

INSIGHTS

EDITION **1** 2014

OPEN HOUSE

April 9 - 12, 2014 in Gosheim

C 12 MACHINING CENTER

compact - precise - dynamic

CUSTOMER STORIES

Robot technology - jet engine technology - micropositioning systems





OPEN HOUSE

GOSHEIM, APRIL 9-12, 2014

EXHIBITORS

TOOL TECHNOLOGY

- ALESA AG
- BAUBLIES AG
- BENZ WERKZEUGSYSTEME
- BIG KAISER GMBH
- BOTEK PRÄZISIONSBOHRTECHNIK GMBH
- EMUGE WERK-RICHARD GLIMPEL GMBH & CO. KG
- FRAISA GMBH
- GDE-WERKZEUGE GMBH
- GÜHRING OHG
- HAIMER GMBH
- HARTMETALL-WERKZEUGFABRIK PAUL HORN GMBH
- HITACHI TOOL E. E. GMBH
- HOFFMANN GROUP
- INGERSOLL WERKZEUGE GMBH
- IRUBA INNOVATIONS GBR
- ISCAR GERMANY GMBH
- KENNAMETAL DEUTSCHLAND GMBH
- KOMET GROUP GMBH
- LMT TOOL SYSTEMS GMBH / BILZ
- MAPAL PRÄZISIONSWERKZEUGE DR. KRESS KG
- MITSUBISHI MMC HARTMETALL GMBH
- POKOLM FRÄSTECHNIK GMBH & CO. KG
- SANDVIK TOOLING DEUTSCHLAND GMBH COROMANT
- SCHRENK SPANN- & ZERSPANTECHNIK GMBH / SECO TOOLS
- WALTER DEUTSCHLAND GMBH
- WOHLHAUPTER GMBH

OTHERS

- BLUM-NOVOTEST GMBH
- CARL ZEISS INDUSTRIELLE MESS-TECHNIK GMBH
- E. ZOLLER GMBH & CO. KG
- KELCH + LINKS GMBH
- M & H INPROCESS MESSTECHNIK GMBH
- RENISHAW GMBH
- ROTHER TECHNOLOGIE GMBH & CO. KG
- STAAB-TEC / RAPIDFORM

SOFTWARE - CAD/CAM

- ARTIS-MARPOSS GMBH
- COMPLETE SOLUTIONS INC.
- CAMTEK GMBH
- CENIT AG
- CGTECH DEUTSCHLAND GMBH
- CIMCO INTEGRATION I/S
- CONCEPTS NREC
- DELCAM GMBH
- JANUS ENGINEERING GMBH
- OPEN MIND TECHNOLOGIES AG
- SESCOI GMBH
- SOLIDCAM GMBH
- TEBIS AG
- UNICAM SOFTWARE GMBH / MASTER CAM CNC SOFTWARE INC.

CONTROL TECHNOLOGY

- DR. JOHANNES HEIDENHAIN GMBH
- SIEMENS AG

AS IN PREVIOUS YEARS, MASCHINENFABRIK BERTHOLD HERMLE AG IS ORGANIZING ITS TRADITIONAL OPEN HOUSE AT ITS GOSHEIM HEADQUARTERS.

When we open the doors of the manufacturing plant April 9-12, 2014 to welcome interested visitors, you will be able not only to experience our entire spectrum of highly innovative machining centers in action, but also get the latest tooling information in our special „Tool Technology“ show. Over 50 external exhibitors will be showing you the future in the areas of tool technology, CAD/CAM and control technology.



THE HERMLE PRODUCT RANGE IN ALL ITS DIVERSITY

And of course all Hermle products (from 3-, 4- and 5-axis machining centers, milling and turning variants through to customized equipment and special solutions) will be shown in the Technology and Training Center, together with interesting workpieces for many different sectors. Or you can see the Hermle machines operating under production conditions in our manufacturing plant.



OPENING HOURS

WEDNESDAY - FRIDAY 9:00 am - 5:00 pm
SATURDAY 9:00 am - 1:00 pm

HIGHLIGHTS

- **Premiere** of the new C 12 high performance center
- **Premiere** of the new PW 150 pallet changer with twice the number of pallets, adapted to a C 22 U
- **Over 30 machines**, some automated, in our Technology and Training Center
- **Hermle Expert Forum** - Our application technology and training departments will be at your disposal to answer all your questions about applications, machine simulation and technical innovations in control units
- **Technical presentations** on a wide variety of topics
- **Service competence live** - Presentation and demonstration of our service division
- **Special tool technology** - CAD/CAM software display with over 50 well-known exhibitors
- **Factory tours** through our manufacturing and assembly facilities and restructured sheet metal production



EXHIBITS

EXHIBITS IN THE TECHNOLOGY AND TRAINING CENTER

- 1 x C 12 U (**premiere**)
- 1 x C 400
- 1 x C 20 U with RS 05 robot system
- 2 x C 22 U
- 1 x C 22 U with PW 150 pallet changer (**premiere**)
- 1 x C 32 U with IH 60 handling system
- 4 x C 32 U
- 1 x C 30 U with RS 2 combo robot system
- 4 x C 42 U
- 2 x C 42 U MT (mill/turn)
- 1 x C 50 U
- 1 x C 50 U MT (mill/turn)
- 1 x C 60 U MT (mill/turn)

EXHIBITS UNDER PRODUCTION CONDITIONS IN OUR MANUFACTURING PLANT

- 1 x C 1200 V (high-precision manufacturing)
- 2 x C 40 U with RS 3 robot system
- 1 x C 42 U with PW 850 pallet changer
- 1 x C 50 U MT with PW 2000 pallet changer
- 1 x C 60 U with PW 3000 pallet changer

EXHIBITS IN OUR SERVICE CENTER

- 1 x C 22 U
- 1 x C 42 U MT (mill/turn)



Foreword

Dear customers, interested persons, employees and friends of the company,

the company's eventful 75th anniversary year is now behind us and with a high level of orders on hand, we have launched full steam into 2014. Demand for Hermle machines held well through the end of 2013. And so our task now, with increased production capacity, is to process the orders in a timely manner.

We also have to deal with the retirement of our previous spokesman of the board, Dietmar Hermle. But if you know him, you know that he has prepared very well for the change over and well means that he will be there if he is needed.

We have ambitious plans for 2014. We will be presenting the new C 12 5-axis machining center at this year's Open House April 9-12. With the development of this new machining center we have extended our product range to cover the smaller side, offering you, dear customers, high precision and dynamics in the smallest possible space. In addition to the C 12 5-axis machining center, we will also be presenting automation solutions associated with it as well as the entire Hermle product family.

The construction on the visitors' restaurant, which began last fall, is making good progress and is scheduled to be completed for the Open House in April of this year. This new building will create the environment we need to provide a typical Hermle atmosphere as we host and support our visitors and participants in training courses.

As already announced the construction on the new assembly building will begin, as soon as weather conditions permit.

2014 will be a year with high investment in the future of our company here at the Gosheim location. The addition of the C 12 5-axis machining center to our product line together with related automation solutions once again demonstrates the innovative force of our company.

We extend a warm welcome to you to visit our Open House and look forward to interesting discussions.

Yours truly,
 Franz-Xaver Bernhard
 Member of the Board



The C 12 – compact – precise – dynamic

With the C 12, Hermle AG further rounds out the smaller side of its product range. Hermle is responding to customer demand for smaller floor space requirements with its new C 12 5-axis machining center. The C 12 rounds out the smaller side of Hermle product range, but it is the equal of the larger models in every way. The focus is not only on compactness, but also on other core areas of Hermle competence such as precision, durability and of course dynamics.

www.hermle.de/c12

DESIGNED AS A 5-AXIS MACHINING CENTER FOR MACHINING CUBIC PARTS UP TO 100 KG.

The working area traverse of 350-440-330 mm in the X-Y-Z axes provide an ideal basis for simultaneous 5-sided/5-axis machining – with linear traverse and acceleration speeds of 30 m/min at 4 m/s² and in the dynamics version 50 m/min at 8 m/s². But the highlight of the C 12 is the tool magazine. The magazine holds 71 tools in the double expansion level, yet it takes up no more additional cm²s of floor space than the standard ring magazine with 36 tools.

The workpiece cube Ø 320 mm with a height of 265 mm is only intended as an approximate value. A detailed workpiece design is required in each case for accurate values. The NC-swiveling rotary table swivels and turns in the working area with a torque drive in the C axis and an adapted drive in the A axis out of the working area on the right side. A dynamics version can also be selected for the standard values. In this version the A axis speed levels are increased from 25 to 55 rpm and the C axis speed levels from 40 to 80 rpm. The swiveling range of +/- 115° is available without restrictions in both versions, thus allowing for complex undercutting as well. Consideration was also given to automation solutions. This makes it possible to adapt the C 12 with a PW 150 pallet changer or an RS 05 robot system. Both systems are located to the left of the machine when they are attached and use the access through the left side, into the working area. We will be presenting these systems in detail at AMB 2014.



The C 12 compact in installation, powerful in processing.



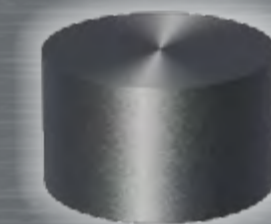
The „Torque“ NC-swiveling rotary table – ideal for 5-axis technology.

TECHNICAL DATA

Traverse path X-Y-Z:	350 – 440 – 330 mm
Speed:	12000 / 15000 / 18000 30000 / 42000 1/min
Rapid linear traverses X-Y-Z:	30 [50] m/min
Linear acceleration X-Y-Z:	4 [8] m/s ²
Control unit:	TNC 640

THE WORKPIECE DIMENSION

- Unrestricted crane top loading to above the table center
- When loading by crane the spindle moves into the magazine – This leaves a completely clear and accessible working area
- Extensive automation solutions for optimum parts handling



5-axis	max. 100 kg
Ø 320 x 265 mm	Collision circle: Ø 620 mm

CLAMPING TABLES

NC-swiveling rotary table "Torque"
 Clamping surface: Ø 320 mm
 Swiveling range: +/- 115°
 Max. table load: 100 kg
 A axis rotation speed: 25 [55] rpm [dynamics]
 C axis speed: 40 [80] rpm [dynamics]



Zero-point clamping systems / pallet clamping systems



DRIVE TECHNOLOGY

- Centric table load
- Drive directly on table housing = low A axis torsion
- Direct, absolute measuring system
- Good maintenance accessibility
- A axis integrated into the machine bed



One-sided drive

- Mechanical drive on right of table housing



PRECISION MILLING FOR EFFICIENCY

From model making enthusiast to businessman: How Christian Frey began by turning his hobby into a career, developed that into a high-tech company, and how Hermle's 5-axis CNC milling technology contributed to it all.



FROM MODEL BUILDER AND LATER INDUSTRIAL MODELING CRAFTSMAN

in conventional tool and mold making through model (aircraft) making to small gas turbines and mini jet engines - to the early history of a company, BF-Turbines GmbH & Co. KG, D-63856 Bessenbach, nothing sums up the whole story better than the proverbial warning "start-up at rocket speed"!

THE FOLLOWING USER REPORT, EXPLAINS WHAT THIS ALL MEANS.

Christian Frey came in contact with the 5-axis CNC high-performance machining centers of Maschinenfabrik Berthold Hermle AG for the first time in his capacity as model builder and industrial modeling craftsman concerned with parts manufacturing in tool and mold making described above. His first real experience with the machines was very positive. The scene changes: It's not unusual for a modeling craftsman to pursue model building of a different type in his free time, for example model aircraft - of course with a machine that actually files. An affinity to the corresponding jet engines is somewhat unusual, however, as the "true" model aircraft fanatic places great value on authenticity. It's not simply a matter of scaling down the size of the aircraft, recreating it with



A selection of challenging, turbine parts for 5-axis machining, made of high-strength aluminum, semi-finished Inconel and fine cast Inconel.

smaller dimensions, but ideally of fitting it with an "authentic" motor or jet engine, not just with the usual electric drive. But Christian Frey was not really satisfied with what was available on the market. So he went to the factory and started to develop small gas turbines and mini jet engines for model aircraft. Somewhere during a period of four years the idea of gas canisters emerged for absolutely realistic jet model building, true in every detail.

YOU ALWAYS REMEMBER THE GOOD PARTS!

So Christian Frey stopped developing and manufacturing alongside his job and founded BF-Turbines GmbH & Co. KG in close collaboration with his test pilot Florian Keilwitz. To move development forward, implement optimization measures without losing time and reliably ensure continuity in production and spare parts supply, the decision was made to set up in-house manufacturing. Christian Frey explains: "Since turbine manufacturing is characterized by special machining requirements, and since I was familiar with the performance capabilities of Hermle machining centers from earlier days, it was clear that we should buy a 5-axis machining center right away." That happened in the fall of 2011 and since then the machine has been used for highly flexible and productive manufacturing of both turbine and jet engine parts in small series production as well as for prototypes and spare parts. The C 30 U dynamic 5-axis CNC high-performance machining center is ideally suited for this great diversity of machining tasks in a challenging range of parts.

AFTER SOME TIME, SERIES PRODUCTION STATUS IS REACHED and a higher quality standard is achieved - and approval is issued for a flight altitude of 10,000 m. The actual capabilities, practical suitability and long-term reliability of BF turbines can perhaps be well assessed by noting that the small gas turbines and mini jet engines are frequently used today in the reconnaissance drones of well known defense technology companies. Not without pride Christian Frey notes: "As standard products we currently have the



Christian Frey, Managing Director and creative developer of small gas turbines and mini jet engines, standing in front of the flagship of single-operator turbine manufacturing, the Hermle C 30 U machining center.

performance versions B100F with a thrust of 120 N at 125,000 rpm and B300F with a thrust of 300 N at 104,000 rpm in the product line. These are true power packs and the only way we could do this was by keeping the components compact and machining every part until it truly reached its smallest possible dimensions, to save weight and space. The parts must also be highly precise and optimally designed for flow, meaning the surfaces must be machined perfectly to achieve maximum efficiency and the lowest possible consumption of jet fuel.

So far we have produced over 450 turbines on the Hermle C 30 U 5-axis CNC high-performance machining center."

SUMMARY

The maximum level of availability offered by the Hermle machining center is indispensable for ensuring availability for deliver and profitability. Not just because of the familiar Hermle attributes: 5-axis functionality, high performance, long-term accuracy and high machining quality, but also because of their proven excellent and competent service and literal immediate response capability to malfunctions.

www.bf-turbines.de



PRECISION-MILLED PARTS FOR MICROPOSITIONING SYSTEMS

From uncompromising striving for precision to perfection, or: Why Märzhäuser Wetzlar relies primarily on CNC high-performance machining centers from Hermle for the production of its high-precision micropositioning system parts.



AT TECHNOLOGY COMPANY

Märzhäuser Wetzlar GmbH & Co. KG, maximum accuracy is always in focus! That refers not only to microscope tables, measurement tables, control units, operating controls and motorized fine focusing, but also complete systems such as automated handling systems. The foundations were laid by brothers Heinz and Walter Märzhäuser in 1946 when they went into business independently producing precision parts for microscopy. Their international breakthrough came in 1962 with the development of the first micro manipulator, the MM 33, which still today has the highest sales in the world. The owner-operated, high-tech operation now in its second generation employs 170 qualified employees today.

THE HIGHEST STANDARDS OF ACCURACY AND QUALITY

Managing Director Dipl.-Ing. Günter Märzhäuser spoke about the very high requirements of customers and users of microscopy systems: "We have all well known international manufacturers of microscopes as original equipment manufacturer customers. About 75% of our turnover is OEM business with these customers. The remaining 25% is in customer-specific solutions or complete systems. All products are developed and designed internally and in close collaboration with our customers and users, then manufactured in-house completely under our control. This is especially true of all the mechanical components, which are fundamental for the required precision and long-term accuracy. We see maximum production depth as indispensable for being able to ensure the precision of machining processes and thus reproducible quality. That also gives us the necessary flexibility and ability

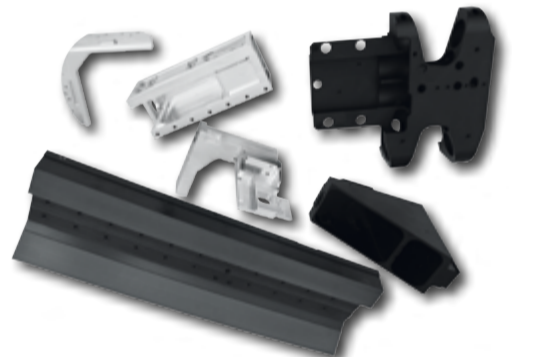
to respond to individual production of a very extensive spectrum of workpieces consisting of about 6500 living components." Production standards are accordingly high in the relevant technologies, milling, turning and lapping with 19 CNC precision machine tools in the ultra-modern machine park, which is fine-tuned for precision, quality and performance. Since the workpieces are frequently cubic or more accurately flat cubic parts, milling/drilling/reaming/tapping make up the lion's share of the precision machining. The word "precision" takes on a special meaning here: "We are speaking of reproducible positioning accuracy in non-air-conditioned operation in the range of less than a µm and micro differences in height in the range of less than 200 nm in machining of surface parts. There's no room for compromises. That's why we have consistently relied on several Hermle CNC high-performance machining center for precision milling since 1999 and still do today," explains the Operations Manager of Märzhäuser Wetzlar, Volker Reinhardt (MBA).

UNWAVERING COMMITMENT ... LOGICALLY CONSISTENT AND RATIONALLY CALCULATED ...

It started in 1999 with a CNC machining center type C 800 V, followed a year later by a type C 800 U machine and again a year later with a series C 600 V CNC machining center. A CNC high-performance machining center of the new C generation arrived in 2005 (a C 40 V) followed in 2012 by another C 40 V. As mentioned previously, other than the CNC C 800 U machining center, all other Hermle machines are V variants with a rigid clamping table. There are good reasons for this, as Volker Reinhardt explains:

"We were literally tortured by worries about accuracy and reproducibility and we looked at different machine manufacturers before choosing

Left to right: Dipl.-Ing Günter Märzhäuser (Managing Director), Uwe Wagner (Work Preparation) and Rafael Dastig (CNC Specialist), all of Märzhäuser Wetzlar GmbH & Co. KG, in front of the new Hermle C 40 V high-performance machining center, equipped with a 10000 rpm main spindle, tool magazine with 38 pockets, SK40 tool holding fixture, rigid machine table and Heidenhain iTNC 530 control unit.



Selection of high-precision aluminum components for Märzhäuser Wetzlar micropositioning systems.

Hermle after some truly impressive trial milling. The focus for us is not on complex 5-sided complete machining, but rather on highly precise complete machining of the flat workpieces described earlier.

A CONSISTENT PACKAGE FOR USERS!

The main reasons for Märzhäuser Wetzlar choosing Hermle included (and still do) such factors as the modified gantry design for maximum stability and rigidity, high precision and absolutely high reproducibility as well as long-term accuracy, very high reliability, availability "off the rack", the uniform control and operating concept, and last but not least the fast, competent customer service, ready with all relevant spare parts. "For us as in-house manufacturers with a high proportion of added value in the manufacture of micropositioning systems, it's a very important competitive factor. That's why we always have and will continue to build on our partnership with Hermle."

www.marzhauser.com



Large working area of the C 40 V machining center with X = 850 mm, Y = 700 mm and Z = 500 mm and the rigid clamping table with clamping surface 1070 x 700 mm. The table is designed for universal applications with standard and special clamping devices. The slim design of the Z axis or milling spindle provides excellent accessibility for 5-sided surface machining.

USERS.

To read the detailed article visit www.hermle.de and see the „News/Anwenderberichte“ area.



QUALITY IS THE DECIDING FACTOR – TOOL MANUFACTURING AT REIS ROBOTICS

Udo Schwind, Production Manager at Reis Robotics, at the control panel with the Heidenhain iTNC 530 HSCI control unit for the C 42 U machining center with PW 850 pallet changer.



Reis Robotics – a successful international manufacturer of automation systems used mostly in the automotive industry.

THE REIS ROBOTICS GROUP OF COMPANIES,

founded in 1957 with corporate headquarters in Obernburg am Main, Germany, is a market leader in automation systems. The solutions combine Reis robots and automation components of other manufacturers in equal measure. The company works as a general contractor, designing and delivering complete automation systems from a single source. Today it is one of the leading integrators for all important sectors of industry.

ACCURACY AND RELIABILITY ARE THE DECIDING FACTORS

Udo Schwind: "As an automation specialist, we set the bar very high in our in-house manufacturing. We work with integrated data coupling to convert CAD data directly from design into CNC programs, which are then immediately capable of running on the Hermle machines. We also use simulations in advance to do this, to exclude the possibility of malfunctions or tool collisions. When combined with sufficiently powerful machines, this noticeably increases efficiency, minimizes potential errors and reduces throughput time along the entire production process chain. To ensure we have the necessary machining capacity, we have among others 14 Hermle machining centers.

THE SPECTRUM OF HERMLE CNC MACHINING CENTERS

Applications are as diverse as the machining tasks, so CNC machining centers of series C 800 V (3x), C 800 U (1x), B 300 (6x), C 30 U (1x), C 40 U (2x) and C 42 U (1x) are installed in the production sites. The machines are largely equipped with identical control units (Heidenhain iTNC 530 or HSCI). The differences are in the working areas and the equipment for 3-axis to 5-axis CNC machining centers and NC-swiveling rotary tables with diameters of 630 mm or 800 mm, with or without additional tool magazines. This ensures maximum flexibility for applications, machining and usage among the various machines.

MANUFACTURING COMPLEX TOOL PARTS AUTOMATICALLY

To ensure that machining would actually be economical in terms of both quality and efficiency, a PW850 pallet changer was ordered for the C 42 U purchased two years ago, the largest 5-axis CHC high-performance machining center to date for Reis Robotics. This machining center was designed from the

ground up as the central component of a manufacturing system to be used for multifunctional purposes.

SUMMARY

If you ask Udo Schwind the reasons why he chose Hermle machining centers, he quickly responds with the two most important ones: "Precision and the first-rate service from Hermle." He says he's never had to wait for more than a day if a machine was damaged or down before production was running again – which is by no means always true of other providers.

www.reisrobotics.de



DATES

VERKTOGMNYASTIKER ODENSE/DENMARK

04/01/2014 – 04/04/2014

OPEN HOUSE

GOSHEIM/GERMANY

04/09/2014 – 04/12/2014

INTERTOOL VIENNA/AUSTRIA

05/06/2014 – 05/09/2014

MACHTOOL POSEN/POLAND

06/03/2014 – 06/06/2014

METALLOBRABOTKA

MOSCOW/RUSSIA

06/16/2014 – 06/20/2014

SHAREHOLDERS' MEETING

GOSHEIM/GERMANY

07/02/2014

EMTE/EASTPO SHANGHAI/CHINA

07/14/2014 – 07/17/2014

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09/08/2014 – 09/13/2014

AMB STUTTGART/GERMANY

09/16/2014 – 09/20/2014

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