1.6 | 1.6 |
| Shore-hardness | | D 80 | D 80 | D 80 |
| Compr. strength [MPa] | | 75 | 80 | 80 |
| HDT [°C] | | 80 | 75 | 85 |

## Biresin® Fastcast Resins - Unfilled

| Biresin® | | G26 | | G27 | | | G27 LV | G27 LR | | G28 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | G26 | G27 | G27 | G27 w | G55 | G26 | G27 | G27 w | G26 | G27 | G27 w |
| Mixing ratio [g] | A | **100** | | **100** | | | **100** | **100** | | **100** | | |
| | B | **100** | **100** | **100** | **100** | **80** | **100** | **100** | **100** | **100** | **100** | **100** |
| Colour | | beige | | beige | white | | beige-grey | beige | white | beige | | white |
| Characteristics | | easily workable, short demoulding time, very fine structure, high filler loading | | | | | | easily workable, longer potlife, low shrinkage, good flowability, high filler loading | | | | |
| Applications | | models, core models, negatives, pattern, small and medium size art and craft articles with detailed shape | | | | | | models, core models, negatives and pattern articles with medium to large dimensions | | | | |
| **Processing data** (approx. values) | | | | | | | | | | | | |
| Mixed viscosity [mPas] | | 70 | 80 | 50 | 30 | 140 | 35 | 50 | 30 | 80 | 90 | 60 |
| Potlife [min] | | 3-4 | 2-3 | 2´15´´ | 2´15´´ | 1´30´´ | 2´20´´ | 4-5 | 4-5 | 7-8 | 6-7 | 6-7 |
| Demoulding time [min] | | > 30 | > 25 | > 20 | > 20 | > 15 | > 15 | > 70 | > 90 | 2-3 h | 2 h | 2-3 h |
| **Physical data** (approx. values) | | | | | | | | | | | | |
| Density [g/cm³] | | 1.1 | | 1.1 | | | 1.1 | 1.1 | | 1.1 | | |
| Shore-hardness | | D 70 | D 70 | D 70 | D 70 | D 75 | D 70 | D 70 | | D 68 | D 69 | D 68 |
| Flexural strength [MPa] | | 40 | 45 | 55 | 40 | 60 | 45 | 40 | | 41 | 40 | 35 |
| Impact strength [kJ/m²] | | 20 | 25 | 25 | 60 | 50 | 23 | 40 | 69 | 20 | 28 | 40 |
| HDT [°C] | | 75 | 80 | 80 | 75 | 75 | 75 | 75 | 70 | 75 | 80 | 75 |

# Biresin® EP- and PUR-Casting Systems

The large range of Biresin® Casting resins based on epoxy and polyurethane can be used in many different ways. The resin systems are highly resistant to mechanical or thermal influences. The system selected depends on the casting procedure in question, e.g. mass casting, backfill or facecasting.

## EP-Casting resins

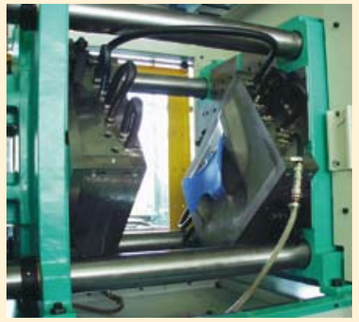
In accordance with their particular application, the Biresin® EP-Casting resins have a good resistance to chemical stress and / or abrasion. Therefore they are suitable for the quick and inexpensive manufacture of production equipment such as foam-, RIM- and vacuumforming moulds as well as foundry patterns and metal sheet forming tools.

## Heat-resistant Casting resins

The heat-resistant Biresin® Casting resins belong to an independent product group. According to the product and application the necessary heat resistance is obtained by post treatment or by thermal running. Possible applications are vacuumforming moulds, injection moulds or other production equipment for higher temperatures.

## PUR- and Backfill-Casting systems

Biresin® PUR- and Backfill-Casting Systems are suitable above all for inexpensive solutions for production equipment by mass casting or backfill casting. For very light backfilling EP foam Biresin® VP680 can be applied.



### Biresin® EP-Casting Resins

| Biresin® | | G30 | | | G32 | | G33 | G37 | | | G49 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | | | | | | | | | | | |
| | B | G30 | F4 | S10 | F4 | F2 | S15 | F1 | F4 | S12 | L80 | L80 R |
| Mixing ratio [g] | A | 100 | | | 100 | | 100 | 100 | | | 100 | |
| | B | 10 | 5 | 5 | 7 | 17 | 6 | 10 | 5 | 5 | 36 | 36 |
| Colour | | black | | | green | | black | grey | | | milky-white | |
| Characteristics | | all-purpose, workable, abrasion resistant, low shrinkage | | | low viscosity, high filler loading and high casting thickness | | very hard, high abrasion resistance, very low shrinkage | high abrasion resistance, very low shrinkage | | | low viscosity, good impact strength and dimensional accuracy | |
| Applications | | foundry patterns, metal sheet forming tools | | | backfilling in foundry pattern and mould making | | abrasion resistant ways | facecasting layer for foundry patterns and diverse moulds | | | impact resistant moulds and mouldings for diverse applications | |
| **Processing data** (approx. values) | | | | | | | | | | | | |
| Mixed viscosity [mPas] | | 14,500 | 4,000 | 35,000 | 1,700 | 2,600 | 6,000 | 23,000 | 4,600 | 15,000 | 3,000 | 3,000 |
| Potlife [min] | | 60 | 45 | 20 | 70 | 180 | 45-60 | 90 | 90 | 60 | 40 | 35 |
| Demoulding time [h] | | 12-16 | 24-48 | > 12 | 24 | 48 | 16 | 16-24 | 16-24 | 12 | 24 | 12-16 |
| **Physical data** (approx. values) | | | | | | | | | | | | |
| Density [g/cm³] | | 2.1 | | | 1.6 | | 1.9 | 2.3 | | | 1.1 | |
| Shore-hardness | | D 87 | D 88 | D 88 | D 90 | D 86 | D 90 | D 89 | D 88 | D 90 | D 74 | D 78 |
| Compr. strength [MPa] | | 96 | 109 | 139 | 112 | 71 | 120 | 105 | 109 | 124 | 70 | 77 |
| HDT [°C] | | 67 | 63 | 65 | 51 | 48 | 95* | 85* | 60 | > 100* | - | - |

### Heat-Resistant Biresin® Casting Resins

| Biresin® | | G36 | | | G38 | G46 AL |
|---|---|---|---|---|---|---|
| | A | | | | | |
| | B | G36 | L74 | P7 | G38 | G46 |
| Mixing ratio [g] | A | 100 | | | 100 | 100 |
| | B | 10 | 6 | 8 | 7 | 25 |
| Colour | | grey | | | grey | grey |
| Characteristics | | workable, can be casted in thick sections, very heat resistantig | | | good flowing and degassing properties, very heat resistant | easily workable, can be casted in thick sections, heat resistant |
| Applications | | vacuumforming moulds and other heat resistant tools | | | heat resistant moulds, e.g. vacuumforming moulds | |
| **Processing data** (approx. values) | | | | | | |
| Mixed viscosity [mPas] | | 18,000 | 6,700 | pasty | 10,500 | 3,000 |
| Potlife [min] | | 60-120 | 60-120 | 30 | 120 | 20-25 |
| Demoulding time [h] | | 24* | 24* | 16-24* | 16-24 | 12-16 |
| **Physical data** (approx. values) | | | | | | |
| Density [g/cm³] | | 1.7 | | | 1.8 | 1.7 |
| Shore-hardness | | D 89 | | | D 90* | D 87 |
| Compr. strength [MPa] | | 130* | 135* | 130* | 112* | 91 |
| HDT [°C] | | 141* | > 220* | 141* | > 130* | 80 |

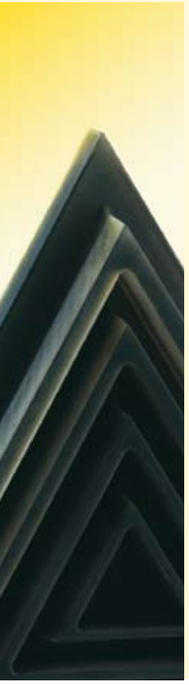
### Biresin® PUR- and Backfill-Casting Systems

| Biresin® | | G46 | G48 | G48 | G48 | VP680 |
|---|---|---|---|---|---|---|
| | A | | | | | |
| | B | G46 | G55 | G55 | G55 | E670 |
| | C | - | - | TE-Füller | Al-Pulver | E670 blowing agent |
| Mixing ratio [g] | A | 100 | 100 | 100 | 100 | 100 |
| | B | 25 | 100 | 100 | 100 | 30 |
| | C | - | - | 350 | 250 | 1-3 |
| Colour | | beige | opaque | beige | grey | light brown |
| Characteristics | | easily workable, can be casted in thick sections, high dimensional accuracy | easily workable, high filler loading, abrasion and impact resistant | easily workable, can be casted in thick sections, high compressive strength | | unsensitive against humidity, slow blowing reaction |
| Applications | | master and core models, negatives, foundry patterns | facecasting layer for metal sheet forming tools and foundry patterns | backfilling for metal sheet forming tools and foundry patterns | | very light backfilling |
| **Processing data** (approx. values) | | | | | | |
| Mixed viscosity [mPas] | | 3,000 | 1,500 | castable | castable | castable |
| Potlife [min] | | 40 | 45-60 | 45-60 | 45-60 | 5-10 |
| Demoulding time [h] | | 16-24 | 16-24 | 16-24 | 16-24 | 24 |
| **Physical data** (approx. values) | | | | | | |
| Density [g/cm³] | | 1.7 | 1.15 | 1.7 | 1.7 | ~ 0.3 |
| Shore-hardness | | D 87 | D 80 | D 84 | D 84 | - |
| Compr. strength [MPa] | | 110 | 94 | 104 | 90 | - |
| HDT [°C] | | 80 | 75 | - | - | - |

* after appropriate thermal treatment (refer to Product Data Sheet)

* after appropri-

# Elastomeric Biresin® Casting Resins



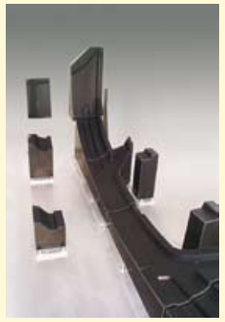
The range of elastomeric Biresin® PUR-Casting resins includes high-quality synthetic resin systems with a variety of shore hardness levels (Shore A40 – D70) and possible applications.

- Elastomeric Casting resins for foundry pattern making

The tough elastic types, are mainly used for foundry pattern making. Due to their very high resistance to abrasion, they are suitable for long-life surface layers of core boxes and match plates.

- Elastomeric Casting resins for mould making

The soft elastic types with very high elongation qualities are used for making flexible moulds (similar to silicone) and for castings made of the most varied of materials (even ceramic). The tough elastic products are suitable for more high-resistant moulds and mouldings as well as for wear-resistant coatings in special machine construction.



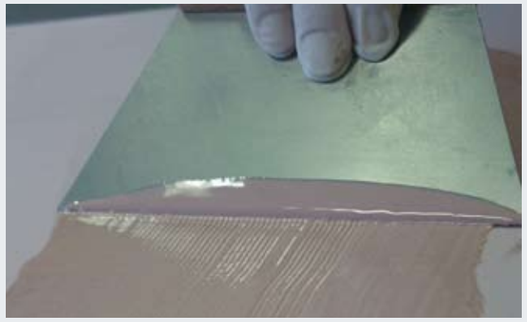
## Elastomeric Biresin® Casting Resins for Foundry Pattern Making

| Biresin® | | | U1419 | | U1305 B | U1316 | U1320 | | |
|---|---|---|---|---|---|---|---|---|---|
| | B | | U1419 | U1320 L | G55B | U1320 L | U1320 L | U1303 | U1320 S Neu |
| Mixing ratio [g] | A | | 100 | | 100 | 100 | 100 | | |
| | B | | 16 | 26 | 95 | 33 | 38 | 38 | 70 |
| Colour | | | coloured-transparent | | ivory | yellowish-transparent | light beige | light beige | green |
| Characteristics | | | abrasion resistant, impact and tear resistant, good flowability | | favourable physiology, abrasion resistant, impact and tear resistant, good flowability | resistant, impact and tear resistant, long potlife, good flowability | very abrasion resistant, very impact and tear resistant | | |
| Application | | | abrasion anCharacteristicst parts and tools, e. g. core boxes | | abrasion and impact resistant parts and tools, e. g. smaller core boxes | abrasion and impact resistant parts and tools, e. g. larger core boxes | high abrasion resistant match plates and with larger dimensions | fast repair, smaller core boxes | high abrasion resistant gelcoat for foundry patterns and core boxes |
| **Processing data (approx. values)** | | | | | | | | | |
| Mixed viscosity [mPas] | | | 2,800 | 3,500 | 550 | 4,000 | 7,000 | 7,000 | spreadable |
| Potlife [min] | | | 6-7 | 25-30 | 6-8 | 25-30 | 20 | 10 | 18 |
| Demoulding time [h] | | | 1-3 | 24 | 12-16 | 16 | 12-16 | > 4 | 12-16 |
| **Physical data (approx. values)** | | | | | | | | | |
| Density [g/cm³] | | | 1.1 | | 1.2 | 1.1 | 1.1 | 1.1 | 1.2 |
| Shore-hardness | | | A 98 (D 54) | A 96 (D 50) | D 65 | D 60 | D 67 | D 67 | D 67 |
| Tear strength [N/mm] | | | 68 | 30 | 80 | 83 | 100 | 105 | 98 |
| Elongation at break [%] | | | 375 | 160 | 190 | 150 | 140 | 135 | 135 |
| Abrasion resistance [mm³] | | | 90 | 150 | 130 | 120 | 68 | 68 | 140 |

## Elastomeric Biresin® Casting Resins for Mould Making

| Biresin® | | U1404 | | U1404 | | | | U1406 | | | U1303 | | U1305 | 407 | 408 | 411 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | B | U1404 | U1434 | + U1404 + U1419 L | | | | U1405 | U1406 | | U1303 | U 1402 | U1305 | G55 | G55 | G53 |
| Mixing ratio [g] | A | 80 | 50 | 100 | | | | 100 | 100 | | 100 | | 100 | 100 | 100 | 100 |
| | B | 100 | 100 | 54 | 32 | 10 | - | 50 | 30 | | 15 | 35 | 60 | 53 | 66 | 48 |
| | | | | 6 | 8 | 10 | 11 | | | | | | | | | |
| Colour | | reddish-transparent | light-beige | reddish-transparent | | | | yellowish-transparent | yellowish-transparent | | amber-transparent | coloured-transparent | cream-white | grey | beige | beige |
| Characteristics | | very soft, high elongation, low shrinkage | | 3-component mix: Shore A 40-A 80 variable | | | | high elasticity and tear strength, insensitive to moisture | | | rubbery, insensitive to moisture | | high abrasion resistance, can be accelerated by HC586 | high abrasion resistance, can be accelerated by HC586 | processed by 2-component unit, high wear resistance | processed by 2-component unit, fast curing |
| Application | | ceramic industry, flexible moulds and components | | ceramic industry, flexible moulds and components | | | | ceramic industry, flexible moulds and components | | | ceramic industry, moulds for concrete mouldings, flexible mouldings | | wear resistant coating, electronic encapsulation | wear resistant coating, electronic encapsulation, moulds for concrete | flexible and wear resistant mouldings and coatings | flexible moulds, e.g. for edge casting |
| **Processing data (approx. values)** | | | | | | | | | | | | | | | | |
| Mixed viscosity [mPas] | | 3,000 | 3,700 | 3,000-5,800 | | | | 2,500 | 2,800 | | 7,500 | 4,000 | 2,300 | 700 | 2,300 / 40°C | 800 |
| Potlife [min] | | 25 | 20 | 60 | 90 | 100 | 100 | 20 | 15-20 | | 45 | 25 | 15-20 | 25-30 | 100-110 sec / 40°C | 1 |
| Demoulding time [h] | | 24 | > 16 | 24 | | | | > 16 | > 16 | | 16 | 16 | 10-16 | 16-24 | 1 / tool 50°C | 1,5 |
| **Physical data (approx. values)** | | | | | | | | | | | | | | | | |
| Density [g/cm³] | | 1.05 | 1.3 | 1.05 | | | | 1.05 | 1.05 | | 1.05 | | 1.2 | 1.15 | 1.25 | 1.1 |
| Shore-hardness | | A 40 | A 55 | A 47 | A 60 | A 74 | A 80 | A 42 | A 55 | | A 73 | A 81 | A 89 | A 85 | A 94 | A 87 |
| Tear strength [N/mm] | | 7 | 9 | 12 | 16 | 25 | 40 | 5.5 | 12 | | 9 | 18 | 27 | 17 | 45 | 21 |
| Elongation at break [%] | | > 600 | > 600 | 1,000 | 1,000 | 1,000 | 800 | 300 | 450 | | 280 | 400 | 300 | 220 | 340 | 90 |

# Biresin® Adhesive and Filler Systems



The Biresin® Adhesive and Filler systems are specially adapted to SikaBlock® boards. This relates to colour and mechanical-physical properties. This results in a similiar behaviour regarding machinability and subsequent use in application.

■ Biresin® Adhesives

In the development of adhesives, special attention is paid to achieving a sufficiently high degree of adhesive strength and rapid curing.

■ Biresin® Filler systems

The creamy-soft consistence of the filler systems results in easy application properties. They are also suitable for levelling, repairing and moulding of models and negatives out of Biresin® Tooling resins, wood and metal etc. for model-, mould and tool making.

| Biresin® Adhesives | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Biresin®** | | A | **Kleber orange** | **Kleber braun** | | **Power Adhesive Thix** | **M60** | **G26** | **G28** | **Foam Adhesive** | **Kleber grün** |
| | | B | G53 | G53 | | Power Adhesive | S10 | G26 | G26 | - | G46 |
| Mixing ratio | [g] | A | **100** | **100** | | **100** | **100** | **100** | **100** | **-** | **100** |
| | | B | **65** | **65** | | **33** | **15** | **100** | **100** | **-** | **50** |
| Colour | | | orange | brown | | yellowish- transparent | brown | beige | beige | colourless | green |
| Characteristics | | | colour and mechanical properties adjusted to M440 | colour and mechanical properties adjusted to M700 | | resistant to high mechanical stresses, good chemical resistance | similar properties like M650, M700 | very fast curing, good mechanical properties | fast curing, good mechanical properties | one component adhesive, humidity curing | resistant to high mechanical stresses, |
| Application | | | bonding of M440, M330, M150 Neu, M80 | bonding of M650, M700 | | bonding of tooling boards | bonding of M650, M700 | very fast bonding of model boards | fast bonding of model boards | for M80, M150 Neu, M330 | bonding and filler for tooling boards |
| **Processing data** (approx. values) | | | | | | | | | | | |
| Material consumption | [kg/m²] | | 0.9 | 0.9 | | 0.7 | 0.6 | 0.7 | 0.7 | 0.1 | 0.7 |
| Potlife | [min] | | 20 | 20 | | 30 | 15 | 3-4 | 7-8 | open time: 10 | 7 - 8** |
| Setting time | [h] | | 6-8 | 6-8 | | 16 | 7-8 | 45 min | 2 | 6-8 | > 6** |
| **Physical data** (approx. values) | | | | | | | | | | | |
| Density | [g/cm³] | | 0.8 | 0.8 | | 1.16 | 0.7 | 1.1 | 1.1 | 0.1-0.2 | 1.3 |
| Shore-hardness | | | D 61 | D 63 | | D 80 | D 69 | D 70 | D 68 | - | D 82 |
| Flexural strength | [MPa] | | 28 | 30 | | 58 | 32 | 40 | 41 | - | - |

| Biresin® Filler Systems | | | | | |
|---|---|---|---|---|---|
| **Biresin®** | | A | **Spachtel orange** | **Spachtel braun** | **Spachtel weiß** |
| | | B | BPO-Paste | BPO-Paste | BPO-Paste |
| Mixing ratio | [g] | A | **100** | **100** | **100** |
| | | B | **2** | **2** | **2** |
| Colour | | | orange | brown | white |
| Characteristics | | | good adhesion, non sticking and fast curing, easily to grind | | |
| | | | colour adjusted to M440 | colour adjusted to M700 | suitable for M1000 |
| Applications | | | levelling, repair and modeling of surfaces | | |
| | | | M440, M330, M150 Neu, M80 | M650, M700 | M1000, M1050 |
| **Processing data** (approx. values) | | | | | |
| Potlife | [min] | | 5 | 5 | 5 |
| Setting time | [min] | | > 20 | > 20 | > 20 |
| **Physical data** (approx. values) | | | | | |
| Density | [g/cm³] | | 1.3 | 1.6 | 1.9 |
| Shore-hardness | | | D 58 | D 70 | D 75 |



* after appropriate thermal treatment (refer to Product Data Sheet) ** acceleration with Biresin HC 586 possible (refer to Product Data Sheet)

# Auxiliary Materials

## Filling materials

Filling materials serves for modification of properties of Biresin® Laminating-, Multipurpose- and Casting resins, e.g. for improving the shrinkage and adapting the thermal conductivity. Especially on castings of higher volumes the material costs can be reduced.


## Additives

Additives are added to Biresin® systems to reach a specific thixotropy, thinning, acceleration or colouring of products.

**Filling Materials**

| Name | Aluminiumgrieß | Aluminiumpulver (AL-Sprühgrieß) | KR-Füller grob | KR-Füller fein | LF-Füller | | TE-Füller | PVC-Brandgranulat |
|---|---|---|---|---|---|---|---|---|
| Colour | silver to matt-grey | silver to matt-grey | white | white | white | | grey | grey |
| Delivery unit | 25 kg paper bag | 25 kg paper bag | 25 kg paper bag | 25 kg paper bag | 20 kg paper bag | | 20 kg paper bag | 30 kg paper bag |
| Description | aluminium grit | aluminium powder | white granulated calcium carbonate | white, fine granulated calcium carbonate | lightweight powder, based on microsilicate | | aluminium hydroxi-de powder | hard PVC, milled |
| Applications | backfill castings with good thermal conductivity and good machinability | backfill castings and parts with good thermal conductivity and good machinability | light mouldings | light mouldings | mouldings with low density | | light mouldings with good workability | mouldings and backfill casting with low shrinkage |
| **Processing data** (approx. values) | | | | | | | | |
| Bulk density | 1 - 1.5 | 1.0 | - | - | 0.4 | | 1.2 | - |
| Mixture for example | G32 Resin : Filler (100 : 100) | G27 Resin : Filler (100 : 300) | G46 Resin : Filler (100 : 100) | G46 Resin : Filler (100 : 80) | G27 LR Resin : Filler (100 : 100) | | G26 Resin : Filler (100 : 250) | G48 Resin : Filler (100 : 150) |
| **Physical data** (approx. values) | | | | | | | | |
| Density [g/cm³] | 2.7 | 0.75 | 2.7 | 2.7 | 0.6 | | 2.4 | 1.4 |
| Grain [mm] | 0.6-1.2 | 0-0.07 | 1.0-1.5 | 0.35-0.7 | 0.01-0.25 | | 0-0.032 | 0-6 |

**Additives** (thixotroping, thinning, acceleration, colouring)

| Name | Stellmittel T | Sikamoll | Biresin® HC 586 | Biresin® Farbpasten |
|---|---|---|---|---|
| Colour | white | clear-transparent | clear-transparent | see below |
| Delivery unit | 1.0 kg | 10 kg | 0.5 kg | 0.5 kg |
| Description | light weight, non dusty powder | non-volatile softener | amine based catalyst | colours: white, black, green, red, blue, yellow |
| Applications | thixotroping of EP- and PUR-systems | flexibilisation of PUR-systems | reaction acceleration of some PUR-systems (e. g. U1305, G46) | colouring of EP- and PUR-systems |

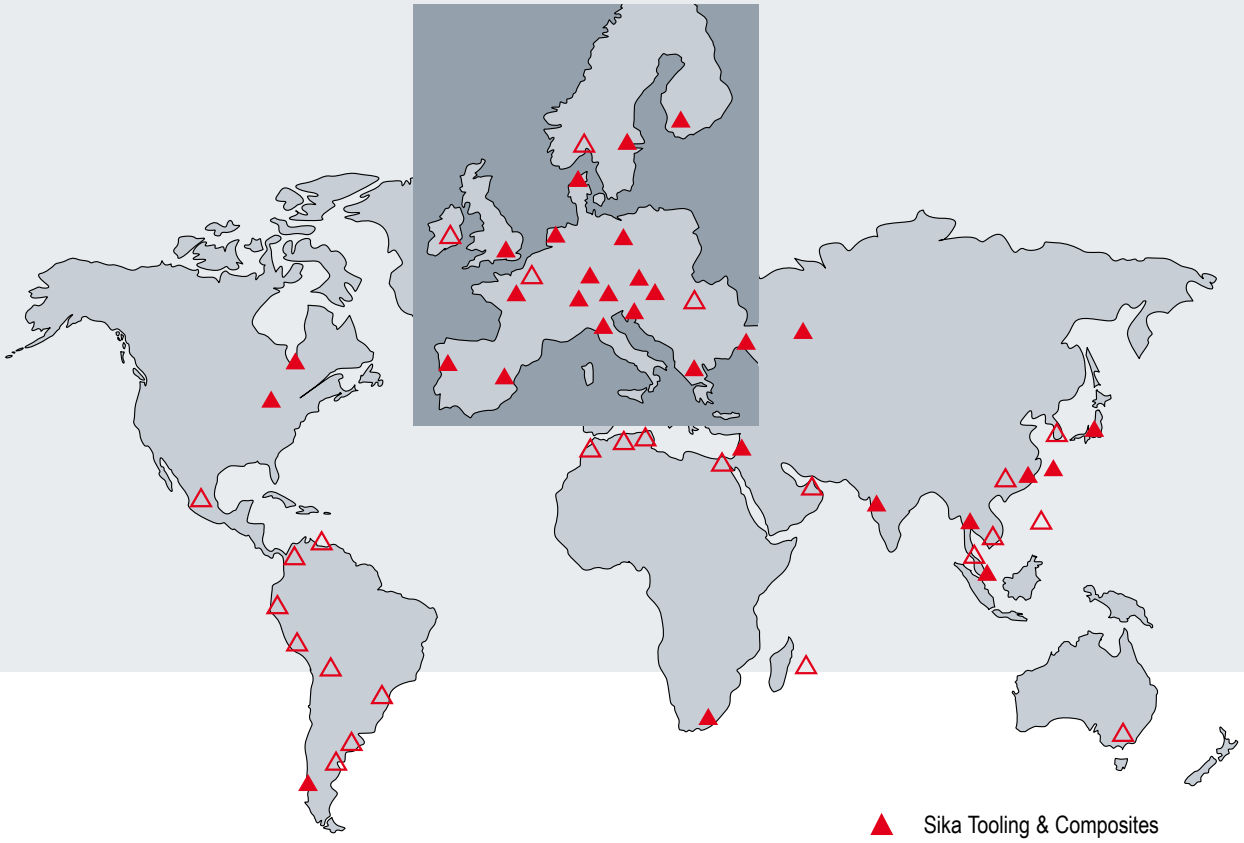
## Surface pre-treatment

High-grade release agents, primer and cleaner providing an optimal surface pre-treatment.

**Surface Pre-Treatment** (Release Agent, Primer,Cleaner)

| Name | Sika® Trennmittel 810 | Sika® Trennmittel 815 Quick | | Sika® Trennwachs 818 | Sika® Release LG | Sika® Mold Sealer | Biresin® HT Sealer | Icosit® KC 330 Primer | Sika® Mold Cleaner | Sika® Reinigungsmittel 5 |
|---|---|---|---|---|---|---|---|---|---|---|
| Colour | milky | milky | | whitish | colourless | colourless | grey | yellowish-transparent | colourless | clear-transparent |
| Delivery unit | 0.7 kg 3.5 kg | 0.68 kg 3.4 kg | | 0.7 kg | 1 l | 1 l | 1 kg (A) + 0.13 kg (B) | 3 l | 1 l | 1 l, 5 l, 10 l |
| Description | low viscosity, silicone free wax dispersion | low viscosity, silicone free wax dispersion with fast drying | | pasty wax dispersion | semipermanent release agent, free from silicones and halogenes | polymeric resin in organic solvent blend | high temperature resistant 2-component selaer for SikaBlock® boards | low viscosity 1-component-PUR-system | organic solvent blend | mild solvent blend |
| Applications | release agent for EP- and PUR-gelcoats and casting resins | release agent for EP- and PUR-gelcoats and casting resins | | release wax for EP- and PUR-gelcoats and casting resins | for EP-, phenol-, poly-ester- and vinylester resins in composite-, Al- and steel moulds | for GRP moulds (poly-ester, vinylester and EP resins) and steel moulds | for prepreg and laminating moulds, vacuumforming moulds | increasing of adhesion of PUR-synthetic resins on metal and plastics | cleaning of mould surfaces in composite production | cleaning of tools and surfaces |
| **Processing data** (approx. values) | | | | | | | | | | |
| Material consumption [g/m²] | | | | | | | | | | |
| - Brushed coats | 70 | 70 | | 50-100 | 70 | - | - | 50-200 | - | - |
| - Sprayed coats | 30 | 30 | | - | - | - | - | - | - | - |
| Drying time [min] | 20-30 | 5-10 | | 10-15 | > 30 | > 30 | - | 60-120 | - | - |
| **Physical data** (approx. values) | | | | | | | | | | |
| Density [g/cm³] | 0.77 | 0.75 | | 0.79 | 0.73 | 0.75 | 1.25 | 1.0 | 0.8 | 0.8 |

# Sika – a Global Network

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