RAMPF
discover the future

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RAMPF MACHINE SYSTEMS

EPUFILL

Composite structures with a mineral casting filling

RAMPF #DiscoverTheFuture

Chemical and Engineering Solutions

Advanced Polymers | Composite Solutions | Machine Systems | Production Systems

RAMPF Machine Systems is a company of the international **RAMPF** Group.
Find out more on page 12.

RAMPF Machine Systems
Innovative solutions for highly dynamic production technology

We are the market-leading development partner and system supplier of complete machine beds and machine systems.

Our product portfolio encompasses
> System solutions, trunk and base machines, as well as multi-axis positioning and motion systems built on machine beds and frame components made from high-performance materials such as mineral casting, hard stone, and ultra-high-performance concrete
> Contract grinding of high-precision machine components

With this holistic approach, RAMPF Machine Systems serves as the ideal partner for the development and manufacture of pioneering machinery and production technology in a wide range of industries, including electronics, semiconductor, and solar module production, laser, woodworking and textile machines, measuring, testing, and inspection technology, as well as machine tool manufacturing.

Your industry | Your application

Customized, sustainable, and used worldwide in a wide range of applications.

- **BATTERY PRODUCTION**
- **ELECTRONICS PRODUCTION**
- **LASER APPLICATIONS**
- **MEASURING, TESTING AND INSPECTION TECHNOLOGY**
- **PICK & PLACE APPLICATIONS**
- **PACKAGING MACHINES**
- **FLAT PANEL TECHNOLOGY**
- **GRAPHIC MACHINES**
- **FOOD PROCESSING TECHNOLOGY**
- **MICROPRODUCTION**
- **SOLAR MODULE PRODUCTION**
- **DISPENSING TECHNOLOGY**
- **WOOD PROCESSING MACHINES**
- **MEDICAL TECHNOLOGY**
- **OPTICAL PRODUCTION**
- **TEXTILE MACHINES**

MACHINE TOOLS

EPUFILL for machine beds, stands and gantries for machine tools, textile, printing, wood processing, and packaging machines

POWER MACHINES

EPUFILL as a base for large motors, turbines, generators, test beds, centrifuges, pumps, and compressors

PRODUCTRONIC

EPUFILL for components and base frames in production equipment for semi-conductor, display, and solar module production

+ YOUR BENEFITS

- Ideally suited for short production runs, prototypes, and special-purpose machines, as no casting molds, casting models, or shells are required
- Mineral casting reliably adheres to metal surfaces (approx. 14 N/mm² on sheet steel and approx. 22 N/mm² on cast iron with a sand-blasted contact surface)
- The mineral casting filling undergoes very little shrinkage when it hardens, does not absorb moisture, does not swell, and therefore ensures that precision remains constant in the long run
- Thanks to the approximated coefficients of linear thermal expansion of the hybrid partners, bimetallic effects that would affect precision have not been determined

EPUFILL

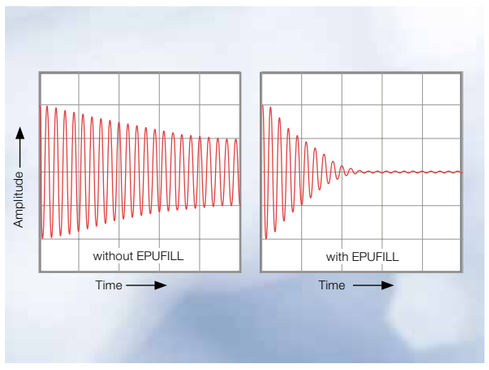
Properties and potential

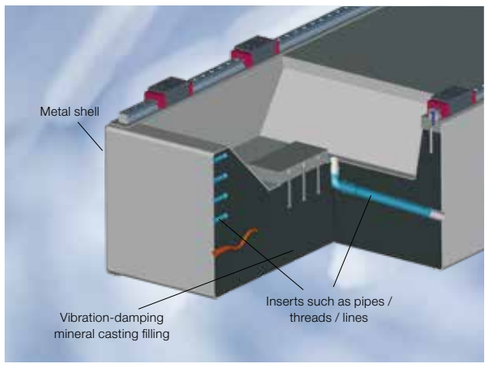
for machine beds and machine bed components subjected to heavy static and dynamic loads

For four decades, cavities in steel or cast iron machine beds and machine bed components have been filled with epoxy resin-bonded mineral casting. Initially often used to subsequently improve dynamic performance, this has since become a process in its own right. The machine bed assembly is designed as a hybrid structure from the outset. Alongside the economic benefits offered by the simpler and more cost-effective design and manufacture of the steel / metal structure, the properties of the machine bed assembly are also being optimized. For example, the damping mineral casting filling has a positive effect on dynamic parameters such as the oscillation amplitude, natural oscillation forms, and thermal behavior. Noise emissions are also reduced.

	MEASURE	EPUMENT® 145/B	EPUMENT® 140/8B	EPUMENT® 140/5
Density	g/cm³	ca. 2,4	ca. 2,3	ca. 2,3
Modulus of elasticity (compression test)*	kN/mm²	40–45	35–40	30–35
Poisson's ratio		ca. 0,30	ca. 0,29	ca. 0,28
Compression strength*	N/mm²	130–150	130–150	140–160
Flexural strength*	N/mm²	30–35	30–35	35–45
Thermal expansion coefficient (20°C)	$10^{-6}K^{-1}$	ca. 15	ca. 16	ca. 19,5
Logarithmic decrement		0,022	0,03	0,035
Maximum grain size	mm	16	8	5
Minimum castable wall thickness	mm	80	50	40

* Measured on Form+Test Seidner testing machine, model 502/3000/100SP





+ ADDITIONAL INFORMATION

1. Construction of a thin metal shell with mineral casting filling for a highly dynamic vertical lathe
2. In a thick-walled steel / welded structure (sheet thickness > 6 mm), the supporting steel elements assume the load-bearing functions; the mineral casting filling is only for damping
3. Thin metal sheets (2 – 5 mm) manufactured using state-of-the-art metal-working technology are welded together to form a thin metal shell; the mineral casting filling assumes static (i.e. load-bearing) and damping functions

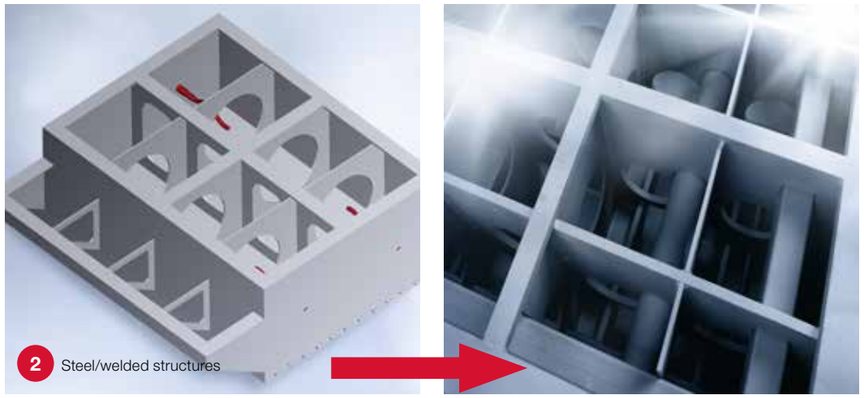
EPUFILL I Engineering, design, and modeling

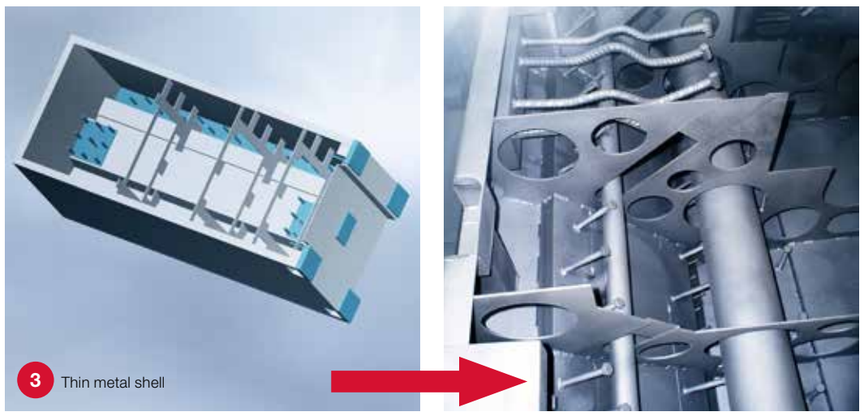
for technology-specific and cost-conscious construction of filled machine beds

EPUFILL technology opens up a wide range of possible designs for depicting the key functions of machine beds and machine bed components:

> Integrating pipes, hoses, cables, and other elements for the transfer of various media
> Secure attachment of transport elements such as bars, eye bolts, and lift truck forks
> Optimum transmission of static and dynamic loads by means of anchoring in the mineral casting (e.g. for mounting elements, guides, drives, and other machine elements)
> Weight-saving potential thanks to the possibility of supporting lost cores

Based on many years of experience, we will guide you through the entire process of constructing your hybrid machine bed component – from design and modeling, to FEM calculations and detailed engineering.



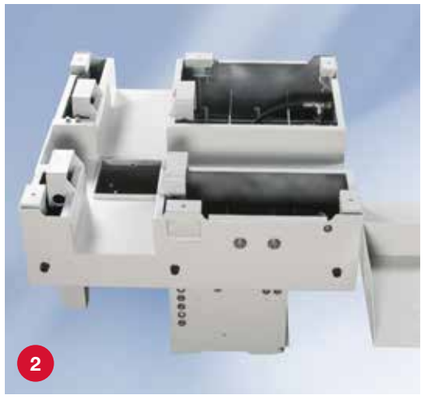


EPUFILL I Production and precision

vibration-optimized hybrid machine beds and machine bed systems that support long-term stability

RAMPF Machine Systems is at your service as a professional supplier of complete systems. We develop, construct, manufacture, fill, process, and assemble your machine bed, machine bed component, or even complete basic machine based on your requirements. We are also happy to fill any existing welded and cast constructions you provide, or to support you in their design and preparation.

The machine components are filled with a high-quality epoxy resin-bonded mineral casting on high-performance compaction tables **(image 1)**. Cutting-edge mixing and dispensing systems ensure the reliable processing of precise formulas. The material is checked daily in our own quality control lab.



+ ADDITIONAL INFORMATION

2 Based on approved drawings, steel/welded and metal shell structures are cost-effectively cut, edged, welded, annealed, sandblasted, and primed on schedule and to the highest standards of quality in state-of-the-art production facilities

3 The torsion-resistant composite constructions feature long-term stability and production in our high-performance milling and machining centers give them the required precision. The precision is then double-checked using cutting-edge measuring equipment

4 Alongside the precision assembly of guides, tables, carriages, drives, and measuring scales in temperature-controlled production halls, completely preassembled basic machines can also be supplied

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

RAMPF stands for pioneering chemical solutions and visionary engineering. Worldwide.

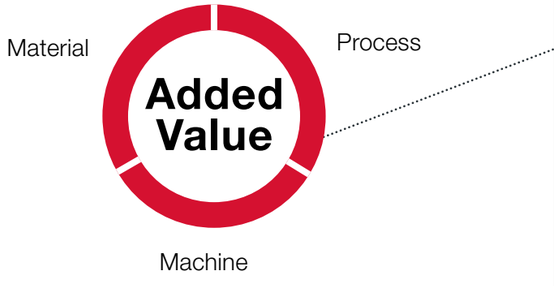
From a one-man operation to an international group with twelve sites spread across three continents – with our products and solutions centered around reactive resins, machine systems, and lightweight construction with composites, we rank among the market leaders in a whole host of industries.

Discover the future – this is both our corporate slogan and the foundation of our long-standing success story. In close cooperation with our customers and partners, we develop tomorrow's products and solutions today – for the decisive competitive advantage.

Sustainability has been a priority right from the outset. This is no mere buzzword but an integral part of our day-to-day activities. As pioneers of chemical recycling, we have been contributing to an effective circular economy for decades. The raw materials that we recycle are used both by our customers and within our Group.

We are also a sustainable employer. RAMPF grows with its employees – we invest in our staff and are keen for them to work with us in the long term. We achieve this by openly showing appreciation and offering extensive training and development opportunities.

A forward-looking, sustainable, and value-creating family-run business – as a partner to industry and as an employer, we attach the greatest of importance to trust and reliability. These qualities are an absolute must when it comes to establishing long-term, successful partnerships.



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

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.**

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