BÜFA

New chemistry.

A No-Limit Tooling Conductive System!

Gelcoats and Resins: Smoother, Safer, Faster

Composites

Headquarters in Rastede (near Oldenburg)

Antistatic mould

New Chemistry is Intelligent

BÜFA Composite Systems manufactures customised special reaction resins and all-in-one solutions. As a provider of system solutions, we are characterised by our excellent technical service and comprehensive expertise in the areas of machinery and applications.
At first glance, it may not be immediately obvious just how diverse the uses of our products are. Our premium high-quality thermoset resins are used by well-known customers from the automotive, rail and commercial vehicle, wind power, construction, plumbing and heating, tank and pipe, and shipbuilding sectors, and even have their uses in swimming pools. These resins are made at our main production plant in Rastede near Oldenburg.
But products are not the only things we offer. We also work with our partners, customers and suppliers to develop ideas and new concepts, then integrate these into the innovation process to create customised solutions – delivering the ultimate benefit to our customers.

Safer, Faster and More Attractive!

Even More Effective for Better Tools

Our Goal:
Our aim is to develop a revolutionary tooling system based on the latest findings in polymer chemistry to deliver a highly efficient process which produces even better tools within a shorter time.

Our Solution:
Providing cutting-edge solutions thanks to continuous improvements in nanotechnology and curing processes.

- Dissipative surface
- Enhanced surface quality
- Moulds with extremely high dimensional stability

The new BÜFA®-Tooling System is always the right choice for efficiency.
It helps you save time, use less material and even do your part for the environment – all while staying on top of the game in terms of product quality. The resulting tool combines top-notch mechanical properties with brilliant surface finishing. And its antistatic properties also help to enhance occupational safety.

At a Glance:

- Increased process safety
- Reliably prevents electrostatic build-up and discharge
- Minimised dust adhesion
- Significantly reduced cycle times High-quality component surfaces with significantly reduced waviness
- Significantly improved efficiency
- Considerably increased economic efficiencyt

Demoulding from a master pattern

The System in the Application

Rostock-based firm EIKBOOM GmbH is a mid-sized, family-run company with over 60 years of experience producing GRP components. Their products are used in a wide range of sectors, including the wind power and shipbuilding industries.

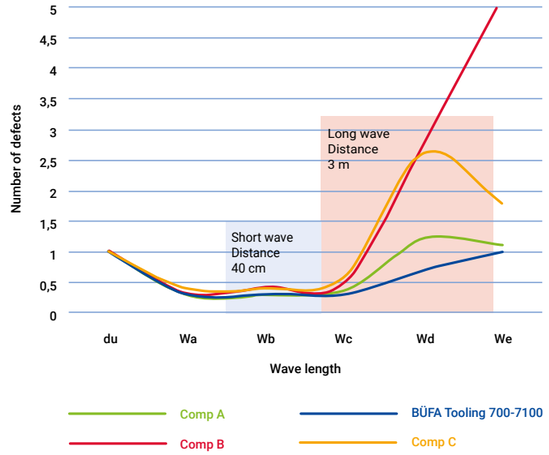
The company also specialises in manufacturing and supplying chassis components and interior GRP parts to the automotive industry.

EIKBOOM uses the new BÜFA®-Tooling System, which comprises the antistatic BÜFA®-Tooling-Conductive Gelcoat, the 1. Layer resin BÜFA®-Resin VE 0910, and the low-profile tooling resin BÜFA®-Resin VE 7100.

> "The new antistatic BÜFA®-Tooling-Conductive Gelcoat and the BÜFA®-Mould Tooling Resins can be processed effortlessly.
> Safety is an important consideration for us – the antistatic system helps prevent electrostatic discharge during demoulding.
> Another crucial factor is that the system produces high-quality surfaces.
> This system is an absolute asset."
>
> Meyk Rohde, Head of Sales EIKBOOM GmbH

Surface Quality:

Measuring surface quality (Wave Scan Dual)



Applying gelcoat by spraying

Measuring layer thickness

The gelcoat's electrical conductivity has been tested and certified by TÜV Nord (08/2018) based on a test sample made using the BÜFA®-Tooling-Conductive Gelcoat.
Feel free to request a copy of the certificate should you require one for your in-house risk assessment. Simply get in touch with us.

Nanotechnology for You!

BÜFA®-Tooling-Conductive Gelcoat

Perhaps the most innovative component of the new Tooling System is the new BÜFA®-Tooling-Conductive Gelcoat. It uses single-walled carbon nanotubes (SWCNT), which make the BÜFA®-Tooling-Conductive Gelcoat and allow it to efficiently discharge static electricity (uniform electric conductivity, adaptable from 10^5 to 10^9 ohms).

The keyword here is "triboelectric effect".

Plastics are non-conductive by nature; this is why a tool and a moulded part have opposite charges during demoulding. The result is a force of attraction between the two objects. Electrostatic build-up not only increases the force required for demoulding, it also causes dust to adhere to surfaces, and this takes a great deal of time and effort to remove.

Our BÜFA®-Tooling-Conductive Gelcoat solves these problems. The nanotubes act like tiny strands of wire in the synthetic resin, creating nanoscopic "electrical lines" that run through the material. This allows the static electricity which builds up during demoulding to be easily discharged using a typical earthing system.

Using SWCNT in our gelcoat offers the following advantages: Easier and quicker demoulding. Mould cleaning takes less effort. Lower scrap rates and higher component quality. Massive improvements in occupational safety.

At a Glance:

- No more "static shocks" during demoulding
- Reduced dust accumulation: higher surface quality, shorter cycle times
- Less force required for demoulding: lfewer scraps, consistently high parts quality
- Tool surfaces retain their gloss even after being sanded and polished
- Only one earth connection point is required, even for large tools
- Improved efficiency during toolmaking
- Increase in tool-making economy

Pre-application of the 1. Layer resin

Working on details

Earth connection point

High-Tech for High Gloss!

1. Layer Resin: BÜFA®-Resin VE 0910

Waviness is always a concern when assessing synthetic resin surfaces. We are setting new standards in this regard with our new 1. Layer resin BÜFA®-Resin VE 0910.

Designed for application directly underneath the gelcoat's visible side, this high-tech resin exhibits significantly improved curing properties. One of the benefits is better curing of the product. Another advantage is its low residual monomer content, which greatly limits the amount of undesirable laminate shrinkage during curing. This helps prevent problems with waviness right from the start. Furthermore, our new 1. Layer resin also has improved thermal dimensional stability. It can help extend the service life of tools used in high-temperature applications.

Features of our 1. Layer Resin:

1. Class A-surface quality
2. Moulds with higher heat resistance
3. Mechanical durability (longer-lasting moulds)

At a Glance:

- Reduced surface waviness
- Improved curing properties
- Higher thermal dimensional stability
- Quicker wetting of fibres at low monomer content

Reliable. Proven. Versatile.

The Mould Tooling Resin: BÜFA®-Resin VE 7100 Tooling

Laminate layer structure

Our BÜFA®-Resin VE 7100 Tooling is a vinylester that contains highly specialised low-profile additives and fillers which cleverly inhibit the shrinking process.
A special aspect of this low-profile tooling resin are its exceptional curing properties. Its heat generation response is designed for both thin- and thick-walled laminated structures. This means that you are now finally able to produce extremely thin laminates (2 mm). At the same time, it is also possible to manufacture laminates as thick as 12 mm.
A single work step is all it takes – thus saving you time and cost.
BÜFA®-Resin VE 7100 Tooling is both delicate and powerful, enabling you to efficiently manufacture not only tools with exceptionally thin walls, but also large-scale products. Needless to say, this BÜFA tooling resin exhibits excellent mechanical properties when fully cured.

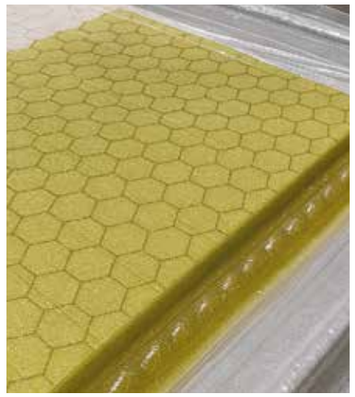
BÜFA®-Resin VE 7100 Tooling has exceptionally low VOC content; in spite of this, this low-profile resin is still easy to process. This means it also offers top-end performance in terms of its fibre-wetting ability and viscosity. The result: extremely high process reliability.

At a Glance:

- Can be applied using either a hand lay-up or spray-up method
- Excellent mechanical properties, exceptional thermal dimensional stability (120 °C)
- Outstanding fibre-wetting ability at low VOC content
- Even laminates as thin as 2 mm can be fully cured while ensuring consistency and reliability
- A single work step is all it takes to create layers with thicknesses of up to 12 mm – offering significant time savings

The Innovative Problem Solver

The High-Performance Resin for modern Mould Making using the Infusion Process: BÜFA®-Resin VE 6699 Tooling Infusion



Infusion setup

With the new BÜFA®-Resin VE 6699 Tooling Infusion, BÜFA is expanding its portfolio with an innovative high-performance resin for modern mould making. The system is based on a vinyl ester resin with low shrinkage behaviour (low profile) and was specially developed for the closed infusion process – a method that enables emission-free, clean and reproducible working.

Due to its low viscosity and excellent impregnation, the resin is ideal for complex component geometries and fine reinforcement fibres. It impresses with high mechanical properties (modulus of elasticity approx. 39,000 MPa) and a heat deflection temperature of over 100 °C – ideal for durable, resilient moulds.

The processing time can be flexibly adjusted using the peroxide used, which enables additional safety and process control. In combination with 3D|CORE™ materials, the mould weight can be reduced by up to 40 % – without compromising on stability or quality.
The system can also be machine-processed, for example with the BÜFA®-Tec RTM Delta Evo-Line (item 028 19 90).

At a Glance:

- Unique low-profile infusion resin for the best surfaces
- Very high mechanical properties
- Heat resistance > 100 °C
- Low viscosity, very good fibre impregnation
- Uniform material distribution, consistent wall thicknesses
- Flexibly adjustable processing time via peroxide
- Machine processable (e.g. RTM Delta)

Toolmaking Compared: Classic vs. Innovative

Criterion	Hand Lay-Up / Spray-Up	Injection Process
Process	Application of gelcoat by hand or spray gun, then manual lamination with glass fiber and resin	Impregnation of fiber mats by injecting or drawing resin into a closed mold
Advantages	- Proven technology - Low machine investment - Little waste	- Lower emissions - Better reproducibility - Shorter cycle times possible - High dimensional accuracy and surface quality
Disadvantages	- Higher material consumption - Open Process	- Higher initial investment (equipment & technology) - Requires in-depth know-how - Waste from infusion materials
Materials & System Solutions	**BÜFA®-Tooling Gelcoats & Resins such as** **7000910 BÜFA®-Resin VE 0910** **7001100 BÜFA®-Resin VE 7100 Tooling** - Easy processing - High dimensional stability - Good heat resistance	**BÜFA®-RTM Resins such as** **7000910 BÜFA®-Resin VE 0910** **7006699 BÜFA®-Resin VE 6699 Tooling Infusion** - Very good mechanical properties - High chemical resistance - High heat resistance
Sustainability	- Conductive gelcoats increase safety by preventing sparking	- Significantly more efficient through reduced resin consumption - Shorter cycle times and closed processes (fewer emissions)
Conclusion	Both processes have their strengths – depending on the project requirements. While hand lay-up and spray-up offer flexibility and easy application, the injection process convinces with process safety, sustainability, and efficiency in series production. Thanks to the BÜFA®-Tooling Systems, powerful solutions are available in both worlds.	

Processing Tips:

The properties of the master pattern play a crucial role in determining the quality of the mould and its surface. The master pattern's gloss level as well as any unevenness will be transferred to the mould. Special attention must therefore be given to the surface of the master pattern. Ensure that the environment is dust-free when making moulds. We recommend using our BF 700 carnauba wax (BÜFA®-BF 700 Mould Release Wax Paste) for releasing moulds from their master pattern.

The Step-By-Step Laminating Process:

1. **Gelcoat Application:**
   The gelcoat can be applied by brushing or spraying. A coating thickness gauge is used to ensure that the layer has been evenly applied (recommended thickness: 1000 µm). When the gelcoat has cured slightly, the earth connection point can be installed.

2. **1. Layer of Laminate:**
   After the gelcoat has cured fully, the process of applying the laminate can begin. The 1. Layer of laminate after the gelcoat should be applied with great care. During this process, it is especially important that all air bubbles between the gelcoat and this 1. Layer are eliminated by rolling. Fibreglass mats with an area density of 150 g/m² or 225 g/m² and with a fibre weight of 15 tex should be used for the 1. Layer.

3a. **Lamination:**
   After the 1. Layer of laminate has cured overnight, it can be sanded sown using sandpaper. Any dust created should be removed. Depending on the mould´s purpose and the required wall thickness, more laminate layers can be added to the structure until the mould meets the specifications.

3b. **Infusion:**
   After the 1. Layer of laminate has cured overnight, it can be sanded sown using sandpaper. Any dust created should be removed. Then set up the infusion equipment (film, vacuum, spiral tubes, tacky tape, etc.). Then start the infusion.

4. **Post Cure:**
   The laminated mould should be post-cured on the model for 8 hours at an increased temperature of approx. 70 - 80 °C. Mould reinforcement is then recommended.

Products from the BÜFA® Tooling-Conductive Gelcoat System are very well suited to processing using machinery. We recommend using the sophisticated, robust and easy-to-operate equipmenmade by BÜFA Tec

Examples:

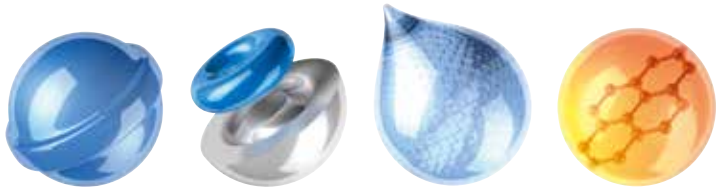
Dosing unit:
- *BÜFA®-Tec Polybar*

Gelcoatanlage:
- *BÜFA®-Tec GSU ES1 „Easy Lift"*
- *BÜFA®-Tec Delta EVO-Line*
- *BÜFA®-Tec Sigma 6 EVO-Line*

Laminate rolling unit:
- *BÜFA®-UNI 150 EVO-Line*
- *BÜFA®-UNI 275 EVO-Line*

Fibreglass spraying unit:
- *BÜFA®-Tec Delta EVO-Line*
- *BÜFA®-Tec Sigma 6 EVO-line*

Infusion process:
- *BÜFA®-Tec RTM Delta EVO-Line. If the machine is equipped with pressure control, infusion can be carried out directly from the system under film.*



Product Overview

	Products	Art.-Nr.	Colour	Application method
Gelcoat	BÜFA®-Tooling-Gelcoat-VE-S-A-black	x04 0107	black	spray
	BÜFA®-Tooling-Gelcoat-VE-S-A-light green	x04 0109	light green	spray
	BÜFA®-Tooling-Gelcoat-VE-H-A-black	x05 0107	black	brush
	BÜFA®-Tooling-Gelcoat-VE-H-A-light green	x05 0109	light green	brush
	BÜFA®-Tooling-Conductive-Gelcoat-S-A-black	x04 0207	black	spray
	BÜFA®-Tooling-Conductive-Gelcoat-S-A-green	x04 0209	green	spray
	BÜFA®-Tooling-Conductive-Gelcoat-H-A-black	x05 0207	black	brush
	BÜFA®-Tooling-Conductive-Gelcoat-H-A-green	x05 0209	green	brush
1. Layer resin	BÜFA®-Resin VE 0910	700-0910	brown	HLU
Mould Tooling Resin	BÜFA®-Resin VE 7100 Tooling	700-7100	light brown	FSU / HLU
	BÜFA®-Resin VE 6699 Tooling Infusion	700-6699	brown	Infusion

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