RAMPF
discover the future

EPUFILL | **Composite structures with a mineral casting filling**

Machine Systems

EN

Innovative solutions for highly dynamic production technology

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
> **Comprehensive range of solutions and services**, particularly for innovative 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 success story of the family-owned company, which now spans over 35 years.

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

RAMPF Machine Systems

Based in Wangen (near Göppingen), Germany, the company is the market-leading development partner and system supplier of complete machine bed solutions and machine systems.

Its service portfolio includes system solutions, trunk machines, basic machinery, and multi-axis positioning and moving systems based on machine beds and machine bed components made from alternative materials such as mineral casting, hard stone, ultra-high performance concrete, aluminum foam, and fiber composites.

High-precision machine systems are created using innovative replication, grinding, and lapping processes in temperature-controlled production environments.

This makes RAMPF Machine Systems the full-service partner for developing and manufacturing future-oriented machinery and production technology for a wide range of industries.

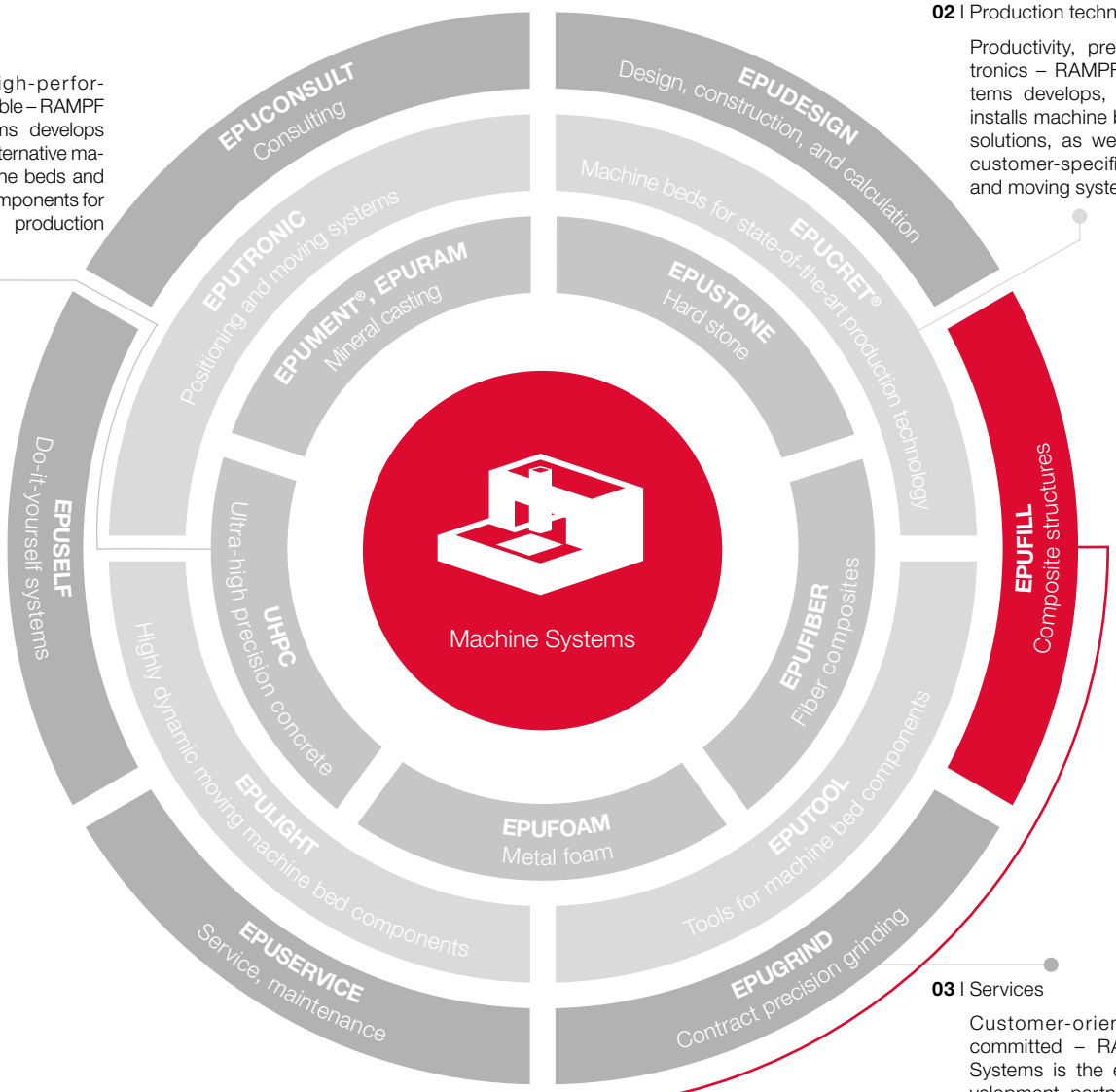
Range of products and services

01 I Materials

Innovative, high-performance, sustainable – RAMPF Machine Systems develops and produces alternative materials for machine beds and machine bed components for highly dynamic production technology

02 I Production technology systems

Productivity, precision, mechatronics – RAMPF Machine Systems develops, produces, and installs machine beds as system solutions, as well as complete, customer-specific positioning and moving systems



03 I Services

Customer-oriented, skilled, committed – RAMPF Machine Systems is the end-to-end development partner and service provider for innovative production technology solutions – from machine base to basic machinery

» EPUFILL technology features steel/welded, metal shell, and cast structures that are filled with a vibration-reducing epoxy resin-bonded mineral casting material. This creates composite structures with long-term stability that also offer an excellent level of static and dynamic rigidity (damping). Since no casting molds, casting models, or shells are required, this technology is particularly suited for short production runs, prototypes, and special-purpose machines. «

Industries

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

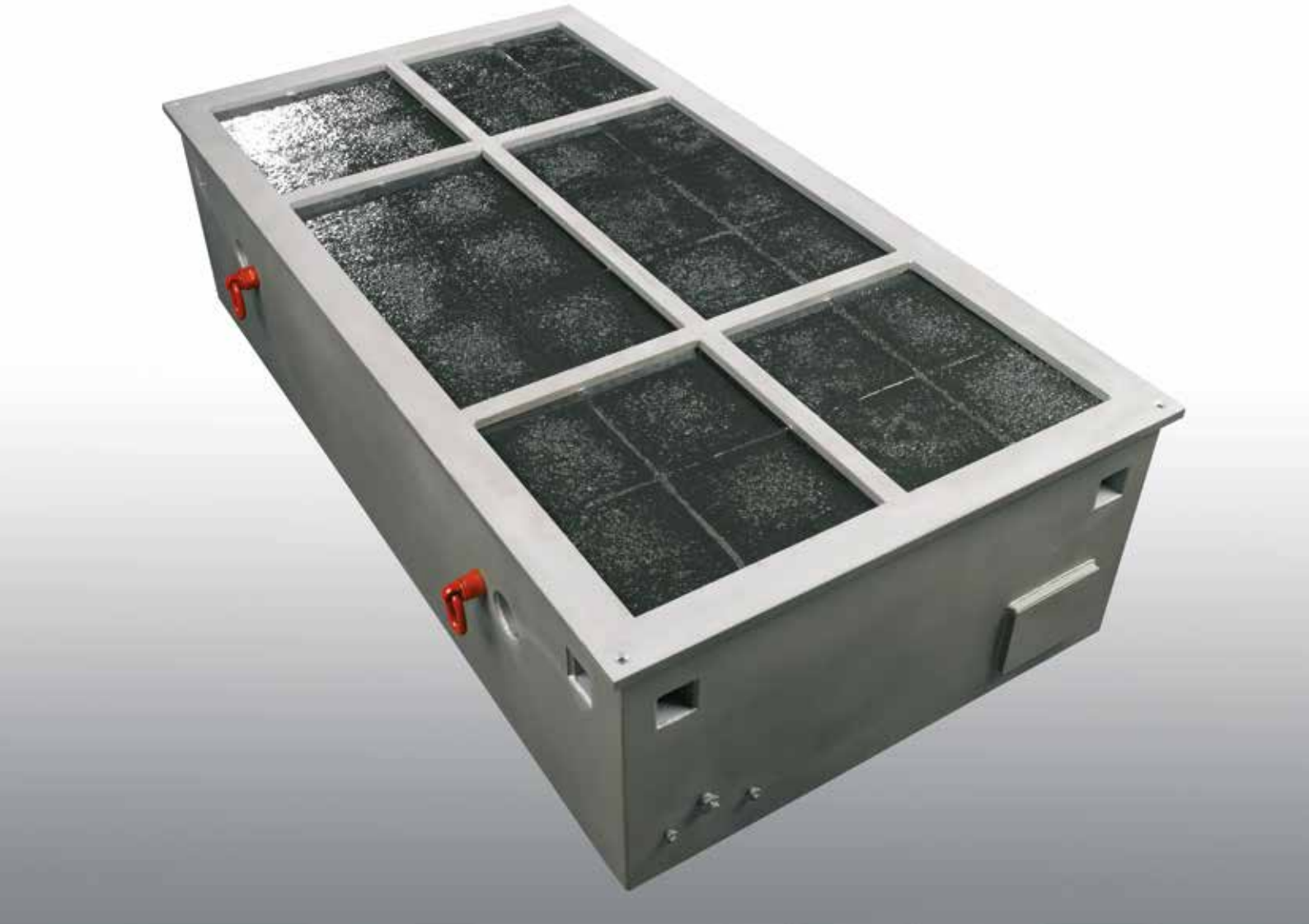
EPUFILL for components and base frames in production equipment for semi-conductor, display, and solar module production

Your industry I Your application

We have been serving well-known customers across the globe for 40 years. In our own plants in Germany and China, we develop and produce innovative composite constructions filled with mineral casting for use in a wide range of applications and industries involving high-performance production technology.

- Machine tools
- Laser applications
- Solar module production
- Electronics production
- Microproduction
- Measuring, testing and inspection technology
- Packaging machines
- Flat panel technology
- Battery production
- Wood processing machines
- Medical technology
- Power machines
- Optical production
- Graphic machines
- Food processing technology
- Pick & place applications
- Textile machines
- Dispensing technology

Properties



EPUFILL | Properties and potential

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

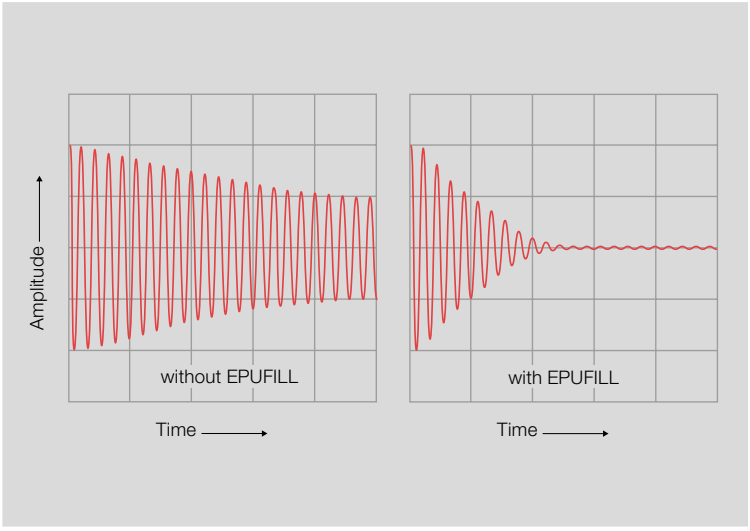
For four decades, cavities in steel or cast iron machine beds and machine bed components have been filled with epoxy resin-bonded mineral casting. Initially often used to subsequently improve dynamic performance, this has since become a process in its own right. The machine bed assembly is designed as 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.w

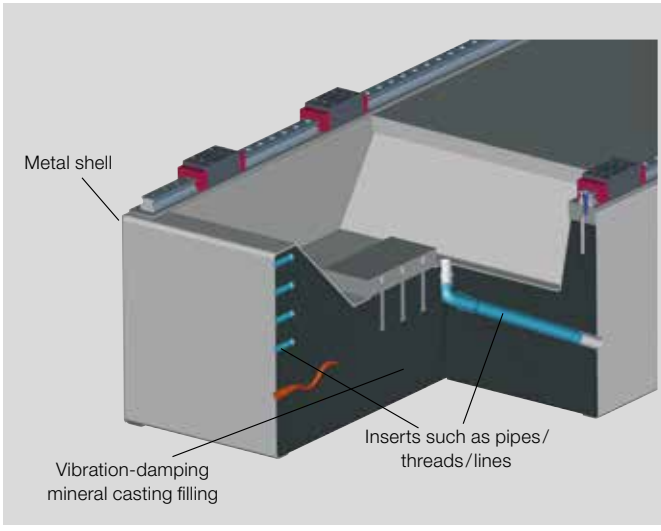
Your benefits

- 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

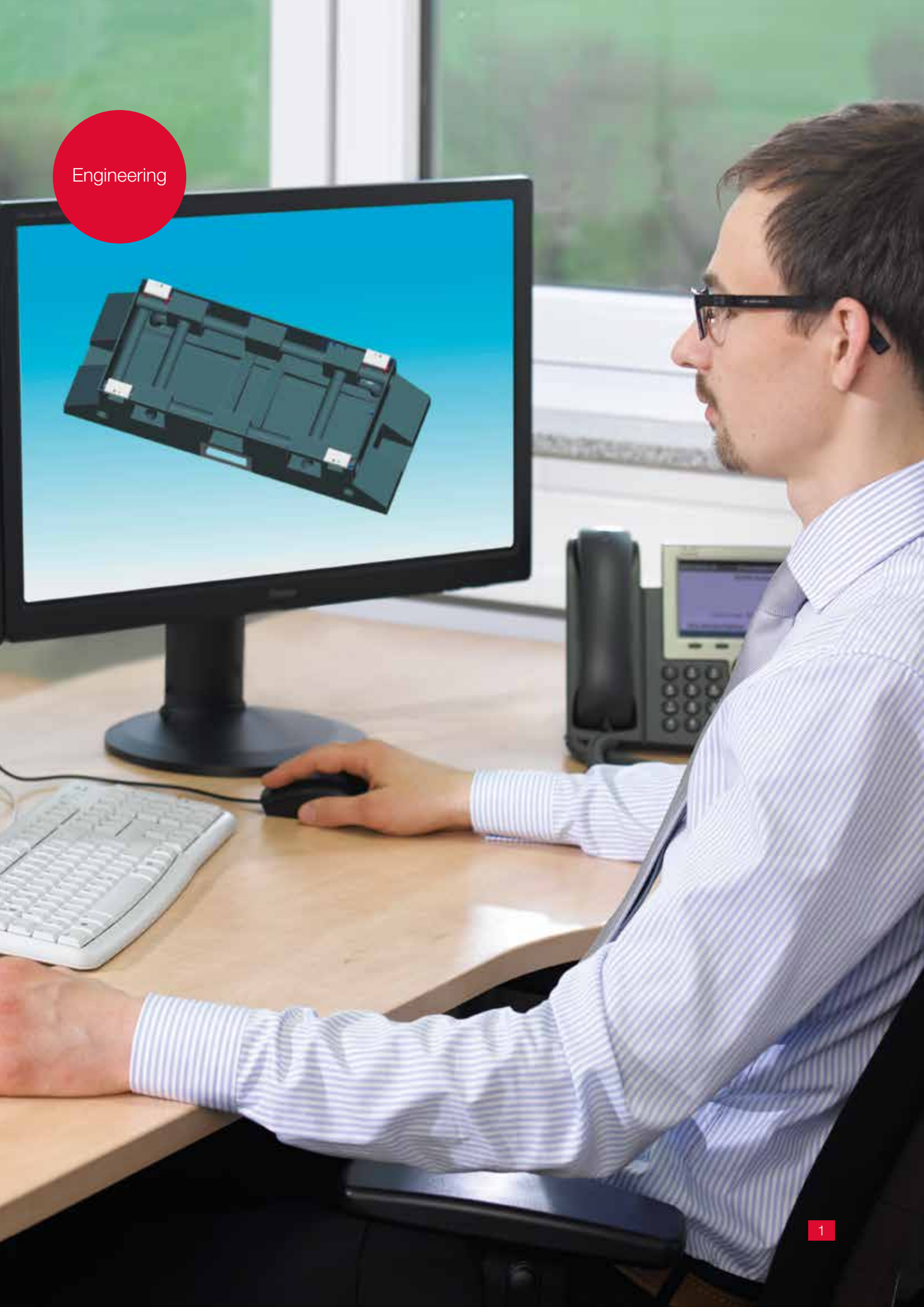
	Measure	EPUMENT® 145/B	EPUMENT® 140/8B	EPUMENT® 140/5
Density	g/cm³	ca. 2.4	ca. 2.3	ca. 2.3
Modulus of elasticity (compression test)*	kN/mm²	40–45	35–40	30–35
Poisson's ratio		ca. 0.30	ca. 0.29	ca. 0.28
Compression strength*	N/mm²	130–150	130–150	140–160
Flexural strength*	N/mm²	30–35	30–35	35–45
Thermal 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





Engineering



EPUFILL | 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

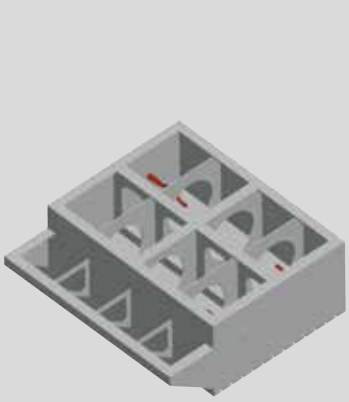
Based on many years of experience, we will guide you through the entire process of constructing your hybrid machine bed component – from design and modeling, to FEM calculations and detailed engineering.

Additional information

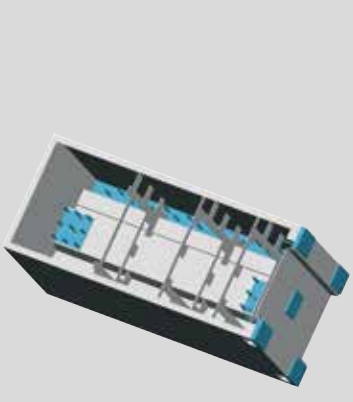
> **Image 1:** Construction of a thin metal shell with mineral casting filling for a highly dynamic vertical lathe

> **Image 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

> **Image 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



2 Steel/welded structures



3 Thin metal shell

Production

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.

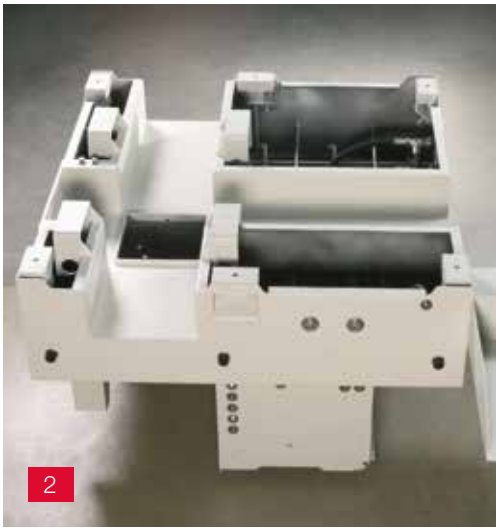
The machine components are filled with a high-quality epoxy resin-bonded mineral casting on high-performance compaction tables **(image 1)**. Cutting-edge mixing and dispensing systems ensure the reliable processing of precise formulas. The material is checked daily in our own quality control lab.

Additional information

> **Image 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

> **Image 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

> **Image 4:** Alongside the precision assembly of guides, tables, carriages, drives, and measuring scales in temperature-controlled production halls, completely pre-assembled basic machines can also be supplied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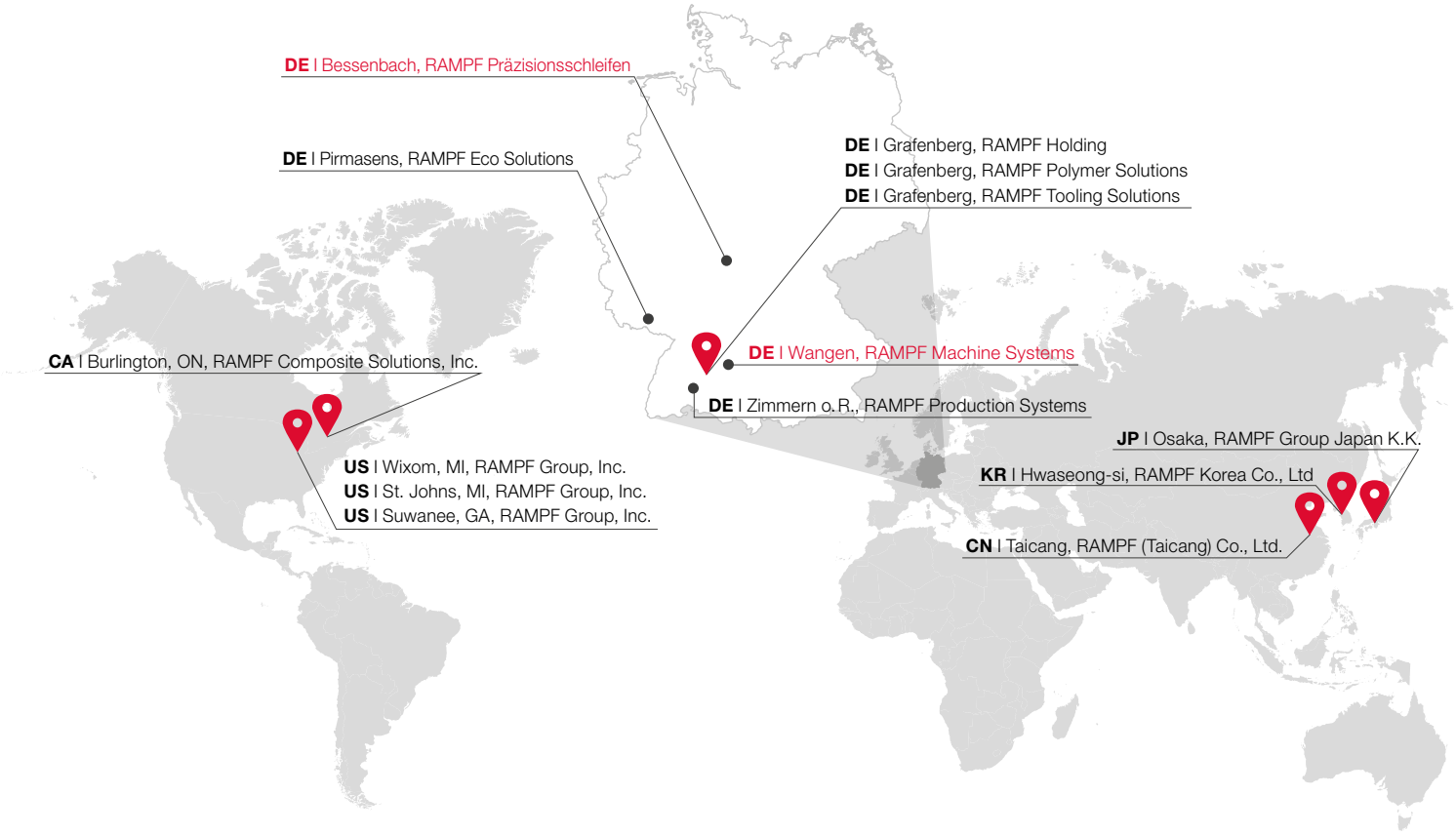
RAMPF Group | Locations



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