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PLASTICS **NEWS** INTERNATIONAL

MARCH 2006

Print Post Approved PP 339434/0007

Battenfeld launches compact HM series machines



Small parts with great market potential



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Small parts with great market potential

With double digit growth rates, the universally applicable micro system technology is changing the products of many industries.

After driving to work in your car with your cellular phone, you are at work on your computer and printing documents on an ink jet printer... using a number of products that owe their efficiency to micro system technology and have been around for a considerable time.

The European micro system technology network NEXUS in France expects an annual global growth rate of just under 20 per cent.

According to a forecast presented by Venture Development Corporation, USA, the market for silicon parts and micro structure technology alone will rise from the current US\$21 to US\$34 billion in 2006.

According to the Federal Research Ministry of Germany, 680,000 jobs are directly connected to micro system technology in Germany alone. The Ministry estimates that by 2010 global sales will have already reached US\$200 billion.

Size categories and applications that seemed to be utopian dreams have already been outclassed. The micro system technologist's task is to produce smaller and more complex components. Nature often serves as a model.

Micro systems are frequently designed as hybrid systems following the functions of natural systems. The object is the optimal integration of

miniature sensors, signal processing and actuators into complete systems, similar to the examples found in nature.

A great variety of techniques must be applied and optimally integrated to achieve such miniaturization. Micro system technology can progress only as fast as the weakest part of its system.

A vital manufacturing process for micro components made from plastics is micro injection moulding, a technology that has made substantial advances during the last few years.

Apart from reduced size, the focus is increasingly on higher performance and lower manufacturing costs as decisive competitive factors. In this area micro injection moulding offers favourable conditions for low cost, high output mass production, direct integration of multiple functions in one component and a high degree of repeatability.

Furthermore, injection moulding offers great potential for automation. This is an indispensable requirement especially in the production of micro components, since the size of such components is below the range of human sensory skill.

Injection moulded micro components fall into four main categories. There are macroscopic parts with microscopic structures, such as CDs or DVDs.

There are macro components with part weights above 1 gram that have, in part, high precision areas with dimensions measured in

micrometres.

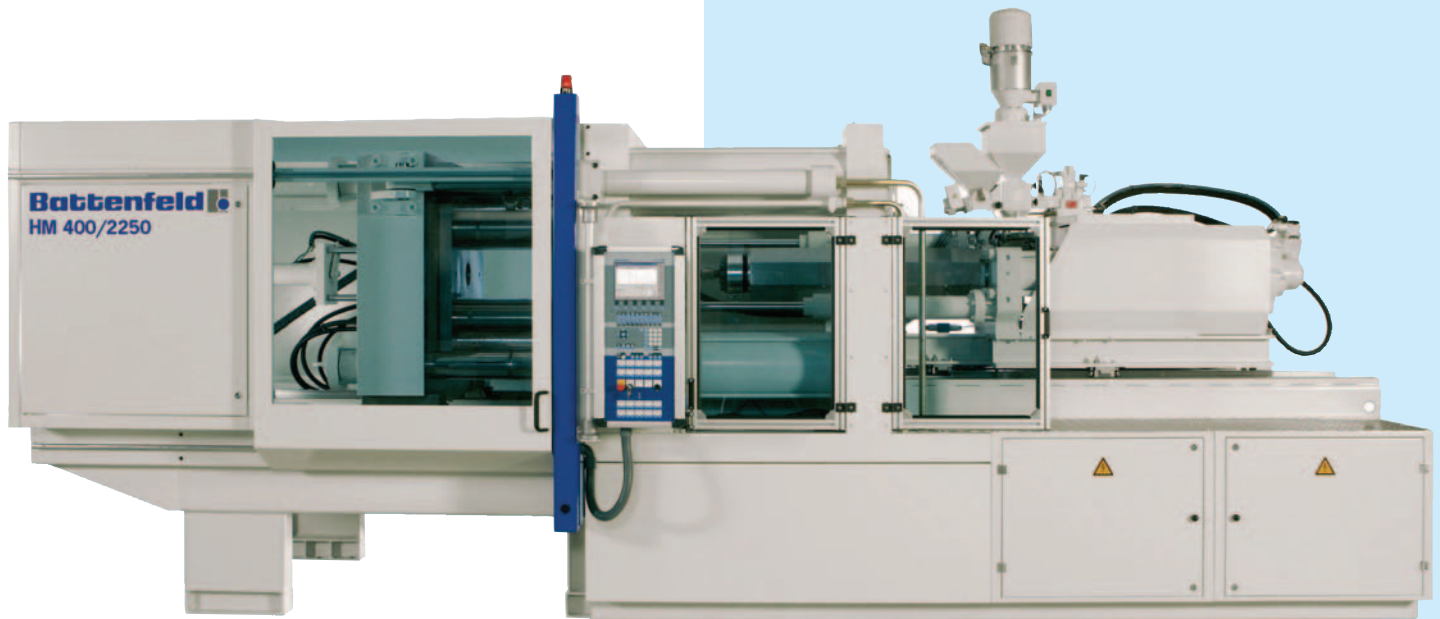
As well, there are micro precision components with tolerance margins measured in micrometres. The family of micro components also includes any parts weighing no more than a few milligrams. Parts measuring less than 0.1 micrometres in two dimensions are classed as nano-components.

The mini submarine often conceived and already used in science fiction novels for a voyage through the human body is not yet a reality. However, the success of micro systems already achieved in medical technology with micro sensors, micro pumps and micro surgical instruments is just as fascinating.

A vital component of the extremely small high performance heart support system that has become a global sensation is manufactured by micro injection moulding.

Newly developed materials and latest manufacturing processes enable the production of bio-resorbable vascular clamps. A newly developed vascular clamp of about 4 mm diameter, 0.4 mm wall thickness and 5 mg part weight dispenses with the need for secondary surgery, thus reducing therapy costs.

An important field of application for micro parts is in optical components, such as lenses. For instance, polycarbonate lenses inserted into mobile phones for IR data transfer are manufactured by micro injection moulding.



Mobile phones are already equipped with complete systems consisting of two to eight individual lenses to support the zoom function of the integrated camera - an area of development currently advancing in leaps and bounds. Mobile phones containing integrated 5-megapixel-cameras with a mechanical zoom function will soon be available for purchase in stores.

Apart from optical micro-components, cell phones contain many other miniature parts that are essential for the performance of the appliance, such as multiway connectors, SIM card connectors and MID (moulded interconnected device) plugs.

Micro components have found their way into a great number of products. Such micro mechanical parts as fibre pins in the watch making industry, or cog wheels with integrated additional functions, or miniature sensor housings in hearing aids, are built in as standard parts.

There are also some applications with integrated fine mechanical structures in multi component technology.

Micro components are not limited to thermoplastic material processing. The use of ceramic or metal powders as well as various multi component technology

applications already realised suggest the magnitude of development in this field which is still to come.

The demand for smaller injection moulded parts of excellent quality and high cost efficiency is accelerating in all areas of technology.

An increasing number of companies are making use of micro system technology to create new, high performance products downsized to miniature dimensions.

Micro injection moulding is already making a decisive contribution to incorporating the visions of tomorrow in products of today in a great variety of industries, such as the medical, optical, watch making or photographic industries, as well as communication technology.

Nature clearly shows us the many ways in which our products can still be improved. The technological means are available. It is now up to the designing engineers to utilise existing resources, and to managers to show the determination which is necessary for innovation or investment.

A copy of the complete document prepared by Battenfeld is available: publisher@plasticsnews.net

Battenfeld HM machine with compact design

Battenfeld's HM series of injection moulding machines stand for ultimate precision, optimised access to all components and modest space requirements (shown above).

Thanks to its extremely compact construction and short footprint, the new HM model with 400 tonne clamping force has emerged as the shortest horizontal injection moulding machine currently on the market.

It also offers generous mould space and scores additional points with the largest diagonal distance between tie-bars in its clamping force class.

The machine provides precise platen parallelism thanks to its generously dimensioned linear guides. The fully hydraulic 2-platen machine reaches high opening and closing speeds by means of quick-stroke cylinders with differential gears mounted on the exterior.

A high performance injection aggregate with a constant L/D ratio of 22 ensures a high plasticizing performance with excellent melt homogeneity.

The new HM allows an injection pressure of up to 3000 bar and injection speeds up to 300 mm/s.