

RAMPF | Tooling Solutions



Innovative solutions for model, mold, and tool making

RAMPF Group

The international RAMPF Group stands for **engineering and chemical solutions** and caters to the economic and ecological needs of industry.

Our range of competencies includes:

- > Production and recycling of **materials** for modeling, lightweight construction, bonding, and protection
- > **Technical production systems** for precise, dynamic positioning and automation, as well as technologies for complex composite parts production
- > **A comprehensive range of solutions and services**, particularly for innovative and customer-specific requirements

This know-how helps our customers achieve profitable and sustainable growth.

Trusting relationships are of utmost importance to RAMPF. They are a vital part of the family-owned company's success story which now spans over 35 years.

RAMPF thinks globally and acts locally. The company has production facilities strategically located in Germany, the United States, Canada, China, and Japan.

RAMPF Tooling Solutions

The company based in Grafenberg (near Stuttgart), Germany, is the world's largest producer of high-performance, high-quality styling, modeling, and working board materials.

Services and products such as Close Contour Pastes, Close Contour Casting, including large-volume casting, 1:1 casting, and Close Contour Blocks ensure the manufacture of outstanding Close Contour models and molds.

The company develops pioneering systems for the composites industry that cover a wide variety of production processes and a broad range of temperatures.

The very latest production processes and facilities, combined with expert advice and customer-specific service, ensure that our products are manufactured cost effectively and environmentally friendly, and conform to the highest quality standard – worldwide.



Machine Systems



Production Systems



Composite Solutions



Eco Solutions



Polymer Solutions



Tooling Solutions

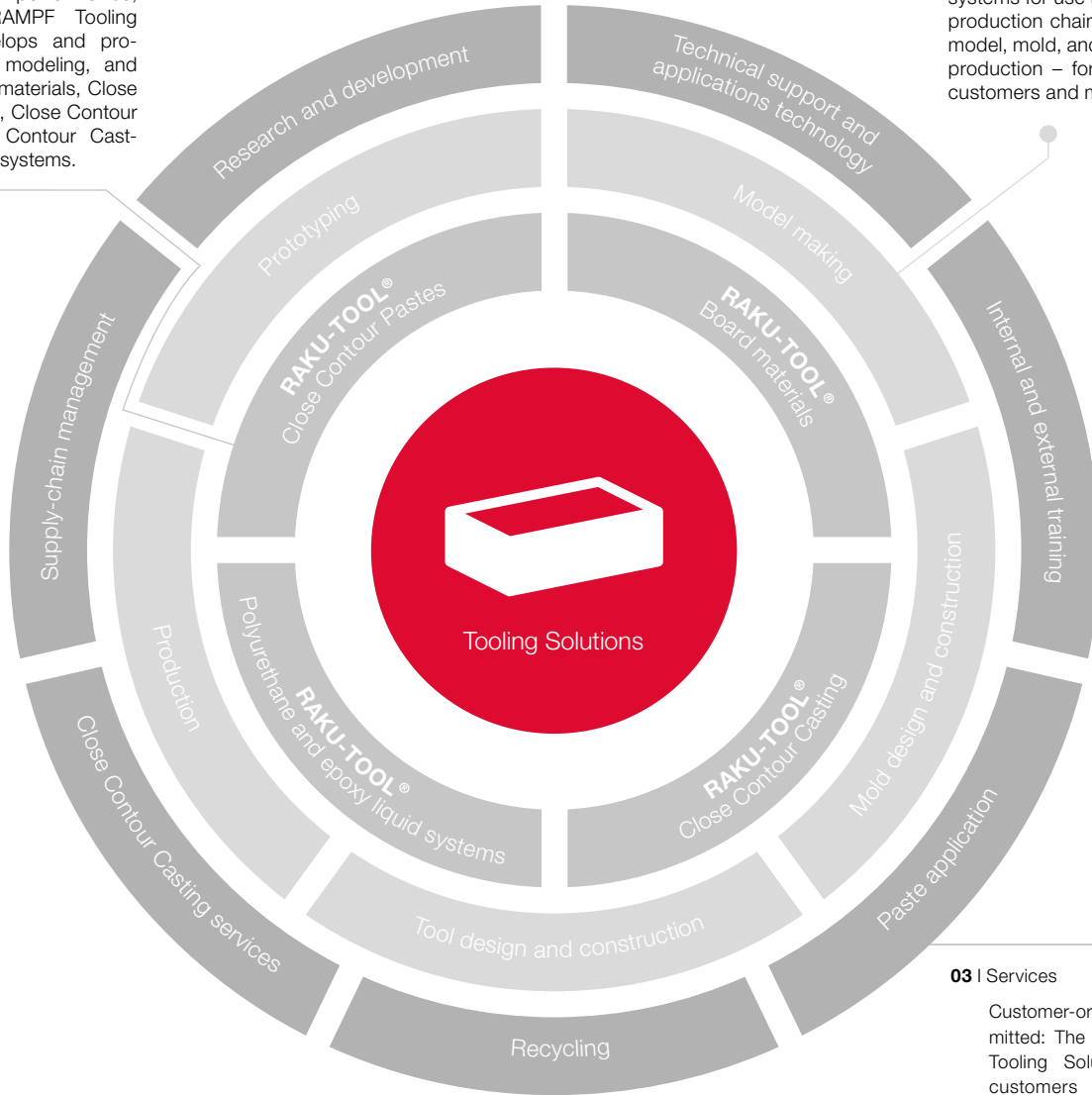
Range of products and services

01 | Materials

Creative, high-performance, sustainable: RAMPF Tooling Solutions develops and produces styling, modeling, and working board materials, Close Contour Pastes, Close Contour Blocks, Close Contour Castings, and liquid systems.

02 | Production systems

Customized, high-tech, professional: RAMPF Tooling Solutions develops systems for use throughout the entire production chain – from prototyping, model, mold, and tool construction to production – for existing and future customers and market requirements.



03 | Services

Customer-oriented, skilled, committed: The experts from RAMPF Tooling Solutions support their customers in technology and product applications, and in the implementation of their ideas – also on-site. They also offer training courses in which the products and solutions are presented using practical demonstrations.

» We provide our customers and partners with customized tooling solutions for cost-effective and high-quality model, mold, and tool construction. We work together to develop creative, customized solutions adapted to their specific needs. Expert advice, customer-specific service, and rapid technical support are all standard at RAMPF. «

Industry



Your industry | Your application

RAMPF Tooling Solutions offers quality, progress, and performance for all branches of industry served by its key applications



● **Automotive and vehicle construction**

- Styling & design models
- Show cars
- Data control models
- 0 series
- Checking jigs
- Functional cubing
- Metal forming tools
- Hammer forms
- Prototypes (parts)
- Lay-up tools
- Galvanobath models



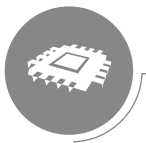
● **Aerospace**

- Drilling/cutting jigs
- Lay-up tools
- Galvanobath models
- Stretch forming tools/shaping dies



● **Mechanical engineering**

- Models
- Molds
- Support casting
- Machine parts
- Assembly jigs



● **Electrical industry**

- Components



● **Medical technology**

- Models
- Molds



● **Foundry**

- Master models
- Negatives
- Models/pattern plates
- Cores
- Core boxes



● **Shipbuilding**

- Master models
- Lay-up tools
- Molds for laminating parts



● **Ceramics**

- Membranes (isostatic pressing)
- Models for plaster working molds
- Models for pressure casting molds (microporous acrylic resin molds)
- General mold engineering and negatives



● **Sport and leisure**

- Models
- Lay-up tools for small-series



● **Plastics processing**

- Vacuum forming molds
- Foam molding tools
- UP forming tools
- Prototypes (parts)



● **Wind energy**

- Master models
- Lay-up tools (RTM/resin infusion)
- Molds for laminating parts

01
Materials



RAKU-TOOL® | Board materials

We have the solution for your applications

For more than 35 years RAMPF Tooling has been producing board materials. We are the market leader with the world's largest production of styling, modeling, and working boards.

- > **High-performance range of standard products** which can be adapted to meet changing market needs.
- > **Complete package solution** comprising boards, matching adhesives, and repair pastes.



Your benefits

- > Quick and individual modification and customization of existing products
- > Comprehensive technical support
- > "Made in Germany"
- > High quality and stringent quality control

RAKU-TOOL® board materials at a glance

Area	Key Applications	Key Properties	Density g/cm³		
			0,08–0,47	0,5–1,0	1,1–1,7
Styling Design	<ul style="list-style-type: none"> > Program proving > Supporting structures > Design studies > Negative molds 	<ul style="list-style-type: none"> > Fine surface > Easy to process > Dimensionally stable 	●		
Modelling	<ul style="list-style-type: none"> > Cubing > Show cars > Data control models > Functional Cubing > Lay-up tools > Jigs & Fixtures 	<ul style="list-style-type: none"> > Very fine surface > Easy to machine > Dimensionally stable 		●	
Prototyping / Small series	<ul style="list-style-type: none"> > Hammer forms > Lay-up tools > Rapid prototyping casting molds > Flanging tools > Welding fixtures 	<ul style="list-style-type: none"> > Good mechanical properties > Easy to machine > Impact and edge strength 			●
Foundry	<ul style="list-style-type: none"> > Pattern plates > Core boxes > Models > Negatives > Auxiliary tools 	<ul style="list-style-type: none"> > Excellent abrasion resistance > Good temperature resistance > Low thermal expansion > Eco-friendly and sustainable 		●	●
Ceramics	<ul style="list-style-type: none"> > Models > Appliance and working models > Negatives > Auxiliary tools 	<ul style="list-style-type: none"> > Excellent surface > Good styrene resistance 		●	●
Composites	<ul style="list-style-type: none"> > Models > Lay-up molds > Prepreg lay-up tools 	<ul style="list-style-type: none"> > Good impact strength > Chemical resistant > Can be polished to a high gloss 	●	●	●

01

Materials



RAKU-TOOL® | Close Contour products

Every job is different. So are our solutions

Close Contour Pastes, Close Contour Blocks, and Close Contour Castings are high-performance products and the result of targeted development work and years of practical experience. We tailor our Close Contour products to your specific requirements quickly – and effectively.

Close Contour Pastes

The paste is applied to a close contour shape supporting structure, cured and then machined according to CAD data. RAMPF Tooling Solutions also offers a Close Contour Paste application service.

Close Contour Blocks

Special blocks are produced in well-known board quality according to customer specifications (L x W x H) and supplied as customized, rectangular, unmachined blocks.

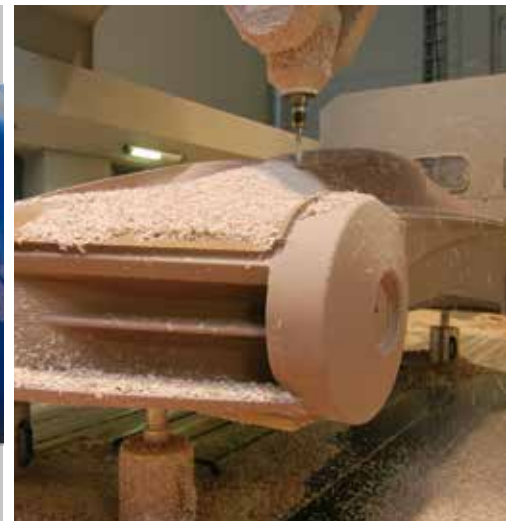
Close Contour Castings

Close Contour Castings are supplied as a three-dimensional shape which is already a close contour of the final shape. The production process takes place in-house at RAMPF Tooling Solutions. A light close contour mold (e.g. EPS or RAKU-TOOL® SB-0080) is machined using the area-based data supplied by the customer. A release agent is applied and the mold filled using a special casting process. Demolding and post curing of the casting is next, followed by machining. Very close co-operation between the customer and RAMPF is essential during this process.



Your benefits

- > Close Contour shape
- > Rapid milling
- > Little waste
- > Seamless, fine surface



01
Materials

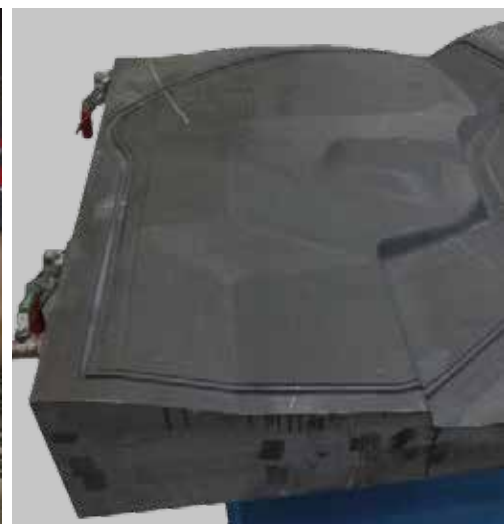


RAKU-TOOL® | Close Contour products

at a glance

	Close Contour Pastes	Close Contour Blocks	Close Contour Castings
Key Applications			
Design and styling	●		
Master models, cubing models	●	●	●
Molds	●	●	●
Jigs and Fixtures	●	●	●
Tools	●	●	●
Foundry patterns		●	●
Qualitative selection criteria			
Size of the models/tools	Medium to very large*	Small to medium	Medium to large*
Mechanical properties dependent on product	See data sheet	See data sheet	See data sheet
Economic selection criteria			
Little waste	●	●	●
Quick machining due to close contour shape	●	●	●
Light, cost-effective supporting structures	●		
No handling of liquid products		●	●
Delivery time	Immediate	Approx. 5 days	Approx. 10 days
Equipment costs	●	None	None
Work hygiene/exposure	marginal	None	None
Specifics	Seamless surface	Seamless surface	Seamless surface

*With large models / molds build-up in segments possible



01
Materials



RAKU-TOOL® | Liquid materials

Gelcoats, Laminating, Casting, and Multipurpose Systems. Our systems for your applications

RAKU-TOOL® liquid products offer a large selection of innovative and efficient gelcoat, laminating, casting and multipurpose systems for various manufacturing techniques, build-up methods and applications.

RAKU-TOOL® liquid materials at a glance

- > **Gelcoats** (Epoxy, Polyurea)
- > **Laminating and Multipurpose Systems** (Epoxy)
- > **Laminating Pastes** (Epoxy)
- > **Infusions Systems** (Epoxy)
- > **Casting Systems** (Epoxy, Polyurethane, Polyurea)
- > **Rapid Prototyping Systems** (Polyurethane)
- > **Fast cast** (Polyurethane)
- > **Repair Pastes** (Polyester)
- > **Adhesives** (Epoxy, Polyurethane)
- > **Auxiliaries** (Release agents, Fillers)



Your benefits

- > Comprehensive product portfolio
- > Systems with varying temperature resistances (RT – 190 °C)
- > Rapid availability

Lay-up



Gelcoats



Backing / Casting



Backing / Tamping



Laminating with fibers



Laminating with pastes

Casting



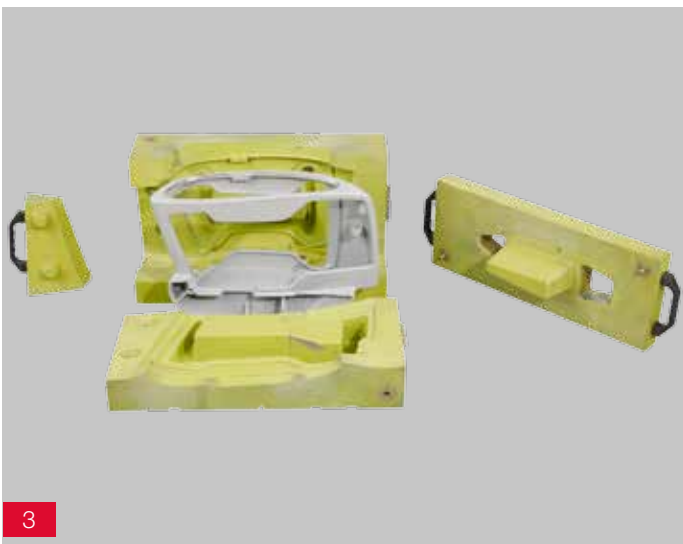
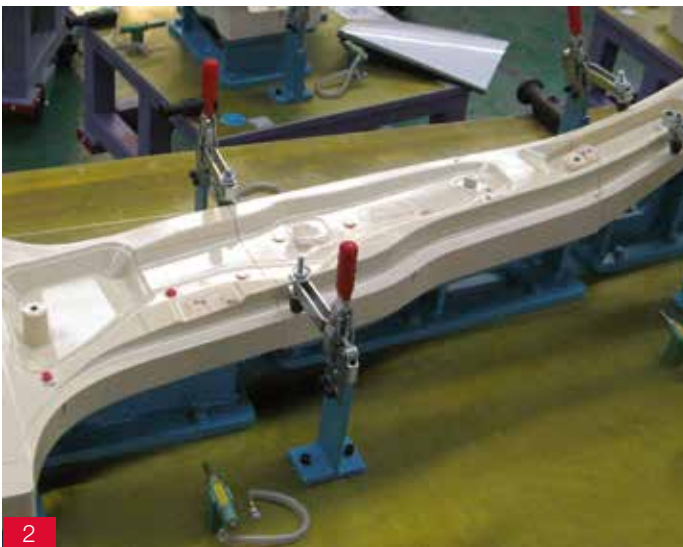
Full casting



Face casting



Applications



Additional information

Fig. 1: Design model

Product: RAKU-TOOL® MB-0600 board material

Advantages:

- > Excellent surface structure
- > Accurate, dimensionally stable
- > Finest details can be reproduced
- > Easy to machine and process
- > Density and color of adhesive matched to board material

Fig. 2: Fixture

Product: RAKU-TOOL® WB-1000 board material

Advantages:

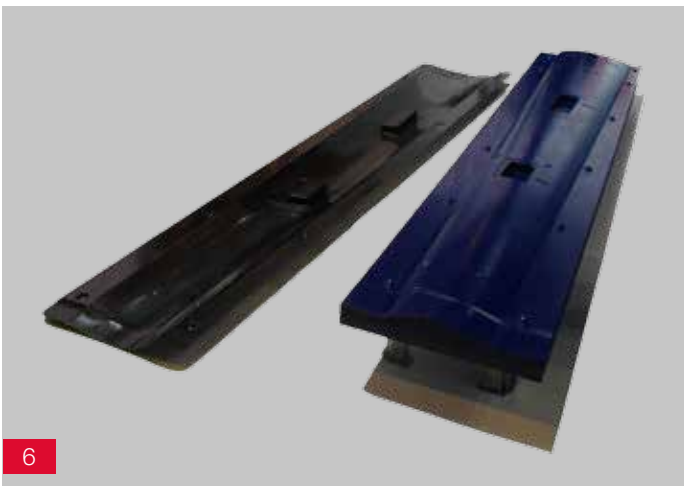
- > 75 % weight saving compared with metal
- > More cost-effective than metal
- > Easy processing and post-processing (ensuring separation of board material and emulsion)
- > Any required dimension can quickly be joined by bonding the board material. No welding or drilling required. Thanks to adhesives specifically matched to the board material, the final properties remain the same

Fig. 3: Production of a five-part core box to produce a special armrest for an EvoBus

Product: RAKU-TOOL® WB-1404 board material

Advantages:

- > Fast production of core box thanks to direct CNC machining
- > Changes are quick and easy to implement
- > Lower costs than with metal or face casting core box
- > Dimensionally stable
- > Good abrasion resistance: > 10,000 parts produced



Additional information

Fig. 4 + 5: Manufacture of a mold for producing wind turbine blades using the composite construction method
 Product: RAKU-TOOL® CP-6060
 Close Contour Paste

Advantages:

- > Close contour shape
- > Faster machining, less waste
- > Economical production of large models and molds
- > High temperature resistance up to 70 °C
- > Very fine, homogeneous surface
- > Good dimensional stability
- > Can be processed after just 9 hours' curing at RT

Fig. 6: Production of a prepreg lay-up tool for making an aircraft wing

Product: RAKU-TOOL® CC-6503
 Close Contour Casting

Advantages:

- > Excellent surface of LTM prepreg mold, no bonding lines
- > No bonding or cutting to size of board material – overdimensional blank supplied ready for machining
- > Shorter machining time thanks to blank's close contour shape
- > Temperature resistant up to 80 °C
- > Good dimensional stability

Fig. 7: Production of a core box for making exhaust manifolds with integrated turbocharger

Product: RAKU-TOOL® PC-3458/PH-3958
 face casting resin

Advantages:

- > Dimensional stability and accuracy
- > High replication quantities thanks to very high abrasion resistance
- > Excellent chemical resistance, no swelling
- > Easy to process, manually or mechanically