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RAMPF GROUP, INC.

# Polyurethanes

Advanced Liquid Polyurethanes for Models, Prototypes, and Production Parts

# RAMPF

## #DiscoverTheFuture



### Engineering and Chemical Solutions



Machine Systems



Production Systems



Composite Solutions



Eco Solutions



Polymer Solutions



Tooling Solutions

RAMPF Group, Inc. is a company of the international RAMPF Group.  
Find out more on page 12.

# RAMPF Group, Inc.

## Polyurethane Liquid Systems.

### Consistency and quality.

**RAMPF Group, Inc., based in Wixom, is the North American subsidiary of the international RAMPF Group.**

The product portfolio of RAMPF Group, Inc. is comprised of:

- > Mixing and dispensing systems for the reliable processing of polymers (Production Systems)
- > Two-component polymer (or synthetic) systems based on polyurethane, epoxy, and silicone (Polymer Solutions)
- > Modeling and mold engineering materials, in particular for the automotive, marine, and aviation industries (Tooling Solutions)

The international RAMPF Group based in Grafenberg, Germany, stands for Engineering and Chemical Solutions and caters to the economic and ecological needs of industry. The Group secures its presence on the international markets with six core competencies and more than 800 employees.

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



We manufacture advanced **mercury-free, RoHS-compliant** polyurethanes for casting models, prototypes, and low-volume production parts. Our comprehensive line of products is known for its outstanding consistency and quality. Polyurethanes supplied by RAMPF exhibit a wide range of handling, curing, and performance properties for use in many applications:

- > Medical and electronic devices and housings
- > Automotive interior parts, under-hood components, and fascia
- > Amusement ride components
- > Theme park scenery
- > Abrasion-resistant parts and linings
- > Medical and veterinary demonstration models
- > High-clarity lenses and pillow optics
- > Taxidermy reproductions
- > Equipment seals, gaskets, and O-rings
- > Material handling nests and fixtures

Based on our extensive experience we formulate polyurethanes for molding via hand casting, mass casting, automated meter/mix dispensing, roto molding, and vacuum casting. Our chemists also have the expertise to develop custom systems and color-match products quickly and economically. In addition, our dedicated technical support team is on-call to help customers solve their toughest casting challenges.

Fast response to customer needs is our priority: We maintain a flexible production schedule that accommodates shipping of most orders on a same-day or next-day basis.



**POLYURETHANE LIQUID SYSTEMS**

Results guaranteed!

# RAKU® TOOL

## Products by Material Properties

### Abrasion Resistant Polyurethane Resins

Our abrasion resistant polyurethanes were developed to meet customer needs for durable parts that can withstand exposure to gouging, cutting, and abrasion as well as chemical and solvent exposure.

They are ideal for use in a variety of markets and industries including amusement / theme park ride components / oil and gas / mining equipment, as well as parts for the paper, printing and metal finishing industries.

#### + HP-Series based on polyester polyols

- > Outstanding elongation characteristics as well as high tear strength and resistance to oils and chemicals
- > Readily processed at temperatures between 120° F and cured at 150° F

#### + HP-Series based on polyether / polyurea polyol hybrids

- > High tear strength and superb abrasion resistance
- > Can be processed at room temperature

### Impact Resistant Polyurethane Resins

Prototypes molded using InnoTuf® TP Series polyurethanes simulate parts built from thermoplastics including ABS, TPO, and polycarbonate

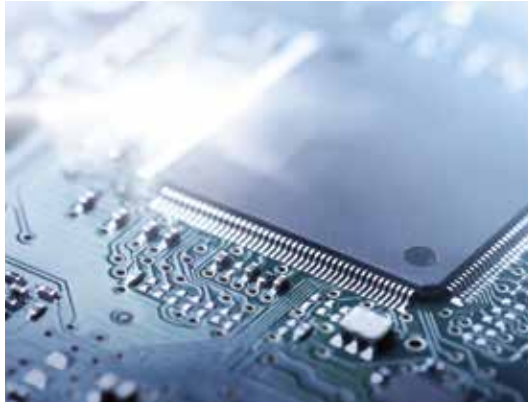
The high-impact polyurethanes are ideal for producing durable military training aids, recreation equipment, functional automotive components, and theme park models to name a few.

#### + The Shore D materials feature a unique combination of:

- > High impact strength with excellent heat resistance and good flexural characteristics
- > Low-viscosity products are easy to handle and process

# RAKU® TOOL

## Products by Material Properties



### Polyurethane Resins for Mold Making

Tooling materials from RAMPF include both Shore A and D durometer hardness polyurethanes:

- > Shore A elastomer with good abrasion resistance and tear strength.
- > Advanced Shore D polyurethanes with low shrinkage values and high tensile strength.

## Flame Retardant Polyurethane Resins

Shore A and D durometer hardness polyurethanes that meet UL94 V-0 requirements or are UL listed:

### FX Series

Shore A products, designed for use in producing electronic parts, medical devices, and video game console components.

### RC Series

For molding medical and electronic devices via automated meter mix dispensing.

### TP Series

For casting equipment housings and automotive parts.

### + FX Series\*

- > UL94 V-0, UL94 5VA, FAR 25.853 and ASTM-1354 compliant materials available
- > Easy to handle

### + RC Series\*

- > Products comply with UL94 V-0 standards, exhibit good flexural properties and high heat resistance

### + TP Series\*

- > Products comply with UL94 V-0 standards
- > High-impact products with good flexural modulus
- > High tensile strength and excellent heat resistance



# RAKU® TOOL

## Products by Material Properties



### Optically Clear Polyurethane Resins

InnoClear™ optically clear series polyurethanes produce water-clear prototypes and initial parts via automated meter mix dispensing, hand casting, and vacuum/pressure casting. The product line includes systems in the Shore A and D durometer hardness range and are based on UV-stable chemistries.

#### **InnoClear™ Shore A Polyurethanes**

For molding water-clear products such as figurines, LED-containing devices, and theme park parts

#### **InnoClear™ Shore D Polyurethanes**

For theme park props, artistic jewelry, and medical teaching aids, including dental models and automotive lenses

The InnoClear™ Shore A Polyurethanes offer a high tear strength and good elongation. Our InnoClear™ Shore D Polyurethanes have a good flexural modulus and excellent buffing and polishing characteristics.

The materials are ideal for molding automotive lenses and light pipes, housings for fluid testing equipment.



## Easy-To-Process, Low Viscosity Polyurethane Resins

The IE Series™ polyurethanes include products ranging from flexible to rigid. The materials are industry favorites for hand casting of prototypes and parts. Several of the products are also suited for mass casting.

### Shore A IE Series™ Polyurethanes

The products are used for building patterns and fixtures as well as military training aids, automotive components, sporting goods, medical training models, seals and gaskets.

### Shore D IE Series™ Polyurethanes

The systems are ideal for molding architectural models, medical training models, taxidermy cores, and scale models / sculptures.

### + Shore A & D IE Series™ Polyurethanes

- > Low-viscosity, easy-to-process and cure systems

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- > Excellent tear strength and elongation

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- > Typically used for hand casting

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- > Several of the products can be mass cast, roto molded or vacuum cast

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- > Materials exhibit low viscosity, pressure, and attain rapid green strength

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- > Cured Shore D polyurethanes simulate polypropylene and ABS thermoplastics with good tensile strength and flexural modulus values

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- > Many of the products are suitable for color matching

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# RAKU® TOOL

## Products by Material Properties

### Polyurethane Resins for Rotational Molding

Specially formulated for rotational casting, RAMPF Tooling Solutions roto molding polyurethanes are formulated with low viscosities and gel times long enough to provide an even, complete coating of mold surfaces.

Typical applications include amusement park ride seats, bottles, and automotive tubing.

#### + Roto molding Rotational-Casting Polyurethanes

- > The roto molding process utilizes low-cost tooling that can be built quickly for fast production of durable parts that withstand exposure to challenging conditions.



### Polyurethane Resins for Quick Demolding

The fast-gelling polyurethanes are used for automated meter-mix dispensing into molds built from a variety of tooling materials. Several of the systems are also suitable for cartridge dispensing. The products are typically used for producing functional ABS and polypropylene-like prototype parts.

Included are UL94 V-0 flame retardant materials (two systems have yellow cards), a buffable, water-clear lens making product, a FDA-compliant (CFR 21.177.1680) product for dry food contact, and a room-temperature cure, high-heat material for under-hood automotive prototypes.

#### + RapidCast™ RC Series Polyurethanes

- > Demold time 5 to 30 minutes at room temperature

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- > Superior flexural modulus

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- > Good elevated temperature performance

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### Polyurethanes for Vacuum-Assisted and Pressure Casting

Polyurethanes for vacuum-assisted and pressure casting are formulated with hardnesses from Shore 50 A to Shore 85 D.

The product line includes two water-clear materials as well as a variety of colorable products.

With a broad range of physical performance properties, the systems are well suited for use in molding high-quality, void-free automotive components, electronics parts, medical equipment components, and sports/recreation equipment.

#### + RapidVac™ VA Series Polyurethanes

- > Low viscosities with rapid gel times

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- > Shore A systems have high elongation and tear strength

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- > Shore D systems include materials with ultra-high flexural modulus, good tensile strength, and high heat resistance

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

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

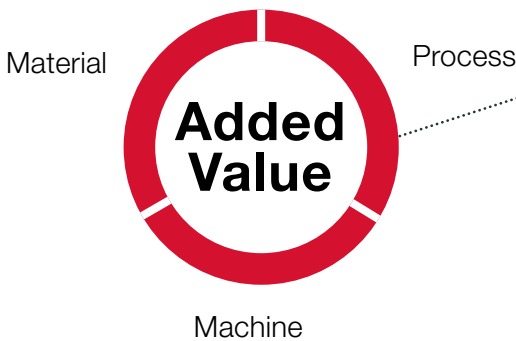
We are experts for reactive resins, machine systems, and lightweight composite construction solutions.

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

Founded as a  
One-man Business

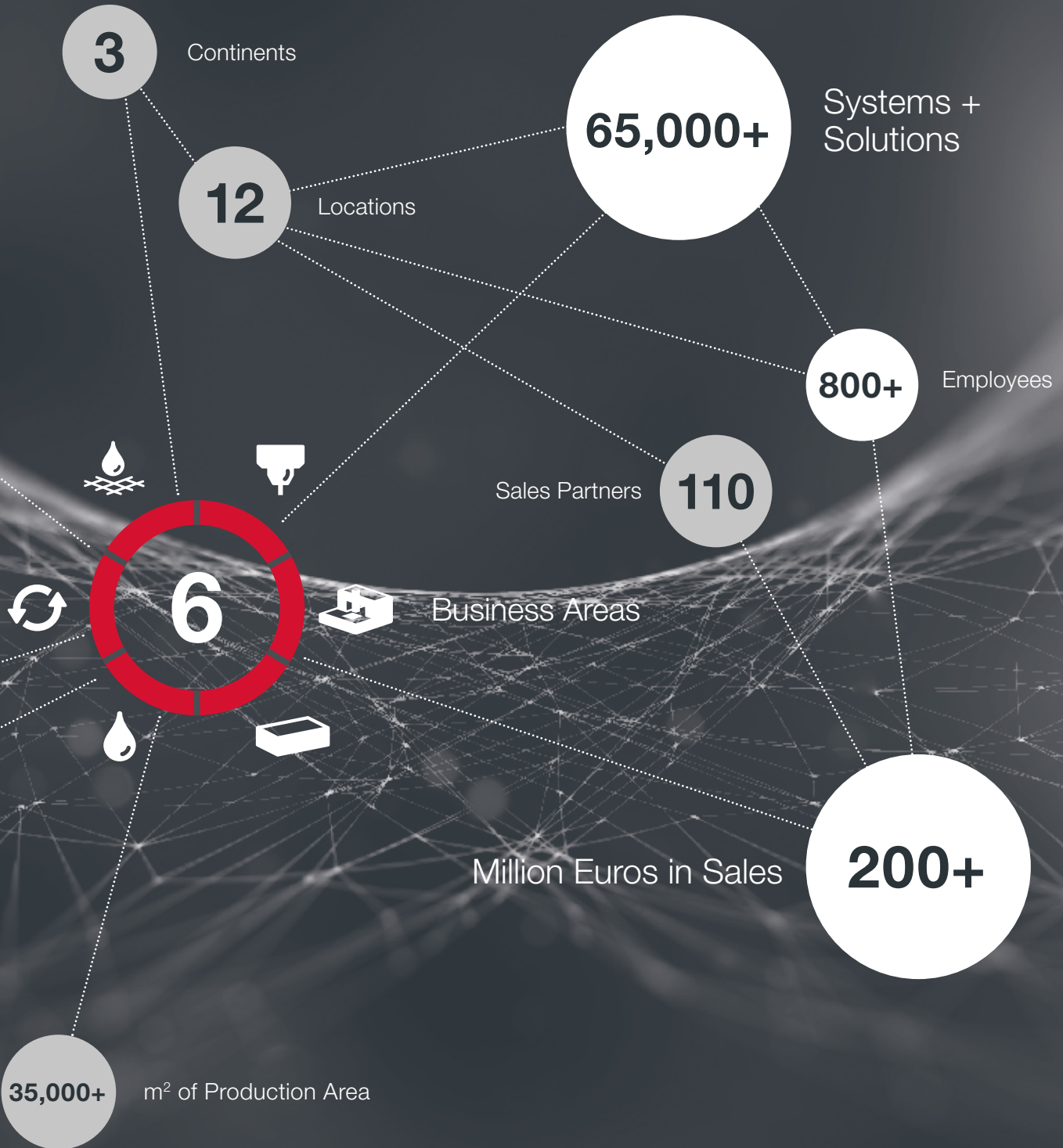
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Second-generation  
Family Company

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m<sup>2</sup> 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.**

