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RAMPF ADVANCED POLYMERS

Electro casting resins

Innovative casting systems for electrical and electronic components

RAMPF

#DiscoverTheFuture



Chemical and Engineering Solutions



Machine Systems



Production Systems



Composite Solutions



Eco Solutions



Advanced Polymers



Tooling Solutions

RAMPF Advanced Polymers is a company of the international **RAMPF** Group.
Find out more on page 24.

RAMPF Advanced Polymers

Innovative solutions for sealing, bonding, and casting

The company from Grafenberg, Germany, is a leading developer and manufacturer of reactive resin systems based on polyurethane, epoxy, and silicone.

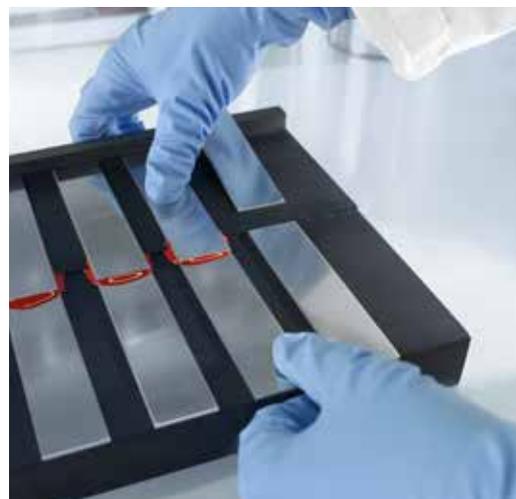
The RAMPF Advanced Polymers product portfolio includes liquid and thixotropic sealing systems, electro and engineering casting resins, edge and filter casting resins, as well as adhesive systems.

Research and development have top priority at RAMPF Advanced Polymers. A large innovation center is available for laboratory and application technology.

There, new products are developed, existing products adapted to specific customer requirements, and a wide range of material combinations tested. In doing so, particular emphasis is placed on the use of renewable raw materials.

It goes without saying that RAMPF Advanced Polymers provides holistic customer support both during product introduction and the production process.

The company is certified to ISO 9001, IATF 16949, ISO 50001, and ISO 14001.



Discover more on
[youtube.com/rampfgroup](https://www.youtube.com/rampfgroup)



Products and services

RAMPF optimizes electrical and electronic systems with materials, machinery, and processing technology from a single source – and has been doing so for more than 40 years.



MATERIALS

RAKU® POX Epoxy	RAKU® PUR Polyurethane	RAKU® SEAL Sealants	RAKU® SIL Silicone
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Innovative, high-performance, sustainable:

RAMPF Advanced Polymers develops and manufactures reactive resin systems based on polyurethane, epoxy, and silicone, and places particular emphasis on the use of renewable raw materials.

PRODUCTION SYSTEMS

Sealing	Design	Insulation	Bonding	Protection	Casting
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Future-oriented, high-tech, professional:

At the RAMPF Innovation Center, we use the latest systems and test procedures to develop new products, adapt existing products to specific customer requirements, and test a huge range of material combinations.

SERVICES

Support in design and construction of components	Consulting, application engineering, and customer service	Global production and sales network
Internal and external training	Customer-specific material development	Samples production, independent process development

Customer-oriented, skilled, committed:

RAMPF Advanced Polymers provides customer support throughout both the development and production process. The company's experts also offer material and application training and innovation workshops.



Technologies | Best properties, premium quality

The optimum solutions for your application based on polyurethane, epoxy, and silicone

We have been designing and manufacturing made-to-measure electro casting systems for over 40 years. You can rest assured that we have the perfect material for your application and industry – made of polyurethane, epoxy, and silicone.

	POLYURETHANE (RAKU® PUR)	EPOXY (RAKU® POX)	SILICONE (RAKU® SIL)
Chemical reaction	<ul style="list-style-type: none"> • 2-component • Polyaddition reaction • Low exothermic reaction • Curing at room temperature • Curing conditions can be flexibly adjusted by adding a catalyst • Low shrinkage pressure on cast components 	<ul style="list-style-type: none"> • 1- or 2-component • Homopolymerization (1- component) and polyaddition reaction (2- component) • Curing at room temperature • Curing can be accelerated using heat • Heat curing required for 1-component and hot-curing epoxy • Good impregnation properties • Low sensitivity to moisture 	<ul style="list-style-type: none"> • 1- or 2-component • Polyaddition and polycondensation reaction • Low exothermic reaction • Curing at room temperature • Curing can be accelerated using heat • Curing without by-products possible (polyaddition reaction) • Low shrinkage pressure on cast components • Low sensitivity to moisture • Hydrophobic
Application range	<ul style="list-style-type: none"> • Application temperature range: –60 to +155 °C • Short-term: +160 °C • Wide range of mechanical properties, from tough to highly elastic 	<ul style="list-style-type: none"> • Application temperature range: –40 to +180 °C • Short-term: +200 °C 	<ul style="list-style-type: none"> • Wide application temperature range: –60 to +200 °C • Short-term: +250 °C • Best physical properties almost constant across the entire temperature range of the application
Properties	<ul style="list-style-type: none"> • Excellent resistance to fluctuations in temperature for sensitive components • High crack resistance of flexible products • Good chemical resistance • Low water absorption • Good electrical properties • Tg: –75 to +120 °C • RTI: to +155 °C • OBJS2-listed 	<ul style="list-style-type: none"> • High heat distortion temperature • Low coefficient of thermal expansion • High dielectric strength • High media resistance to fuels • Low water absorption and water vapor permeability • Tg: –20 to +180 °C • OBJS2-listed 	<ul style="list-style-type: none"> • Excellent resistance to fluctuations in temperature • High crack resistance • Excellent chemical resistance for extreme environments • Low water absorption • High water vapor permeability • High UV and weather resistance • Tg: always < 0 °C
Bonding	<ul style="list-style-type: none"> • Good adhesion to housings and components • Good adhesion to plastic: PA, PBT, ABS 	<ul style="list-style-type: none"> • Good adhesion to metals, housings, and components 	<ul style="list-style-type: none"> • Good adhesion to housings and components
Flame retardancy	<ul style="list-style-type: none"> • UL 94 V0 possible 	<ul style="list-style-type: none"> • UL 94 V0 possible 	<ul style="list-style-type: none"> • UL 94 V0 possible



+ YOUR BENEFITS

- > More than 40 years of experience in developing and producing innovative 1- and 2-component electro casting resin systems
- > In-depth technical consulting on selecting the most suitable material
- > Joint process development and optimization
- > Material, machine, and process from a single source – the complete expert service from RAMPF

Processing | Expertise and know-how

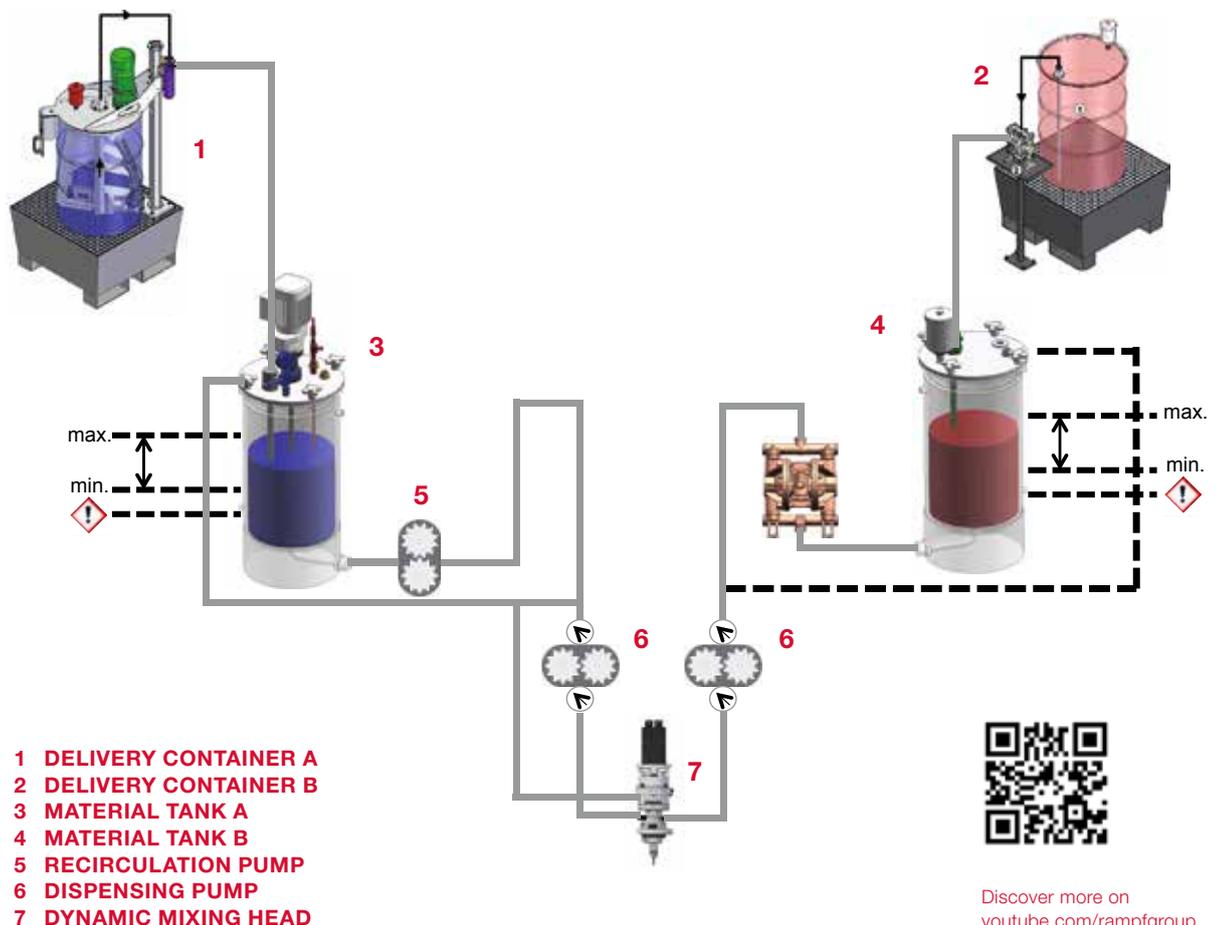
Optimal material processing with RAMPF

Material quality and material processing are key to the correct functioning and durability of electrical and electronic systems.

1- and 2-component electro casting resin systems from RAMPF Advanced Polymers, combined with the application expertise of RAMPF Production Systems, one of the world's leading specialists for production systems with integrated dispensing technology, enable the rapid development of customized complete solutions for a wide range of electrical and electronic applications.

Whether manually, statically, dynamically, under atmospheric or vacuum conditions, or at high or low temperatures – RAMPF knows how to achieve optimal material processing.

Material and machine from a single source – harness RAMPF's full range of services for your application.



Your industry | Your application

Pioneering solutions for current and future challenges

When used in everything from sensitive electronic components, batteries, power electronics, and automotive sensors to transformers, motors, and numerous other electrical and electronic components, electro casting resins from RAMPF Advanced Polymers provide reliable and efficient protection against chemical substances and environmental influences such as heat, cold, and moisture.

They also ensure optimum heat dissipation, which helps the component perform more efficiently and achieve a longer service life.

Our polyurethane-, epoxy-, and silicone-based products – RAKU® PUR, RAKU® POX, and RAKU® SIL – offer a wide range of mechanical, thermal, and chemical properties and meet the highest quality requirements. They are used by leading manufacturers, including in the automotive and electronics industries.

Thanks to many years of experience in product development and processing technologies, we can provide comprehensive advice on materials and process engineering issues.

We have the best solution for your application in the following sectors:





AUTOMOTIVE



**ELECTRICAL /
ELECTRONICS**



E-MOBILITY



**ENERGY
MANAGEMENT**



**RENEWABLE
ENERGY**



**HOUSEHOLD
APPLIANCES**



+ YOUR BENEFITS

- > Comprehensive product range and broad spectrum of properties ensure the perfect material for your requirements
- > RoHS and REACH compliance
- > ISO 9001 and ISO/TS 16949 certification
- > Used by leading manufacturers in the automotive industry
- > Compliance with the test standards of leading OEMs





Automotive

Speed and reliability

With customized electro casting resin systems

Automotive technology is developing at a rapid pace. The majority of innovations are occurring in the electrical and electronic fields, where high thermal, chemical, and mechanical resistance and reliable protection against environmental influences ensure safe and comfortable driving.

Electro casting resins play a key role here. RAKU® PUR, RAKU® POX, and RAKU® SIL brand products meet the above requirements, and a whole lot more, too. They can be adapted quickly to new industry specifications and, due to their high quality, ensure that components deliver consistent performance throughout their entire service lives and beyond as spare parts.

Thanks to our management system certified to IATF 16949, we ensure our customers top quality and a high level of innovation. That's why leading manufacturers and suppliers in the automotive industry put their trust in us.

Applications:



AC/DC AND DC/DC CONVERTERS



ON-BOARD POWER CONTROL



FUEL PUMP CONTROL



VENTILATION CONTROLS



SENSORS

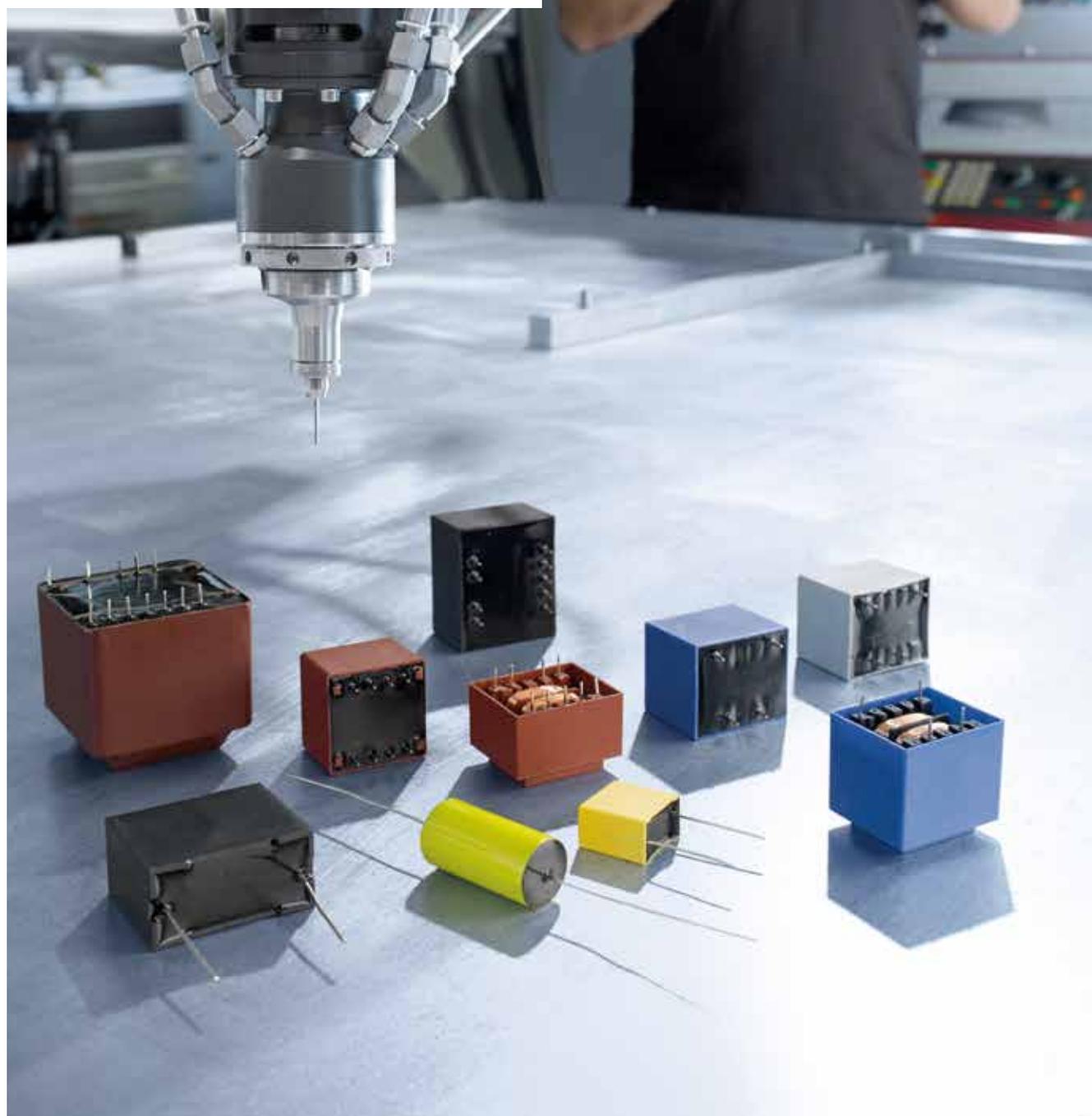
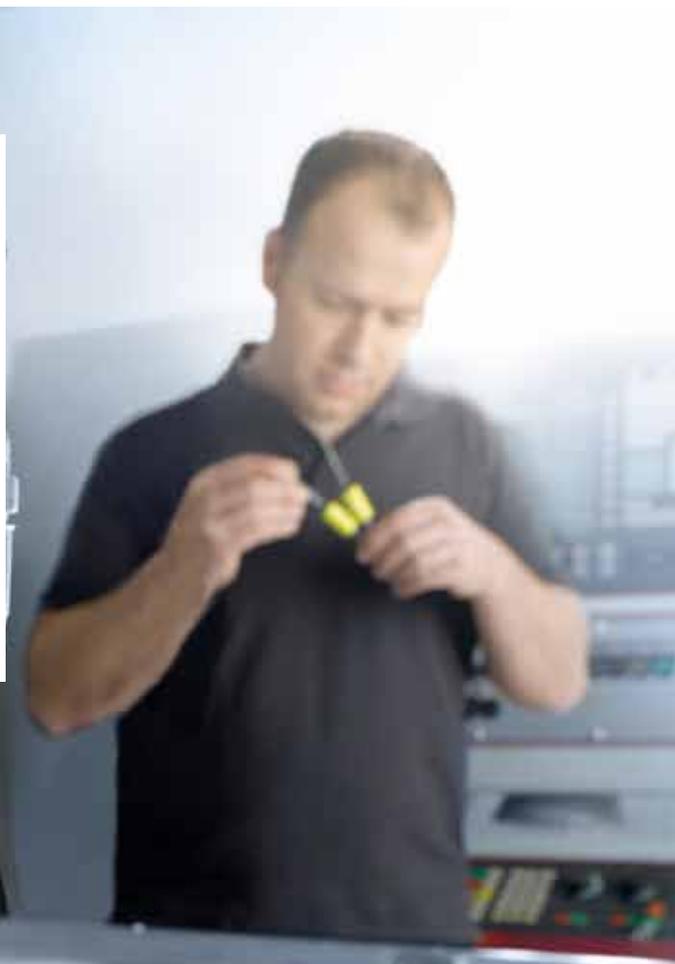


TRUNK LATCHES



+ YOUR BENEFITS

- > High resistance to fluctuations in temperature
- > High mechanical and thermal strength ensure your product functions correctly over the long term
- > Wide range of applications due to innovative, customized product development
- > High thermal conductivity
- > Meets the strictest requirements of test standards and listings such as UL 94 V0, RTI, and OBJS2





Electrical / Electronics

High-performance systems
for maximum durability

Diverse range of products for the protection of sensitive components

Electrical and electronic components play a key role in the development of numerous industries. Robust and fault-free electronics are essential for the long-term functionality of assemblies. High resistance to fluctuations in temperature is of major importance for material and components in this regard. These need to withstand extreme and rapid levels of cooling and heating without sustaining damage. Our high-performance electro casting resins under the RAKU® PUR, RAKU® POX, and RAKU® SIL brands protect sensitive electronic components due to their high thermal and mechanical strength, high resistance to moisture and chemicals, and high flame retardancy.

We also have the solution for extreme conditions. Thanks to their outstanding thermal capacity, our RTI electro casting resins permanently retain their properties and functions, and thus ensure the best performance of the electrical/electronic systems.

Applications:



PLUGS



RELAIS



CAPACITORS



TRANSFORMERS



MOTORS



CONTROL UNITS

+ YOUR BENEFITS

- > Comprehensive industry and application expertise
- > Customized materials – pot life, viscosity, and thermal conductivity can be matched to customer specifications
- > Listings with leading manufacturers in the automotive and electronics industries
- > Our products comply with RoHS regulations and meet the highest requirements of leading test standards and listings such as UL 94, RTI, and OBJS2
- > Great variety of products with a broad spectrum of properties and outstanding quality





E-Mobility

Innovative. High-tech.

Smart products for smart technology

The electrification of mobility is in full swing. Electric vehicles are set to become an integral part of the mobility of tomorrow, and this field is currently experiencing enormous growth all over the world.

In times of such dynamic change, RAMPF Advanced Polymers is a technological pioneer with its high-performance electro casting resins based on polyurethane, epoxy, and silicone, which ensure optimum heat dissipation in batteries and power electronics and provide reliable protection against chemical substances and environmental influences – thus maximizing service life, reliability, and performance.

As “innovative heat managers”, gap fillers and heat-conductive casting materials made of polyurethane, epoxy, and silicone also ensure an optimized heat management of electrical and electronic components.

Applications:

- | | |
|----------------------------|---|
| > <u>Battery modules</u> | > <u>Electronic Control Units (ECU)</u> |
| > <u>Sensors</u> | > <u>Charging connector for electric vehicles</u> |
| > <u>Power electronics</u> | > <u>Converters</u> |

E-Mobility Applications

SENSORS

2C Polyurethane

2C Silicone



POWER ELECTRONICS

2C Polyurethane

2C Silicone

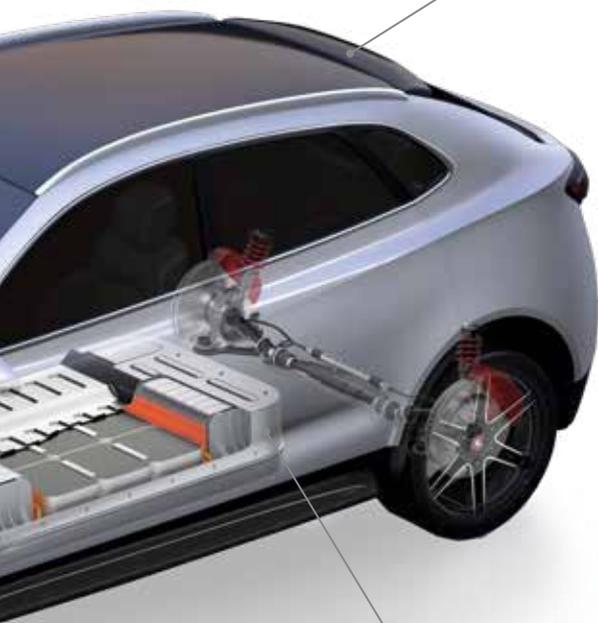


ELECTRONIC CONTROL UNITS

2C Polyurethane

2C Silicone





INVERTERS

2C Polyurethane

2C Epoxy



CHARGING PLUGS

2C Polyurethane



BATTERY SYSTEMS

2C Epoxy

2C Polyurethane

2C Silicone



+ YOUR BENEFITS

- > People come first – trusting and successful cooperation with customers is a top priority
- > Customer-focused and progress-oriented – we work with our customers to develop the solutions of the future
- > Comprehensive customer advice and cross-process expertise
- > Material, plant, and process technology from a single source – RAMPF offers a full range of services
- > Many years of experience in processing technologies such as foaming, casting, bonding, coating, and spraying

Comprehensive support

From concept to finished product

Materials, processing, consulting –
your end-to-end partner

RAMPF offers its customers complete support – from product development to market launch:



LABORATORY AND APPLICATION TECHNOLOGY

- Initial consultation on selecting the best material and processing procedure
- Customized development of your material or adaptation of a product from our comprehensive portfolio
- Application engineering consultation for component design and manufacture of sample parts in near-series conditions
- Manufacture of prototypes



PROCESSING EXPERTISE

- Support and consulting for applications as well as process development and optimization
- All-encompassing machinery pool for conducting near-series customer trials
- Mixing and dispensing systems from RAMPF Production Systems – perfect processing for all 1- and 2-component materials



AFTER-SALES SERVICE AND TRAINING

- Our customer service does not end with the start of series production: Technical field representatives, application technicians, and product developers are always at your service
- The RAMPF Academy offers product and application training courses that emphasize sharing experiences

Think global | Act local

With production on three continents and sales partners worldwide, we are always there for our customers – wherever they are

RAMPF thinks globally and acts locally. In addition to our state-of-the-art production facility in Grafenberg, our products are also manufactured at key strategic sites in the United States and China.

No matter where they are produced, the same applies – when it says RAMPF, it is RAMPF. The highest standards of quality apply to our production in both the United States and China, which has helped our facilities become very successful. Our foreign subsidiaries RAMPF Group, Inc. (USA), and RAMPF (Nantong) Co., Ltd. (China) are experiencing rapid growth, and ever more customers are placing their trust in RAMPF quality.

Of course, there is more to it than production standards. The high quality of RAMPF products is also based on first-class advice and a comprehensive array of services.

This strategy is also supported by our global network of sales partners and experts at our sales offices in the United States, China, and Japan. They ensure our customers receive rapid and expert advice – no matter where they are and which industry they represent.





+ YOUR BENEFITS

- > Global presence of our products and experts
- > High level of flexibility in production
- > Short delivery times
- > Comprehensive consultation

We are inventors. Team players. And a strong partner.

RAMPF – a global market-leading specialist in custom chemical and engineering solutions

We are experts for reactive resins, machine systems, and lightweight composite construction solutions.

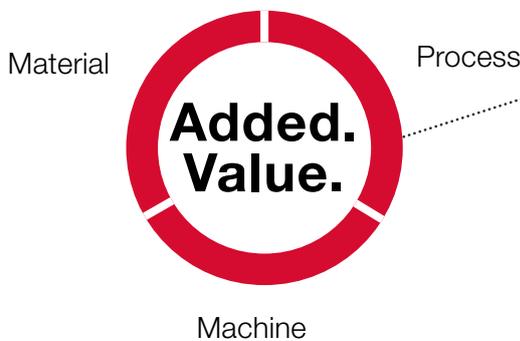
Our mission – discover the future.

In partnership with our customers, we develop tomorrow's products and tailored solutions today – for the decisive competitive edge.

Over the last 40 years, we have grown from an inventive one-man business into an international medium-sized group of companies, with operations at twelve locations on three continents.

Now run by the next generation of our family, the business still maintains the same fundamental values – being a trustworthy and reliable partner for our customers and our employees. This is the only way to build lasting, successful partnerships.

At RAMPF, innovation and tradition go hand in hand. We are one big family, focusing on the future with a sustainable, value-adding approach, and are very much aware of the social and environmental responsibilities associated with our business activities. That is why we are committed to promoting a respectful and appreciative way of dealing with one another.



**RAMPF – Chemical and Engineering Solutions.
Utilize our wide-ranging innovative potential
for Added.Value.**

Founded as a
One-man Business

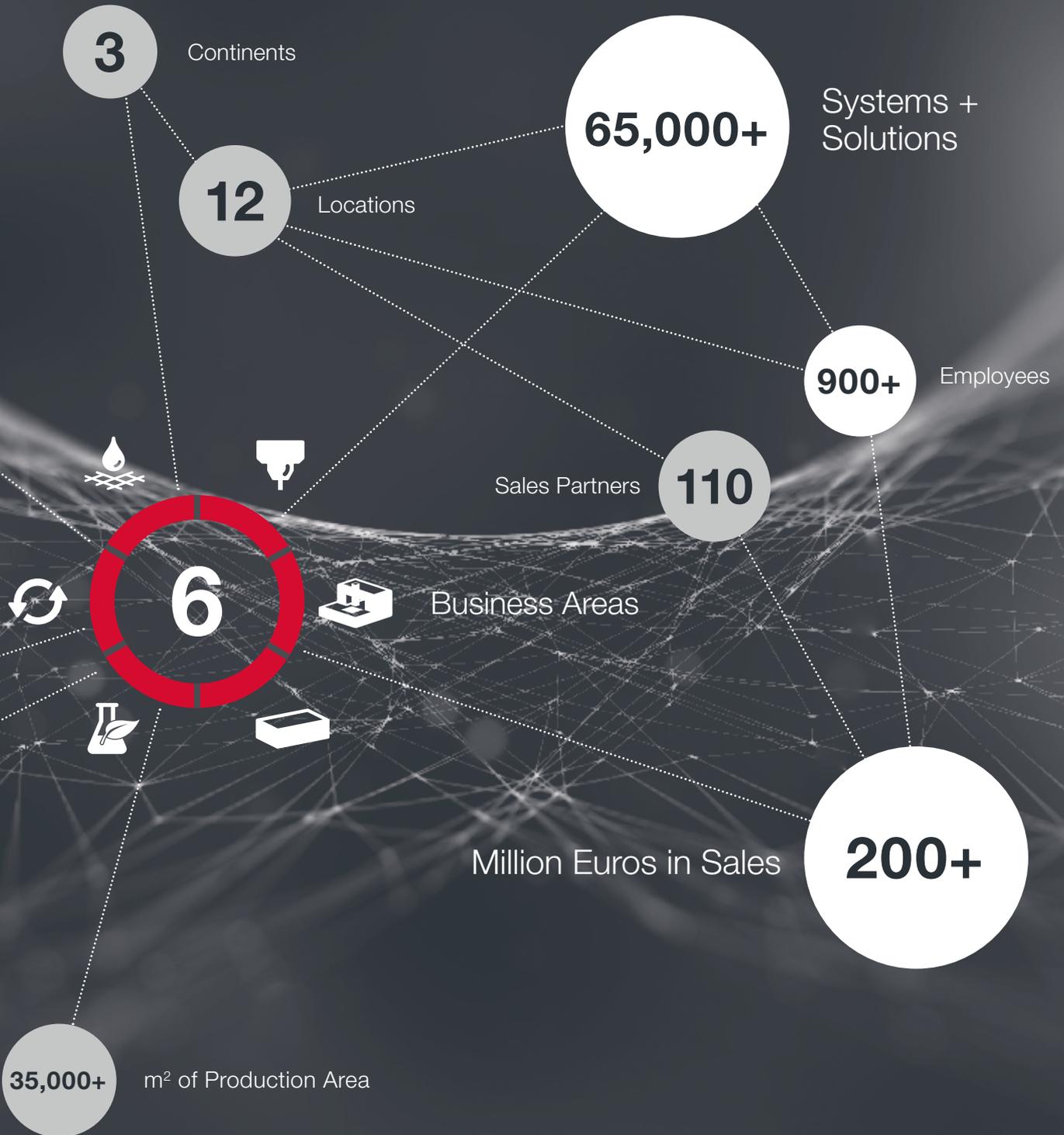
1980

Second-generation
Family Company

2

m² of Laboratories

3,000+





RAMPF –

discover the future

Developing the Solutions
of Tomorrow – Today.

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Mass production?

Not at RAMPF.

**We engineer
made-to-order solutions.**

