Press Release

RAMPF at CAMX 2018 – High-performance modeling and mold engineering materials

Close Contour Pastes and Castings / Epoxy board for pre-preg production / Parts manufacture for aerospace and medical industries

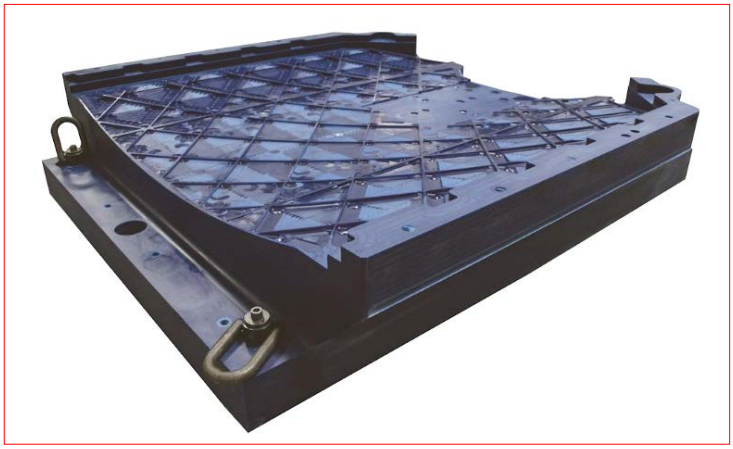
Wixom, MI, USA, October 10, 2018. Innovative modeling and mold engineering materials as well as composites design, engineering, and manufacturing capabilities are the focus of the international RAMPF Group's presentation at CAMX 2018 from October 16 - 18 in Dallas, TX – Booth Q29.

RAMPF Group, Inc. is a leading developer and manufacturer of customized tooling solutions for cost-effective and high-quality model, mold, and tool construction for the automotive, marine, and aviation industries. The company's portfolio includes styling, modeling, and working board materials; Close Contour Pastes, Close Contour Casting, and Close Contour Blocks; and liquid systems for the composites industry that cover a wide variety of production processes and a broad range of temperatures.

The highlights at CAMX 2018 include:

RAKU® TOOL Close Contour Castings

Close Contour Castings are supplied as a three dimensional shape that is already a close contour of the final part. There is no bonding or cutting of boards, and manufacturing is cost effective due to the close contour of the part (less milling, less waste). The dense polyurethane systems exhibit good heat and chemical resistance, and the homogenous and seamless surface is easy to polish.



At CAMX 2018, RAMPF is presenting RAKU® TOOL Close Contour Casting CC-6503/CB-6503, which was used for the production of vacuum trim fixtures for isometric aircraft parts.

RAKU® TOOL Close Contour Pastes

Close Contour Pastes are applied to a close contour shape supporting structure, cured, and then machined according to the CAD data of the customer. The application process is quick and easy as most

pastes are machine applied and virtually any material can be used as a supporting structure. RAMPF also offers a close contour paste application service.

RAKU® TOOL Close Contour Pastes have a very fine, homogeneous, and seamless surface that is easy to machine with low dust formation. The two-component epoxy systems exhibit high surface hardness and low CTE, and are especially suited for the production of large models or molds (e.g. master models, check fixtures, infusion tooling, prepreg tooling).

This mold for producing wind turbine blades using the composite construction method was manufactured using Close Contour Paste RAKU® TOOL CP-6060.

RAKU® TOOL working boards

Working boards from RAMPF combine the ultimate in quality with outstanding mechanical properties. The semi-finished products (prefabricated, rectangular boards) can be bonded in various shapes and sizes. The epoxy or polyurethane systems boast excellent dimensional stability and enable quick and easy machining. Applications include metal forming, hammer forms, foundry patterns, molds, checking fixtures, jigs, and lay-up tools.

At CAMX, RAMPF is presenting its high-tech board RAKU® TOOL WB-0691. The epoxy system with a HDT 110 ºC is especially suited for prepreg lay-up tools for low temperature prepregs, vacuum forming molds, and medium temperature applications in the aerospace, racing, marine, sports, and medical technology industries.

Milling of a prepreg lay-up tool from RAKU® TOOL WB-0691 for composite part production.

Design, engineering, and manufacture of composites parts for the aerospace and medical industries

RAMPF Composite Solutions is a complete solution provider of innovative carbon fiber and fiberglass composites for the aerospace and medical industries based in Burlington, Ontario, Canada. At CAMX 2018, the company will showcase its capabilities in engineering, structural analysis, and manufacturing to optimize the balance of weight, stiffness, vibration, materials, cost, environment, flammability, toxicity, schedule, and manufacturability of cutting-edge composite parts and assemblies.

A highlight at the RAMPF booth – FST resin infusion systems, which are used to manufacture secondary structures in passenger aircraft (e.g. interior parts, doors, cabins, and evacuation system components) and for seat covers and components in business jets. RAMPF will also be featuring its range of highly toughened and low-viscosity infusion systems with high Tg.

Extremely light, extremely stable: This seat backrest for a business jet was made by RAMPF using VARTM (vacuum-assisted resin transfer molding) and the FST resin infusion system RAKU® FST 5501. The component combines a sandwich structure (carbon-fiber layers / foam core / carbon-fiber layers) and monolithic laminate (carbon fiber).

www.rampf-group.com

RAMPF Group, Inc., based in Wixom, Michigan, 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
> two-component polymer (or synthetic) systems based on polyurethane, epoxy, and silicone
> modeling and mold engineering materials, in particular for the automotive, marine, and aviation industries
> machine bases, machine frames, and other structural components made from mineral casting (polymer concrete)

The international RAMPF Group 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 800 employees and six core competencies:

> **RAMPF Machine Systems** based in Wangen (Göppingen), Germany, develops and produces multi-axis positioning and moving systems, trunk machines, and basic machines based on high-precision machine beds and machine bed components made from alternative materials.

> **RAMPF Production Systems** based in Zimmern o. R., Germany, develops and produces mixing and dispensing systems for bonding, sealing, foaming, and casting a wide variety of materials. The company also offers a wide range of automation skills relating to all aspects of process engineering.

> **RAMPF Composite Solutions** based in Burlington, Ontario, Canada, is a holistic composites supplier to companies in the aerospace and medical industries. The company offers a complete suite of services including composite part design and engineering, metal-to-composite conversion engineering, and composite manufacturing to very tight tolerances.

> **RAMPF Eco Solutions** based in Pirmasens, Germany, develops chemical solutions for the manufacture of high-quality alternative polyols from PU and PET waste materials. This expertise is also put to use in the planning and construction of customer-specific facilities for manufacturing polyols.

> **RAMPF Polymer Solutions** based in Grafenberg, Germany, develops and produces reactive resin systems based on polyurethane, epoxy, and silicone. Its product portfolio includes liquid and thixotropic sealing systems, electro and engineering casting resins, edge and filter casting resins, and adhesives.

> **RAMPF Tooling Solutions** based in Grafenberg, Germany, develops and produces board and liquid materials for cutting-edge modeling and mold engineering. The range of skills includes made-to-measure services and products such as pastes, large-volume and full-size castings for Close Contour models, and prototyping systems.

RAMPF has subsidiaries in Germany, the U.S., Canada, Japan, and China.

All RAMPF companies are united under a holding company – **RAMPF Holding GmbH & Co. KG** – based in Grafenberg, Germany.

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