

IVAM Product Market “High-tech for Medical Devices” at COMPAMED 2011

November 16 to 18, 2011, hall 8a, (booths F19, F29, F34, G19, H19, H23, H29)

The medical device industry continues to be in a primary uptrend, due to a fast growing world population and the demographic transition. COMPAMED, the international leading trade fair for the supplier market of medical manufacturing, opens its doors in the scope of MEDICA from November 16 to 18, 2011 in Düsseldorf, Germany. Experts of the medical technology industry show new developments at the IVAM Product Market and the forum “High-tech for Medical Devices”. The focal themes include precision and quality assurance. Product Market and forum are organized by the **IVAM Microtechnology Network**.

Functional surfaces and advanced materials

The area of Biomaterials Technology at the **Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM** shows its expertise in the field of materials and process development for biomaterials at COMPAMED 2011. For example, products with functionalized titanium surface for improved ingrowths of implants will be presented. Furthermore, interference screws made from a novel calcium phosphate-PLA composite will be displayed. Also, IFAM shows components made of bio mimetic modified, hardened biopolymers. All materials can be processed by injection moulding and extrusion processes and can be processed in series with complex geometries. Particular attention is paid to special technologies such as powder injection moulding and manufacturing of micro parts and defined structured surfaces.

Specialty Coating Systems (SCS) will be exhibiting their parylene conformal coating services at COMPAMED 2011. SCS parylene coatings are biocompatible and biostable and offer excellent moisture, chemical and dielectric barrier properties to many medical devices including stents, catheters, pacemakers, needles, mandrels, and elastomeric seals, to name a few. Ultra-thin and perfectly conformal, parylene coatings are ideal for advancing medical technologies.

Elektroform GmbH & Co. KG is specialized in electroplating and electroforming with nickel as for example electro deposition of High Grade Nickel, MIKRO-Nickel, Bright Nickel, Nickel-Cobalt and Nickel-Phosphorus (diamond machinable).

Chemviron Carbon manufactures Zorflex Activated Carbon Cloth mainly used in wound dressings amongst other medical devices. Zorflex can be impregnated with silver. Recent testing was carried out in an attempt to compare the amount and type of silver leached from 3 different types of silver containing wound dressings. Test results confirmed that the Zorflex containing dressing leached the lowest level of silver compared with the other two dressings. Up to a 91% reduction in the level of leached silver was measured. There was strong evidence to suggest that leached silver from the Zorflex containing wound dressing was nano-particulate and not ionic as per the other two dressings. Alleged cytotoxic effects of silver are associated with entry to the body via silver released into a wound.

Innovative sensor technologies for medical devices

ACEOS GmbH shows its OEM O₂-CO₂-Flow-module with optional on-board breath-analysis. The ACE-DXV has an integrated pump, temperature- and pressure-sensors and analyses the gas concentration within milliseconds. Through the FDA certified volume flow sensor it is also possible to determine the amount of gas. The ACE-DXV can also calculate such useful parameters as VO₂, VCO₂ and RQ. The board of a size of a postcard meets the RoHS standard, can be calibrated with ambient air, has no consumables and can be connected via USB-port. "Among others our customers are companies from the medical, sports and fitness market. They use the ACE-DXV to determine the metabolism of end-customers through analyzing their breath", says Gunnar Jung - product manager at ACEOS.

CiS is a research institute dealing with development and manufacturing of micro sensor systems in particular placed in medical applications too. Competences are mainly reflected in micro-optical and haptical systems for long-time monitoring of vital signs, determining blood glucose, for measuring local dermal impedances and for identifying micro-forces in catheter tips. **The CiS Research Institute** provides a full R&D service from sensor design to prototyping.

HSG-IMIT, a leading R&D provider of micro technical components and systems in Germany, presents novel microsystems and sensors for use in medical technology. This includes the drug delivery system "BuccalDose" for liquid or water-soluble drugs. BuccalDose is designed as a disposable having no active electric components and is attached into two artificial teeth of a removable partial denture. Consequently, the dosage system can deliver drugs, e.g. for Parkinson therapy, directly to the buccal mucosa where they are efficiently absorbed by the body. With respect to thermal sensors, a novel MEMS flow sensor for medical emergency ventilation is presented. Generally, the high humidity of the exhaled air is considered to be a challenge for this kind of application. Therefore, an integrated chip heating is implemented to actively prevent condensation on the sensor.

Once again **Sensirion AG** is exhibiting its leading expertise in flow measurement at COMPAMED 2011. The SFM3000 calibrated digital mass flow sensor features very low pressure drop, high speed and high accuracy for measurements up to 200 slm. It is the first product in Sensirion's new medical platform for mass flow sensors and is suitable for applications in anaesthesia and ventilation. In the differential pressure sensors area, several new versions of the SDP600 digital series and SDP1000 analog series stand out with features such very low or expanded measuring ranges. Sensirion also demonstrates its high technological capabilities in liquid flow sensors. Along with the proven LG16 OEM microsensor, a new nanoflow sensor for UHPLC applications is on display. Finally, Sensirion presents the SHT2x family of digital humidity and temperature sensors, which deliver top performance in a miniature format. A new sensor for temperature measurement is also available.

Precision for automation solutions in medical technologies

MicroE Systems will exhibit a wide range of linear and rotary encoders suited to medical and life sciences applications. Linear resolutions are from 5 microns to 1.2 nanometers and rotary resolutions from 3,000 to 268M counts. The smallest model is only 7mm x 11mm and mounts directly on a PC board. Linear travel can be from 10mm to 30m. Applications include robotic medical systems, diagnostic scanners, laser surgery, lab automation, blood analyzers, hand-held devices, and microscope stages. The encoders are used for position feedback in rotary joints and linear motion subsystems, as well as servo control for rotary motors of all sizes and linear voice coil actuators. High precision, smooth and accurate positioning, and low power consumption are common features.

PIC, one of the worldwide leading manufacturers in the field for piezoelectric actuators and sensors, presents its wide range of products at the COMPAMED. Part of the product range are piezoceramic materials, piezo components in the form of rings or disks, multilayer piezo actuators (translators or benders), stack actuators and shear modules. These can be produced in any required shape. Their employment is as varied as in compact pump drives, oscillation damping or materials processing. Special DuraAct transducers can be used as sensors, actuators and for energy harvesting. Ultrasonic generators for imaging or therapy round off the offer. PIC places a particularly great importance on the cooperation with the customer, for example, when the ceramic needs to be integrated into an application. In this case, PIC even produces entire assemblies.

SYSMELEC S.A. designs and realizes standard and custom designed machines for the high precision assembly of miniaturized products and microsystems. Sysmelec also offers a wide range of consulting-engineering services to help its customers in defining, qualifying and attaining their automatic process goals.

Steinmeyer FMD is dedicated to the design and engineering of precision linear and rotary stages. For unique environmental requirements of the semiconductor equipment industry, Steinmeyer FMD has designed and shipped many multi-axis systems. The expertise lies not only in appreciating the details of every application but also in knowing how to achieve the highest possible precision.

Micromotion GmbH produces micromechanical parts as well as the world's smallest backlash-free precision gears and actuators for rotary and linear positioning challenges. Compact design and high power density make these products ideally suited to demanding applications in medical equipment. The micromechanical parts built up with LIGA technology are applied for miniaturized adaptation mechanisms in systems like endoscopes. An integration of these parts to fully encapsulated micro gears enables the usage in applications with extreme environmental conditions (UHV and sterilisable applications). Positioning challenges with resolutions of few nm for microscopy can be realised by combining these micro gears to high precision multi axis positioning tools with smallest dimensions.

Quality assurance for highest demands: ultra-precise metrology

With InfiniteFocus, **Alicona Imaging GmbH** offers an optical high resolution measurement system that combines all functionalities of a surface roughness measurement system and form measurement device. For users, this means to measure roughness and form of miniaturized components with only one system. Typical applications in medical device development are the roughness measurement of tooth implants, cutting edge measurement of surgical instruments such as bone drills as well as roughness measurement of injection molding components in pharmaceutical industry. Also, a numerical correlation of the material and its biological behaviour can be established. Users measure components made of chromium steels, titan, ceramics or metal alloys.

At COMPAMED 2011, **NanoFocus AG** exhibits the confocal microscopes μ surf basic, μ surf explorer and μ surf mobile. The μ surf-measurement technology is applicable for use in laboratory and production. Ideally suited for application in medical technology, such as analyses of tribology of dental replica or implants as well as applications in laser surgery and microfluidics, this non-contact measuring method produces rich-in-depth images in the sub-micrometer level and measurements with high repeat accuracy. The μ surf-technology performs measurements conforming to DIN EN ISO standards of tribology, micro-geometry, micro- and nano-volume, topography and layer thickness of almost all surfaces within only a few seconds.

Lasertechnology for supply industry and research

3D-Micromac AG, a leading supplier of customized laser micro machining systems develops and manufactures state of the art laser micromachining workstations for industry, research, and science. These systems are used e.g. for production of medical parts and implants. Processes used with laser micromachining are micro drilling, cutting, 2D/3D structuring, welding, and marking of various materials and thin films.

The **Fraunhofer Institute for Laser Technology ILT** presents laser technology working for medical technology. Personalized bioresorbable implants are fabricated by Selective Laser Melting (SLM). The porous structure supports tissue ingrowth and osseointegration. For polishing of metal parts the laser beam melts a thin surface layer which solidifies afterwards very smoothly. Nearly any free formed surface can be treated. Small size laser modules are developed for micro-perforation and cutting of thin sheet materials. The TransTWIST-Technology allows joining of transparent plastic parts without use of extrinsic absorbers. For laser therapy of atrial fibrillation a laser catheter has been developed in cooperation with Vimecon. A specially designed hand piece facilitates temperature-controlled tissue coagulation and laser fixation of wound dressings.

Highly precise manufacturing of medical device components and equipment

In addition to the fields of connectors, housing technology and sensors, **2E mechatronic GmbH & Co. KG** belongs to one of the leading provider of MID parts. The latest product of 2E is a miniaturized 3D-MID-based flow sensor. The new thermal membrane-based flow sensor of 2E mechatronic for measuring smallest pressure differences was developed in collaboration with the HSG-IMIT, the MMA AG and the company Gruner AG. By implementing the innovative MID-technology a considerable reduction in volume was achieved. The complete sensor can also be assembled like an SMD with standard SMT-machines. The liquid-based connectors are integrated in the MID as well. The electrical

contacting between Chip and MID is realized through wire bonding. High precision is achieved by fluidic channels integrated in the silicon chip. The modular set-up allows variable measuring ranges from 0-3 mbar or 0-15 mbar respectively.

IMT Masken und Teilungen AG will show glass components with microstructures for medical and screening applications in Dusseldorf. "As a partner for industry and research, we are involved in projects requiring bio-chips, wave guides with gratings, micro-channels for flow-cells often in combination with electrodes and optical functions" says Dr A. Tzannis, Business Development Manager. IMT is applying its competences in large scale manufacturing to provide high-end microstructures on and in glass at highly competitive prices. "Our know-how in large scale manufacturing of micro-channels, electrodes, micro-optics and coatings allows the supply of disposable components at costs that will enable technologies that hitherto have been hampered by too high costs for the disposables. We look forward to participate in these markets!"

Microsystems UK will be exhibiting the new Wittmann Battenfeld MicroPower micro injection molding machine with rotary table & vertical scara robot with in line vision system, producing a micro medical clip. Microsystems UK specialises in design and manufacture of ultra precision tooling for micro molded parts.

PTF Pfüller GmbH & Co. KG is a full service provider of high precise CNC milling and turning products and assembly units (in cleanroom 10k as well) in Germany and China. From construction till finished products, customers will get all from one hand.

WITTMANN BATTENFELD has long-standing experience with regard to medical products and clean room applications. The all-electric machines of the EcoPower and MicroPower series have also been designed with a special focus on medical technology. At COMPAMED 2011 a medical clamp with a part weight of 0.003 g is manufactured from POM supplied by Ticona on a MicroPower 15/7.5 with a 4-cavity mold from Microsystems UK. The parts are removed by a W8VS2 WITTMANN robot and passed on to a camera integrated in the production cell and in the machine's control system for quality inspection.

Innovative services: competence and know-how for research, development and production

At this year's COPAMED **Bartels Mikrotechnik**, the leading provider of development services in active microfluidics, is presenting examples of successful developments in the design and realization of complex microfluidic systems, including the integration of hybrid components; continuous and discontinuous fluid delivery; micro dosing; micro spraying and generation of mist and droplet based liquid handling. This year's novelty is the mobile dispenser system mp6JET. Single volumes from sub- μ l into the μ l range can be dosed contact less over a distance of 80 mm. The small, sterilizable and cost effective system can be used in a variety of life science applications. Due to the chosen material the use in medical technology is possible.

Siemens Enterprise Communications Manufacturing offers custom-tailored electronic manufacturing services (EMS) and plastics processing, all under the same roof and at competitive rates. "For an EMS player embedded in the communication industries like we are, it is thrilling to be part of one of the most robust businesses worldwide. As to functionality and device technology, medical engineering and information technologies are increasingly merging by smart, integrated data recording and storage systems. Access to medical data via network or radio communications (WLAN, GPRS, EDGE, UMTS/HSDPA, GPS) is critical and means any OEM must have a partner feeling at home in this field of communication," says Matthias Keith, Marketing/Sales SECM.

Roland Stangl Innovations will present the Mind2Market method for innovation management, which will be marketed in Germany in co-operation with VERHAERT and CAMOLEON. As an example the method was applied to an innovative approach for COPD-diagnosis. Roland Stangl Innovations offers management and technology consulting with focus on innovations management, business development, intellectual properties, R+D process and project analysis, interim management, product

development, technology development, micro technologies, manufacturing processes and automation for life science, laboratory technologies and medical technologies.

VOCscan AG is an internationally acting contract research organization (CRO) and service provider manufacturing instrumentation and accessories related to VOCs analysis and GC. The global analysis and fingerprinting of volatile organic compounds (VOCs) based on mass spectrometry (VOCscanner) can be used to differentiate corresponding human exhaled breath samples (e.g. in COPD) and develop a non invasive in vitro diagnostic at the point of care. This offers not only the indication of a disorder but also monitoring the therapy progression. The global analysis of the corresponding VOC profile is an ideal system to differentiate between an unknown sample and a well characterized reference without any further information.

At COMPAMED 2011, the **IVAM Microtechnology Network** will demonstrate the advantages it offers to high-tech suppliers. With IVAM's help, about 300 companies and institutes from approx. 20 countries open up innovative markets and set new standards. IVAM accelerates the transfer of innovative ideas into profitable products. Apart from technology marketing, IVAM's activities include lobbying, market research, mission oriented research and accessing international markets.

www.ivam.eu

Further information and an exhibitor overview including contact data can be found at <http://www.ivam.de/calendar/compamed11>. Please contact the exhibitors directly in case of any questions concerning product details or pictures.

Pictures for editorial use (including reference) can be downloaded at <http://web.ivam.de/dl/COMPAMED%20Images>

Captions and sources of pictures:

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2E 1.jpg

Comparison of the sizes Source: 2E mechatronic GmbH & Co. KG

2E 2.jpg

Flow sensor Source: 2E mechatronic GmbH & Co. KG

Bartels 1.jpg

Dispense System mp6JET. Source: Bartels Mikrotechnik GmbH

Bartels 2.jpg

Development services for active microfluidics. Source: Bartels Mikrotechnik GmbH

COMPAMED_1.jpg

COMPAMED_2.jpg

COMPAMED_3.jpg

Impressions of the IVAM Product Market /Forum „High-tech for Medical Devices“
Source: IVAM.

Elektroform.jpg

Homogeneous 4 mm Nickel-Phosphorus layer (diamond machinable).
Source: Elektroform GmbH & Co. KG

IMT AG 1.png

Glass components with micro-Channels for microfluidic and biophotonic applications.
Source: IMT Masken und Teilungen AG

IMT AG 2.jpg

Electrically conductive structures for sensing applications.
Source: IMT Masken und Teilungen AG

Feinmess Dresden 1.jpg

Precise bio array system for smallest dispensing volumes. Source: Feinmess Dresden GmbH

Feinmess Dresden 2.jpg

Drive component in a computer tomography. Source: Feinmess Dresden GmbH

Fraunhofer IFAM 1.jpg

Thermoplastic chitosans in different modifications.
Source: Fraunhofer Institute for Manufacturing Technology and Advanced Materials

Fraunhofer IFAM 2.jpg

Titanium Interference screw.
Source: Fraunhofer Institute for Manufacturing Technology and Advanced Materials

Fraunhofer ILT 1.jpg

Bone implant made of bioresorbable composite material TCP/PLA by Selecti.
Source: Fraunhofer Institute for Laser Technology ILT

Fraunhofer ILT 2.jpg

Laser finishing of a titanium part of a blood pump; left: as machined; right: after laser polishing.
Source: Fraunhofer Institute for Laser Technology ILT

Fraunhofer ILT 3.jpg

Laser plastics welding of a transparent microfluidic part.
Source: Fraunhofer Institute for Laser Technology ILT

Fraunhofer ILT 4.jpg

Laser module for micromachining of medical products.
Source: Fraunhofer Institute for Laser Technology ILT

Fraunhofer ILT 5.jpg

Laser catheter for treatment of atrial fibrillation, in cooperation with Vimecon.
Source: Fraunhofer Institute for Laser Technology ILT

Fraunhofer ILT 6.jpg

Handpiece for temperature-controlled laser coagulation.
Source: Fraunhofer Institute for Laser Technology ILT

HSG-IMIT 1.jpg

Intraoral drug delivery system "BuccalDose" for integration into two artificial teeth of a removable partial denture.
Source: HSG-IMIT

HSG-IMIT 2.jpg

MEMS flow sensor for use in medical emergency ventilation.
Source: HSG-IMIT

MicroE Systems 1.jpg

MicroE Systems' encoder for linear and rotary applications is only 7mm x 11mm
Source: MicroE Systems

MicroE Systems 2.jpg

MicroE Systems' smallest encoder with up to 1.2 nanometers resolution.
Source: MicroE Systems

Micromotion 1.jpg

Quelle: Micromotion GmbH

Micromotion 2.jpg

Source: Micromotion GmbH

Nanofocus 1.jpg

Source: NanoFocus AG

Nanofocus 2.jpg

Source: NanoFocus AG

Nanofocus 3.jpg

Source: NanoFocus AG

PI.jpg

Source: PI Ceramic GmbH

Sensirion 1.jpg

Source: Sensirion AG

Sensirion 2.jpg

Gas Flow Sensor SFM3000.
Source: Sensirion AG

Sensirion 3.jpg

Humidity and temperature sensors SHT2x.
Source: Sensirion AG

Wittmann Battenfeld.jpg

MicroPower 15/7,5 by WITTMANN BATTENFELD.
Source: Wittmann Battenfeld GmbH

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