TAGMA TIMES
NEWSLETTER

(Technical Info. on Die, Moulds & Toolroom)

Volume: XXVI / No. 03 (Private Circulation for Members Only) November 2019

Plastic Packaging:

Moulding a Plastic World

Leaders Speak

Stephen Harris
MWI Inc

Arvind Chawla,
ZAHORANSKY MOULDS AND MACHINES

Event Report

Conference on Trends in Die & Mould manufacturing

TAGMA DIEMOULD INDIA-2020
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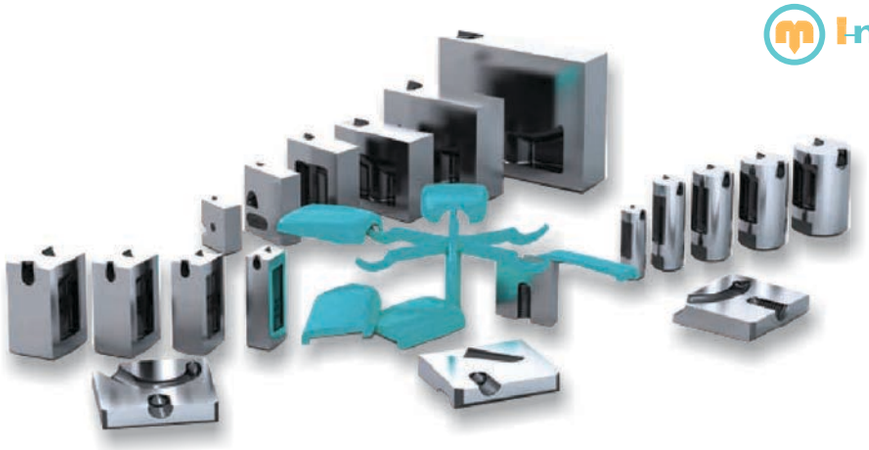

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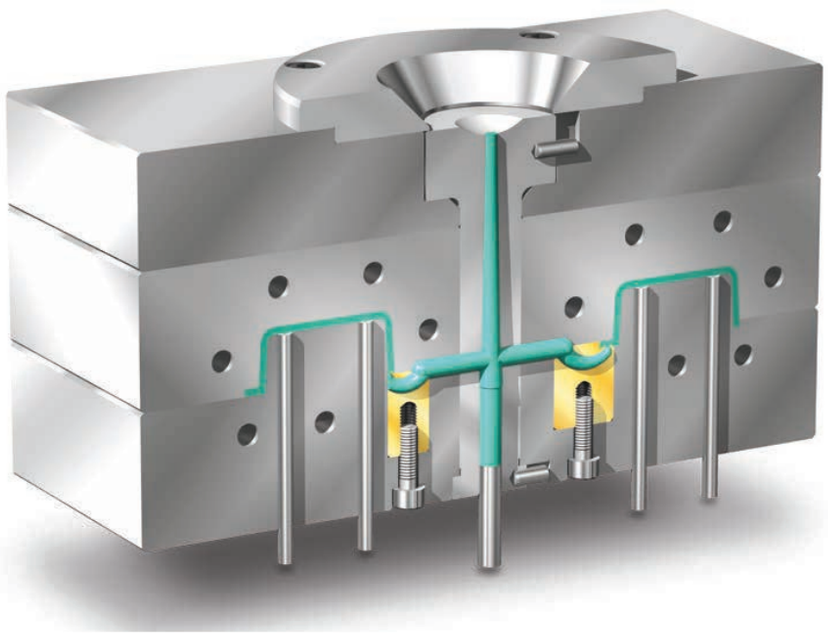

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Moulding a Plastic World

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Director of EDM Sales & Technical at MWI, Inc, USA

Arvind Chawla
Managing Director, ZAHORANSKY MOULDS AND MACHINES PVT. LTD

Event Report

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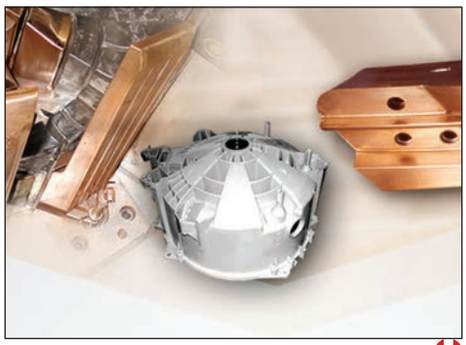
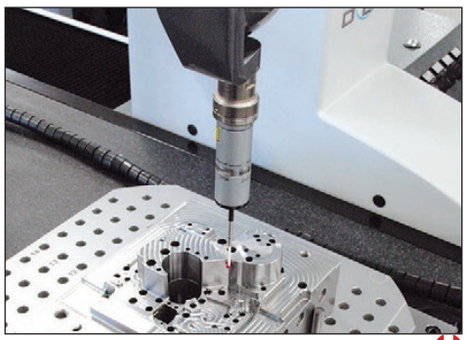
Techno Focus



Advantages and disadvantages of beryllium-copper in the manufacturing of injection mould

Case Study



Presetting and measuring for semi-automated tool making with the DEA GLOBAL and PC-DMIS

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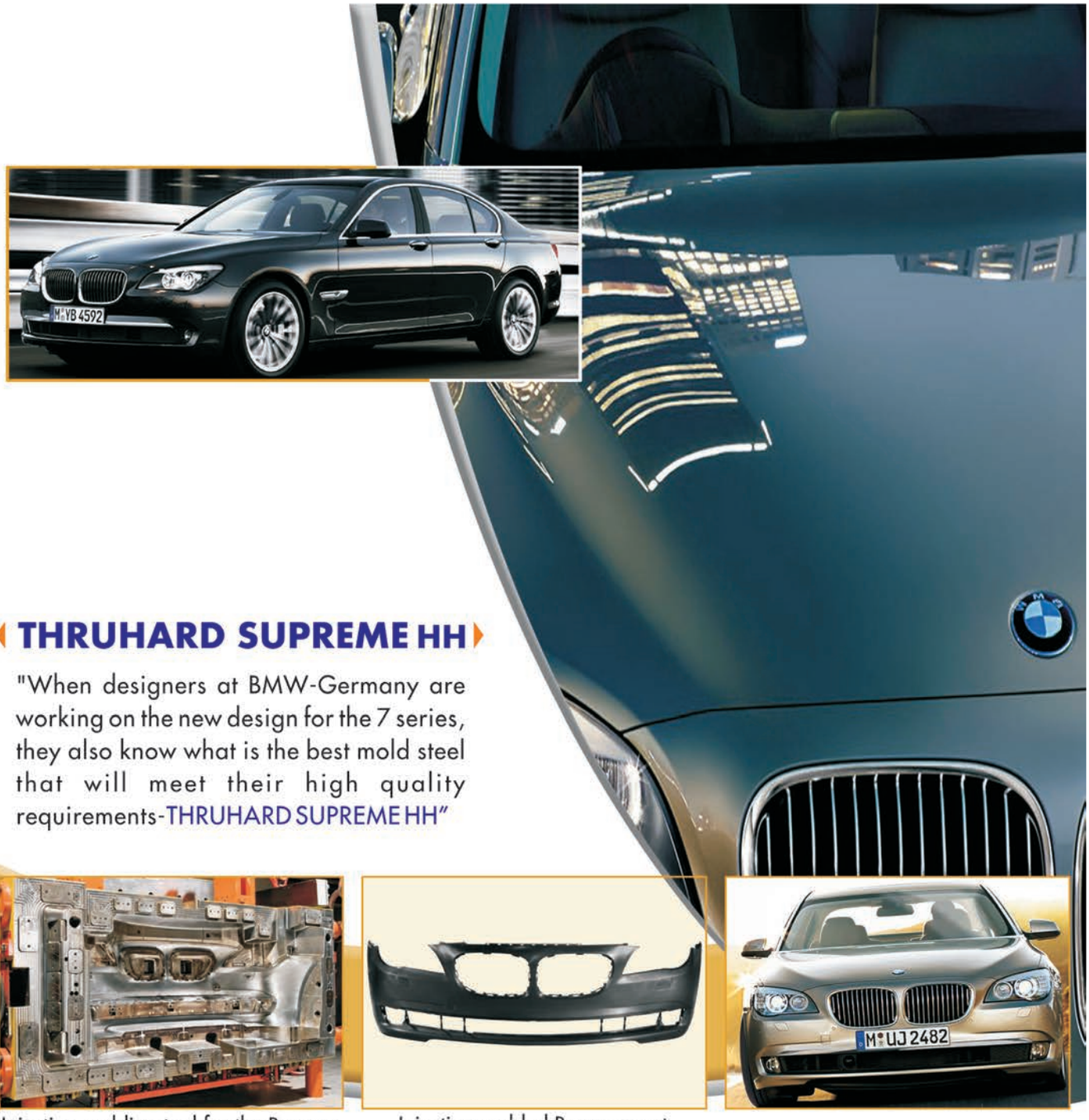

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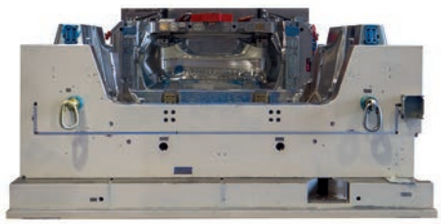

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EDITORIAL

Packaging it right!!

Dear Readers,

In our quest to provide you information about the industries that are equally attractive like automotive, we have stumbled upon yet another interesting and bourgeoning industry. This industry looks for high level of precision and is currently one of the most booming sectors in India. The industry is directly associated with one of the most essential materials used in our daily lives.

We are talking about plastic packaging industry which holds a galore of opportunity for the Indian tooling industry.

While packaging is one of the fastest-growing markets, plastic packaging has proven to be one of the most cost-effective, efficient, and flexible modes of packaging available. Packaging Industry Association of India (PIAI) points out that packaging is the fifth largest sector in India's economy and is one of the highest growing sectors in the country at a growth rate of 22% to 25% per annum. Looking at the growth prospects, it is comfortable to say this is the right time to explore business opportunities in the plastic packaging industry.

Usually, no two types of custom packaging are the same, which means manufacturers will likely not have existing tooling that would fit your specific custom packaging. As a result, the industry demands a large number of tools for packaging. Looking at the demand in the industry, toolmakers should align themselves to serve the industry by developing skills, adopting technologies, and enhancing capabilities. Turn to our 'In Focus' segment to learn more about the industry and prospects.

Also, don't forget to scan through the 'Leaders Speak' section, as industry leaders share their opinion about the Indian tooling industry and opportunities for Indian tooling suppliers.

Please share your views and suggestions with us. Also, if there is any other industry that you would want to learn more about, we are here to help.

Best Wishes,

Nishant Kashyap
Editor
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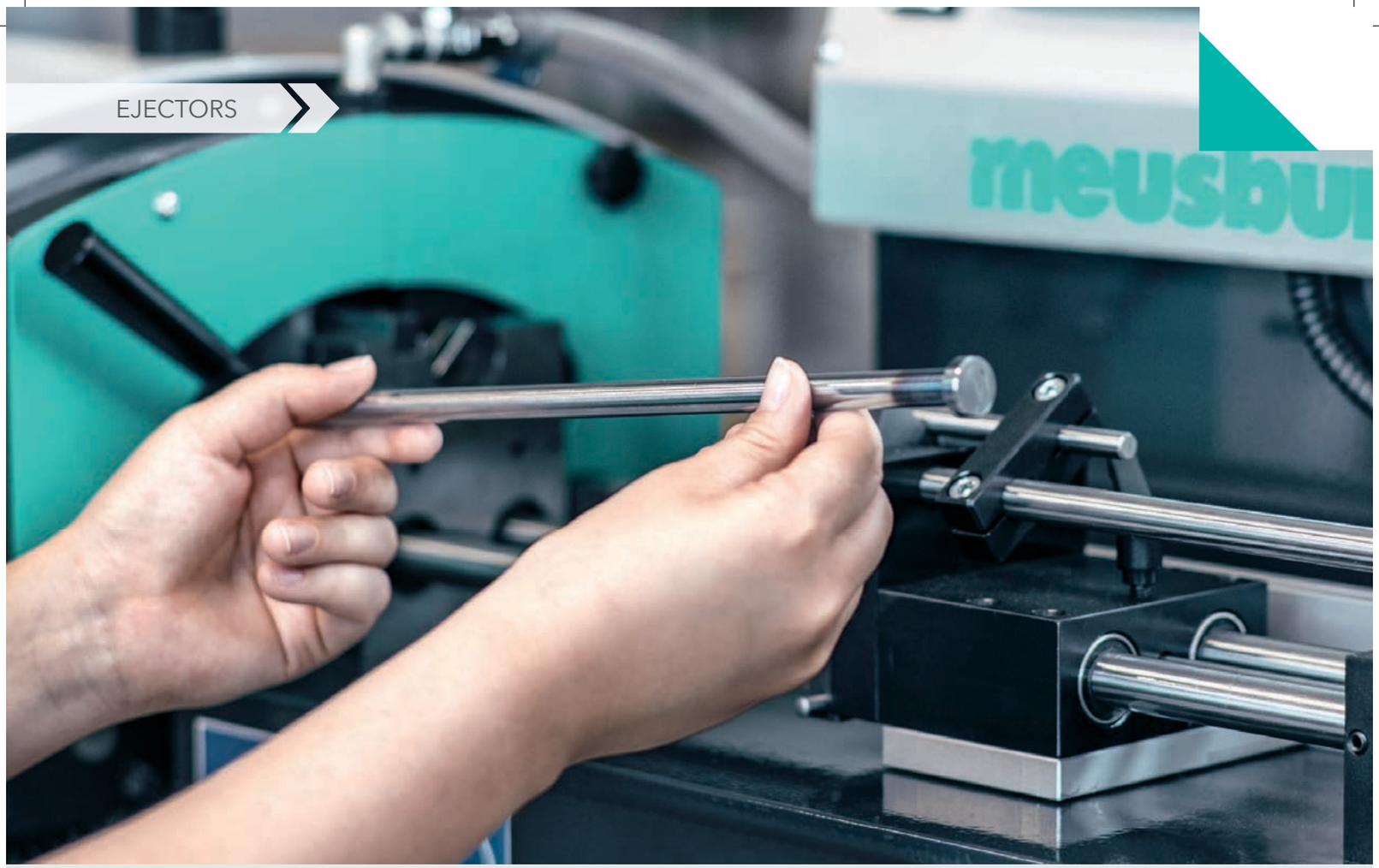

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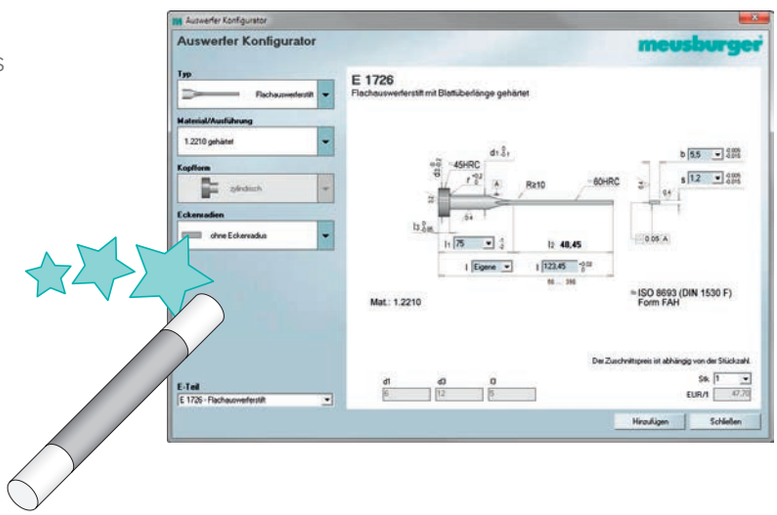

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TAGMA organises 'Tool Makers Meet' to discuss opportunities and challenges

THE Indian tooling industry is constantly growing at double digit since last few years and the future also looks the same. However, the industry experts feel that the Indian mould makers have not been able to capitalise properly on the opportunities available in the country. Although there has been growth, there are many challenges as well such as low availability of finance, infrastructure, growing imports from south eastern countries and high import duty on raw materials and machines, among others. TAGMA, which is always in forefront to put forward industry challenges to the Government, organised tool makers meet in Mumbai on 8th November. The agenda of the event was to come together under one roof and discuss all the challenges tool makers face in business and document the same to present to the Government.

The event started with welcome note from Mr. DK Sharma, President, TAGMA India. In his welcome note Mr Sharma spoke about the current trends in the industry, challenges and opportunities. "I have no doubt that there is enough demand for us to grow together. There is a lot of opportunities for all to get good businesses without competing with each-others. However, there are certain areas where we fall behind our peers from countries like China, Taiwan and S Korea, etc. The most basic thing, such as tools steel and 5-axis machines have high import duties which makes our overall cost and time higher; we still do not have a cluster where all the operations related to mould making can be carried out, we do not enjoy the kind of finance support like companies from China, Taiwan enjoy and at times we also do not get the kind of support we should get from OEMs. These are the growing concerns and hurdle in growth of industry. I invite all of you to actively participate in today's discussion and share your challenges with all of us. We will prepare a document containing all the challenges and suggested solutions and present the same to the government," said Mr. Sharma.

After Mr. Sharma's speech; Ashim Sharma, Partner & Group Head Business Performance Improvement Consulting (Auto, Engg. & Logistics) at Nomura Research Institute, gave his presentation which highlighted the present condition of Indian mould makers, major issues concerning mould makers that need urgent attention from the policymakers, policies and government supports in other countries and some possible policy implementations to support the Indian mould makers.

Post Mr. Ashim's presentation, the event was open to the audience for the discussion. Some of the pointes raised by tool makers during the event were:

- Some suggested anti-dumping policy while few felt that anti-dumping will not really help. Instead the white papers should be presented as business case showing tangible assets.
- Anti-dumping, if any, can be restricted to moulds
- Tool makers should get better finance rate.
- Reduction in import duty on raw materials (esp. special steel grade which is not manufactured in India)
- Accelerated rate of depreciation on machine tools (say 50%)
- Govt. giving incentive to OEMs to buy locally
- Promoting tooling industry as 'Import Substitute'
- Cluster approach like that of China should be adopted

The event was attended by Mr.SC Kalyanpur, Past President, TAGMA India and Founder of Sridevi Tools; Mr. D Ravi, MD, Classic Dies & Moulds; Mr. DM Sheregar, CMD, Devu Tools Pvt Ltd; Mr. Paresh Panchal, CEO, CAM Tools; Mr. Anil Patil, Technical Advisor, Reliable Autotech, among others.

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Bosch opens service center for Power Tools

BOSCH Power Tools India, a market leader in the power tools segment that offers a complete range of power tools for construction, woodworking, and the metalworking industry, launch their company-owned service center in Mumbai, India dedicated to tool repairs and service. To empower and assist tradesmen and professionals across, the service center comes with a promise to provide quality solutions and customised support services.

Hitherto, Bosch Power Tools has authorised service centers and authorised service dealers run by channel partners and dealers. With their brand-owned establishment, Bosch seeks to provide expeditious yet efficient service to its users while maintaining the absolute authenticity of accessories and spare parts.

Commenting on the occasion, Panish PK, Regional Business Director – India and SAARC – Bosch Power Tools said, "Bosch Power Tools' offerings are designed to minimise manual effort and discomfort while maximising and driving quality output. Our promise of delivering first hand customer experience has ensured brand loyalty and consumer delight in all innovations and services. The service center's goal is to assist this dream and lay

the foundation for effortless working in the Indian creative and construction space."

He further adds, "India's real estate and construction sector is undergoing a paradigm shift due to reformative and transformative projects undertaken by the government and private segments. We, at Bosch Power Tools India, believe in empowering individuals, offering state-of-the-art devices, flawless experiences and services to individuals who create visions into reality at the operational level."

Completing 25 years of operations in India, Bosch Power Tools has achieved multiple milestones in the industry introducing innovations and best in class products and will continue on this journey of invention and development. As the customer base grows, Bosch Power Tools works with their people and partners to create new opportunities, provide exclusive experiences, unparalled service and advanced tools aiding the Indian Machine Industry in the years to follow.

The premier Bosch Power Tools service center has launched and is now open for operations in Mumbai, India.

Hannover Messe 2020 to focus on Industrial Transformation

THE global industrial sector is in the midst of a period of major change, driven primarily by the megatrends of digitisation, individualisation and climate protection. At the same time, it is grappling with some very challenging economic and political fundamentals.

"The world is embarking on a period of change, the likes of which we haven't seen for a long time," said Deutsche Messe Managing Board Chairman Dr. Jochen Köckler. "And that makes HANNOVER MESSE more important than ever – because it is the only trade show to accord the industrial transformation process the holistic and ongoing focus that it warrants. Thanks to the diversity and expertise of its multi-industry exhibitor base and its lead-theme focus on Industrial Transformation, HANNOVER MESSE is a trend barometer and innovations driver for a globally and digitally integrated industrial sector."

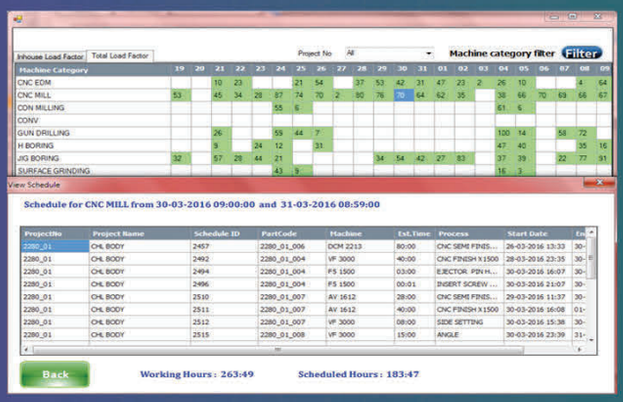
Today's industrial-sector customers are facing very different requirements and challenges than only a few years ago. The result is a very different demand-side situation, and the R&D sector and providers of production, logistics and energy supply technology need to adapt to it. The challenge is to take control and actively shape this transformation process, and that means investment in areas like Industry 4.0, Logistics 4.0, artificial intelligence, 5G, CO2-neutral production, lightweight design and electric dive technology.

HANNOVER MESSE's comprehensive coverage of these technologies and its holistic focus on Industrial Transformation make it the perfect platform for exhibitors from the mechanical engineering industry. "Companies from the mechanical and plant engineering industry want a platform where they can connect with an international industry audience and showcase their strengths as providers of solutions in a digitally integrated production landscape. That's solutions across entire value chains, from materials procurement to production and logistics, to energy supply, right through to new platform-based sales channels. At the same time, these companies seek inspiration and fresh ideas for the ongoing changes they need to make in their own operations. HANNOVER MESSE meets both of these requirements. As such, it is a unique meeting hub that shows the way forward into the future," said Thilo Brodtmann, CEO of the German Engineering Federation (VDMA).

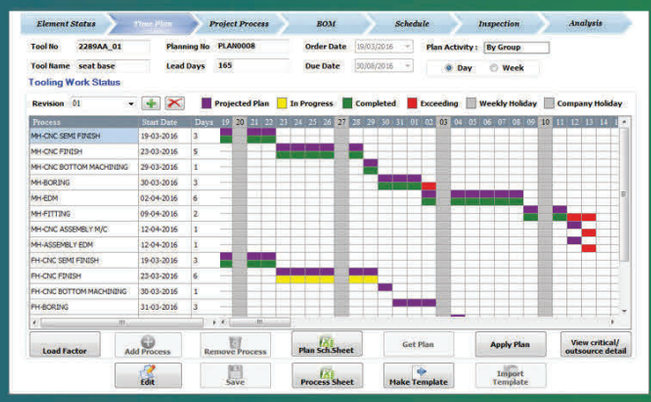
Approximately 6,000 companies will be exhibiting at HANNOVER MESSE 2020. Among them are names like ABB, Amazon Web Services, Arburg, Beckhoff, Bosch Rexroth, Cisco, Dematic, Endress+Hauser, Festo, Fraunhofer, Harting, IBG, IBM, ifm, igus, Kawasaki, Knapp, Lapp, Lenze, Microsoft, Mitsubishi, Phoenix Contact, Pepperl+Fuchs, Rittal, SAP, Schaeffler, Schneider Electric, Schunk, SEW-EURODRIVE, SICK, Siemens, and among others.

SHOP PLAN

The turn key solution to the Mother Industry



As an Integrated Platform, Shop Plan effectively explores the concurrent load of the machines in the floor to take decision whether to go for In-house utility or to move outsourcing as and when required.



The core module of any Project Management (PM) will be based on its capacity planning. In shop plan too, the user can do forward planning and backward planning to manage the capacity towards the end delivery.

ADVANTAGES

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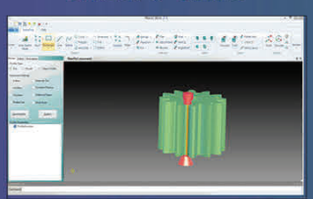
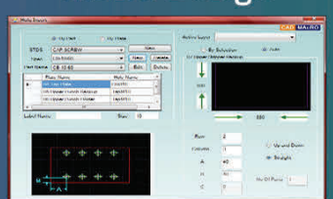
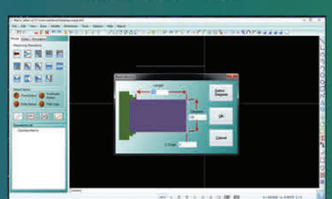


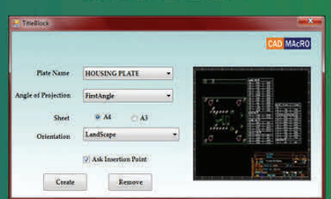
Macro Design



Macro Turn



Macro Dim



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Kia Motors opens India plant

KIA Motors Corporation has opened its new Indian production facility at Anantapur district, Andhra Pradesh. The plant will produce Kia's first 'made in India' product, the Seltos compact SUV, with other models to follow. Andhra Pradesh Chief Minister Y. S. Jagan Mohan Reddy, Bongkil Shin, Ambassador of the Republic of Korea to India, Han-Woo Park, President and CEO of Kia Motors Corporation, Kookhyun Shim, Managing Director and CEO of Kia Motors India were present.

"We are proud to open our new production facility in Anantapur today," said Han-Woo Park. "Now fully in operation, our new plant allows us to serve the growing Indian car market, and export models like the Seltos to markets across the world in major regions. In the longer-term, it will also become a vital part of our global production network."

The Anantapur production facility is capable of producing up to around 300,000 units each year.

The plant occupies around 23 million square feet (2.16 km2 / 536 acres) and incorporates facilities for stamping, welding, painting and assembly.

In addition to petrol and diesel variants of the Seltos, production of future electric and hybrid vehicles was put into consideration when designing the plant production lines.

The plant is equipped with more than 450 robots, helping to automate the press, body and paint shops, as well as the assembly line. Kia's presence in Anantapur has helped create over 12,000 new direct and indirect jobs across the region, said the company.

As many as 40,649 units of Kia Seltos have been sold as of November 2019.

Kia will commence production of its premium MPV model at KMI in early 2020. The brand also plans to introduce a new sub-compact SUV model to the market later that year.

Already established with 265 touchpoints and service centers in 160 different cities, Kia Motors will add an additional 50 touchpoints and services centers by March 2020.

Kia would be showcasing its next product for the Indian market – premium Carnival MPV – at the India Auto Expo in February 2020.

Tata Motors, Lithium Urban Technologies Partner to Develop EVs

TATA Motors has partnered with Lithium Urban Technologies to develop tailor-made mobility solutions and address customer requirements across mass transit, freight as well as passenger vehicles.

As the first milestone, Tata Motors and Lithium have signed a contract for 400 newly launched, Tigor Sedan EV, with an extended range of 213 km, to be supplied by FY20 and deployed across India. This partnership plans to additionally induct 100 electric vehicles, which would include cars to be launched in near future, like Nexon EV for corporate leadership transport services.

"This is not just the most significant milestone for Tata Motors' E-Mobility Business, but also a big turning point in the EV market, which is now likely to see fleets electrify faster than ever before. We are delighted to enter this partnership with Lithium, who are on their pragmatic journey of expanding their zero-emission transport service rapidly. We are committed to nurturing this valued partnership as we address the evolving mobility needs of our customers through various disruptive business models," said Shailesh Chandra, President, Electric Mobility Business & Corporate Strategy, Tata Motors Ltd.

Sanjay Krishnan, Founder, Lithium Urban Technologies, said the partnership will ensure viability of new market segments across passenger, mass transit and freight.

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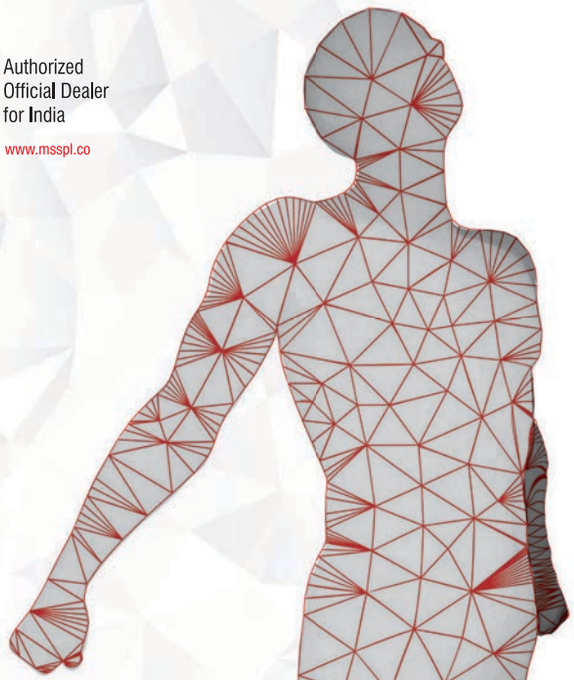

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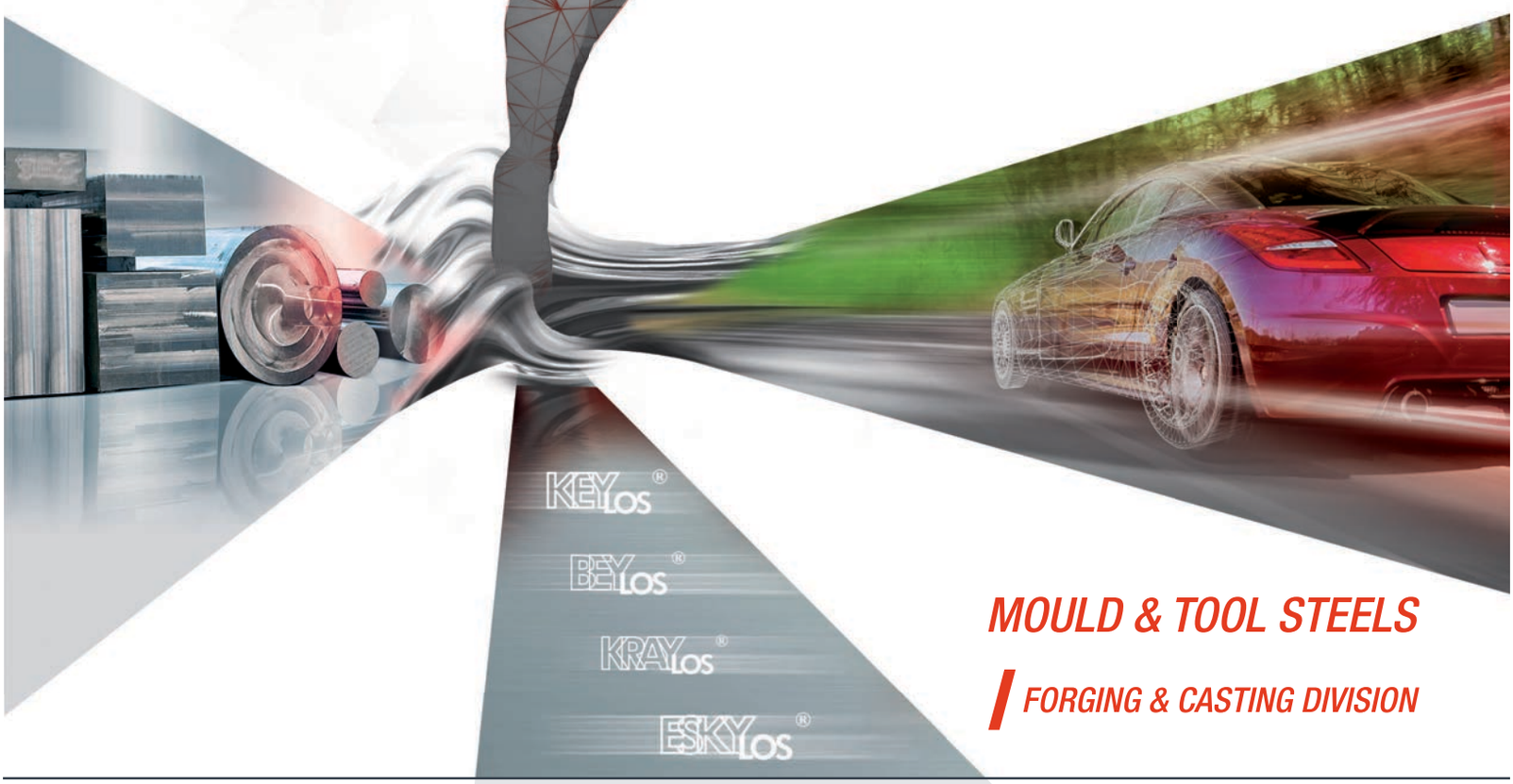

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SIAM signs MoU with Korean counterpart KAMA

SOCIETY of Indian Automobile Manufacturers (SIAM) signed a *Memorandum of Understanding (MoU)* with its Korea counterpart Korea Automobile Manufacturers Association (KAMA) during Organisation Internationale des Constructeurs d'Automobiles (OICA) general assembly meeting in Mumbai. The MoU insititutionalised the framework for a cooperative dialogue between the two organisations to support each other's efforts in promoting a sustainable, affordable and efficient automobile industry.

Rajan Wadhera, President, SIAM said, "In context of the auto sector, ties between India and South Korea can be traced back to when Hyundai Motors entered the Indian market in 1996. Indian manufacturers, like Tata Group and Mahindra & Mahindra, have made significant investment in Korea's auto industry till date. Since the year 2000, these companies have invested USD 3.8 billion in India across various sectors such as electronics, automobiles, metallurgy, earth movers, etc. Recently, Kia Motors has entered India. The success of these ventures is a reflection of the strong ties between both the countries and associations. We hope that this MoU will benefit both the organisations in facilitating further collaboration in areas of technology advancements, and research & development in the automotive sector."

Jeong Marn-Ki, President & CEO, KAMA said, "I hope that today's MoU ceremony between our organizations works as a catalyst to strengthen our ties so we can enjoy mutual benefits, constantly increasing investment and trade between both countries."

The MoU ascertained that both the organisations will set up regular information exchange mechanism to maintain their cooperative dialogues and deliberate on issues on the subjects of their common interests.

ZF and Wolong Electric Plan Joint Venture for Production of Electric Motors and Components

ZF Friedrichshafen AG and China's Wolong Electric Group Co., Ltd are stepping up their existing cooperation. The two companies have signed an agreement to establish a joint venture that will produce components and electric motors for automotive applications. This partnership will enhance the ZF product portfolio and further improve competitiveness in electric driveline systems.

The joint venture will operate under the name Wolong ZF Automotive E Motors Co Ltd. and manufactures electric motors and components for use in ZF driveline systems and the open market. An initial success of this partnership is the award of a major series production contract for electric motor components for hybrid and electric drives. Electrified drivelines contribute significantly to reduce CO2 emissions from road traffic.

Greaves completes acquisition of Ampere Vehicles

GREAVES Cotton, a diversified engineering company in India, today announced the completion of its acquisition of entire shareholding of Ms Hemalatha Annamalai in Ampere Vehicles Pvt Ltd through secondary purchase, thereby acquiring absolute control in its subsidiary Ampere Vehicles Pvt Ltd.

This is part of Greaves' long-term strategy to strengthen and expand its presence in last-mile e-Mobility space that is seeing significant interest from government and commuters alike. "Greaves Cotton is looking to leverage its position as the leader in providing last mile solutions by playing a pivotal role in enhancing the pace of India's transition to electric mobility. Our strategic acquisition of Ampere, one of the leading brands in the personal and last mile mobility electric vehicles segment, is part of a larger vision to helm a renewable-energy revolution in the country. With Ampere's acquisition, we are now well poised to become one of the fast-growing e2W player in the market." said Nagesh Basavanhalli, MD and CEO, Greaves Cotton Limited.

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Ampere Vehicles is now part of the e-Mobility division of Greaves Cotton, with a significant presence in the Indian electric two-wheeler industry since last 10 years. The brand has efficiently contributed towards a sustainable environment with a range of affordable electric scooters such as Zeal, V-48 LA, Magnus 60, Reo LA and REO Li. These scooters are popular with commuters making a switch from conventional to electric two-wheelers.

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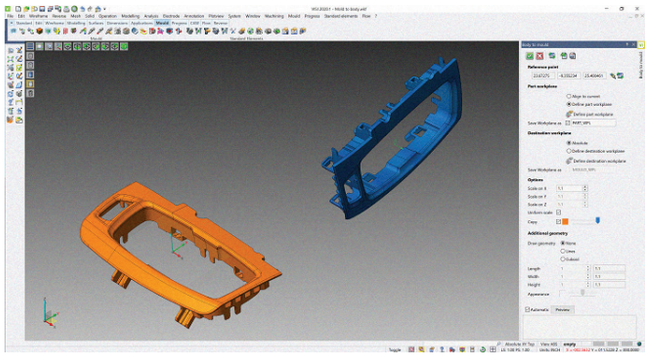
Hexagon's VISI Improves Die Design

THE latest release of VISI mould and die software enhances the progressive die design processes, along with enhancements for the Reverse module.

Progressive Die design

Upgrades to the new part unfolding technology provides the ability to work directly on the original solid model, supports blanking functionality, and manages parts with non-linear bends. The sheet-metal part recognition provides an improved graphical representation of the part, analysed by identifying bends, planar faces and features.

VISI Product Manager Marco Cafasso says the major advantage of the new technology is the associativity provided with the original model during the die design process. "It



allows the original part to be modified, and changes to be automatically propagated on the banked part. This new feature allows all the linked parts to be rebuilt in reference to a modification done to the original part. This is extremely useful because it updates all the studied parts in a single click, and is a major time saving in the design and modification phase of a progressive die."

Enhanced Reverse and Casting

The Reverse module has been enhanced with additional functionalities for both Reverse and Casting processes, including new features to support the scanning to surfaces generation.

Mold Tool design

A new body-to-mould functionality has been introduced, which provides a quick solution to define the correct position and orientation of a plastic part on the tool. The feature allows the transformation of the model from the "car in line" position to the mould position, and to apply the required shrinkage value.

5-Axis Deburring

Cafasso says that a new automatic deburring function reduces the set-up time for that vital aspect of the overall process. The purpose of VISI's deburring strategy is to provide automatic finishing to the machined part's sharp edges – an important phase of the manufacturing process for parts with no tangent surfaces.

Enhanced graphics

New graphical representations assist in validating the model for manufacturing purposes. The Undercut and Accessibility shading also identifies undercut areas during the design and modelling phases.

Dormer Pramet Mills a Deeper Path

DORMER Pramet has expanded its milling assortment for die and mould and general machining applications with several introductions. This includes the new double-sided SNGX11 insert for high feed milling with up to 1.7mm depths of cut.

A strong main cutting edge ensures high levels of durability and process security – especially when machining corners inside a pocket. With eight cutting edges, the square-shaped SNGX11 also represents an extremely economical solution.

Suitable for copy milling, helical interpolation, ramping, progressive plunging and face milling, the SNGX11 is available in two geometries. M is for machining steel, but also hardened steel

and cast iron. MM provides a smoother cut and is more suitable for stainless steel, soft steel and super alloys.

The range is supplemented by the new SSN11 cutter, available in diameters from 32 – 125mm, with intermediate sizes for die and mould applications. All cutters feature a special through-coolant design to further improve process security and a high overhang to support deep milling up to 10xD. Meanwhile, Dormer Pramet has added to its ADMX07 milling program with a new F geometry for finishing and semi-finishing applications. This sits alongside the existing M, FA and HF geometries and targets light machining of stainless steel and low carbon steels.

Extremely suited to vibration sensitive machining, the chip breaker features a highly positive geometry with narrow peripheral land. This reduces chatter and enables a smooth cutting action without burrs on the machined wall.

Significantly, it also supports lower cutting forces which not only reduces energy consumption, but also prevents work hardening, meaning increased durability and longer tool life.

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TRUMPF unveiled 3D printer for medical devices

GERMAN high-tech company TRUMPF unveiled a new 3D printer at Frankfurt's Formnext, the leading international trade fair for additive manufacturing. Called TruPrint 2000, it lends itself to medical engineering and other applications with lofty standards and quality. TRUMPF experts revamped the system so inert gas now flows through it back to front. This enhances printed parts' quality. In another new development, the operator can now remove excess powder from the component right there in the system rather than having to take it out and unpack it at a separate station, as in the past. This is easier and saves time when dealing with the smaller build chambers of 3D printers such as the TruPrint 2000. The newly designed machine now processes the printing powder in an inert gas environment, which prevents contaminants from infiltrating he powder circuit. This is a key advantage for sensitive medical devices and the like. "With the TruPrint 2000, we are showing that TRUMPF puts the needs of AM-focused industries first – that is, the aerospace, automotive, mechanical engineering, tool and mold making, and the medical and dental engineering industries. The TruPrint 2000 enables manufacturers to take advantages of additive manufacturing's benefits – particularly medical and dental engineering companies," says Klaus Parey, managing director TRUMPF Additive Manufacturing.

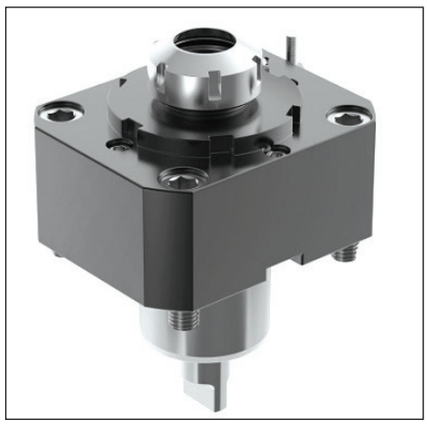
Highest productivity at low cost

The TruPrint 2000 features the Multilaser design. Two 300-watt lasers working in tandem illuminate the 3D printer's entire build chamber to boost the system's productivity. Taking the same approach as for the TruPrint 1000, TRUMPF development engineers reduced the TruPrint 2000 laser's focal diameter to 55 micrometers to print components with smoother surfaces, enhanced quality and intricate grid structures. The TruPrint 2000 is perfectly at home printing parts out of titanium, a material that figures prominently in medical devices. Companies do not need a separate unpacking station, so they also save money with this printer. "The machine's new design brings the benefits of lean manufacturing to users. It requires fewer add-ons, so the entry-level investment is lower for companies that want to get into AM," says Florian Krist, product manager at TRUMPF Additive Manufacturing.

Kennametal makes turrets, chucks more flexible

KENNAMETAL announced an expansion of the turret adapted clamping units (TACU): ER-ready driven units in conjunction with a line of solid ER collets which are threaded to accept screw-on milling cutters.

"Together the new TACU ER units and the solid ER collets are a great marriage of technology. Available in sizes ER25 through ER40 with thread sizes ranging from M08 through M16, this innovation provides machining center-like capabilities to your live tool lathe. These new products provide the flexibility to use standard ER collets with solid end mills, or the new solid ER collets together with screw-on indexable milling cutters", said Ronald West, Manager, Tooling Systems.



Sealed for through-the-tool coolant and there is a one-millimeter standoff for additional clearance on larger end mills with a precision-ground locating boss for minimal runout. It's a very compact design, reducing the chance of interference on smaller machines. Compared to a standard spring-style ER collet, they're very rigid, so you can take heavier cuts.

The TACU offering can be used on seven leading brands of CNC lathes, both VDI and bolt-mounted turrets (BMT) with a variety of static and driven blocks. TACU's are equipped for internal and external coolant, with up to 12,000 RPM possible on specified driven tools. "This addition greatly increases the capabilities of our TACU offering", said West.

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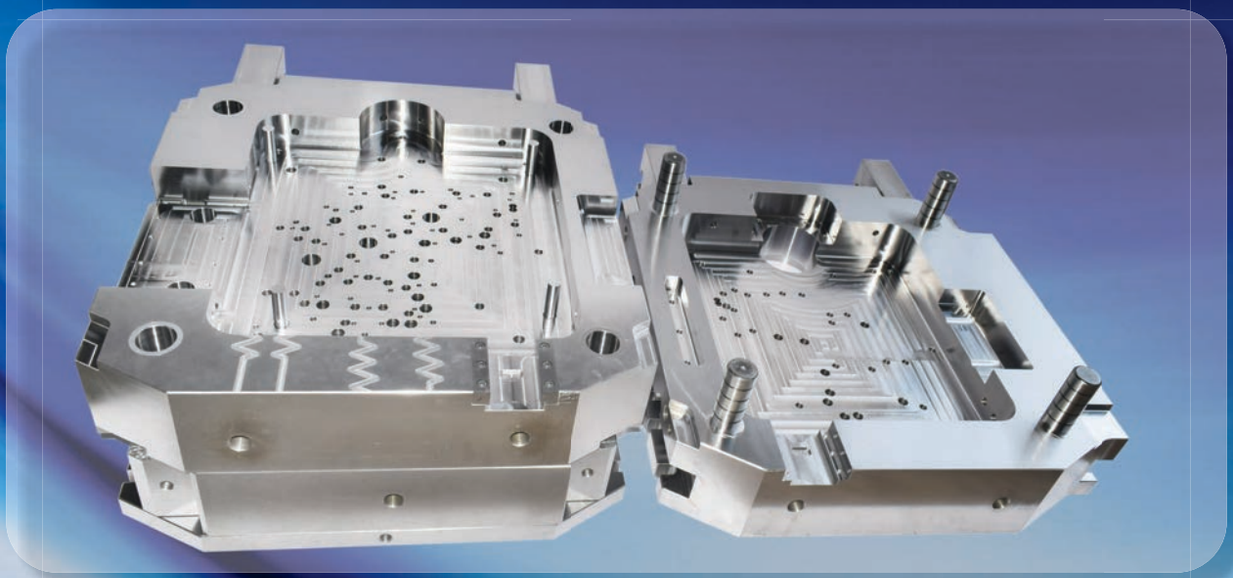

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Swiss CNC Technology Leader, NUM, Expands to India

NUM AG has opened a branch in Bangalore in November 2019. With this expansion in Asia, the international company with headquarters in Teufen, Switzerland, further reinforces its position as a technology leader in the field of CNC controls. With the expansion to India, NUM increases its local presence there as well as its customer-oriented sales and service offering.

"The location in Bangalore will enable us to respond much more quickly to customer enquiries and further expand our brand in the region. We have been well represented in China and Taiwan for many years and would now like to further strengthen our position in Asia," says Rajesh Nath, Managing Director of NUM India. This latest expansion secures jobs worldwide, as well as creating new employment opportunities in India.

Rajesh Nath and NUM CEO Peter von Rüti set up the branch in the south of Bangalore. The offices are located in a modern office complex in the business area of Jayaprakash Narayan Nagara district. "By opening a branch in India, we are exploiting our growth potential. At the same time, the Indian team is expanding our expertise in sales, service and after-sales support," adds von Rüti. NUM believes that Bangalore, as a high-tech location, will strongly influence the CNC market in the future and thus significantly promote the development potential for CNC controls. With the new office in Bangalore, NUM is now represented internationally at twelve locations.

CERATIZIT Group inaugurates manufacturing facility in Bengaluru

IN order to satisfy the steadily increasing demand for cutting tools in the Asian markets, the CERATIZIT Group last year laid the foundation stone for the expansion of production at the CERATIZIT Bengaluru site.

The expansion is inaugurated by HE Mr.Jean Claude Kugener, Ambassador of Grand Duchy of Luxembourg in India, in presence of Members of the Board – Mr Thierry Wolter, Mr Andreas Lackner, Mr Andreas Schwenninger, and Mr. Gerhard Bailom, Mr. AK Sareen, Mr.Anil Kumar. With the expansion, the company has gained the flexibility to accommodate the machines necessary for further growth and to optimise its production processes.

The original building, opened in 2009, currently has an area of 36,500 square feet. The new extension has more than doubled it to 85,000 square feet and now offers the urgently needed space, as Managing Director Anil Kumar explains: "Due to the growth in recent years, we have been lacking the space to install additional machines. The extension removes this crucial bottleneck and allows us to continue growing here at the site."

Tata Motors inaugurates Advance Power Systems Engineering Tech Center in Pune

TATA Motors Ltd. today inaugurated its state-of-the-art 'Advance Power Systems Engineering Tech Center' at the Engineering Research Center (ERC) Pune, India. This futuristic tech center will play a key role in engineering, testing and developing cutting-edge powertrain solutions for all its products, bringing in synergies across PV, CV and EV Businesses. This new world-class facility will primarily focus on future development of BS6 (Phase 1 & 2), Real Driving Emissions (RDE), CAFÉ II, Hybrids, Electrification, and BS7.

Speaking on the occasion, Mr. Guenter Butschek, CEO & MD, Tata Motors Ltd. said, "We at Tata Motors have been consistently gearing up for the future through strategic investments in our product development and engineering capabilities. I am delighted to witness our new 'Advance Power Systems Engineering Tech Center in Pune' go live, which was established in a record time of 15 months. This facility will act as a hub to develop class-leading powertrain solutions for our vast product portfolio across ICE and Electric. This technical centre reiterates our commitment to offer our customers a wide range of clean, sustainable technologies, thus meeting their aspirations."

Spread over 12,000 square meters with future-proof design elements, this test facility is equipped to meet the development, calibration & type approval requirement for light & heavy-duty powertrains. It is also capable of testing – range, power, drivability and durability of electric vehicles.

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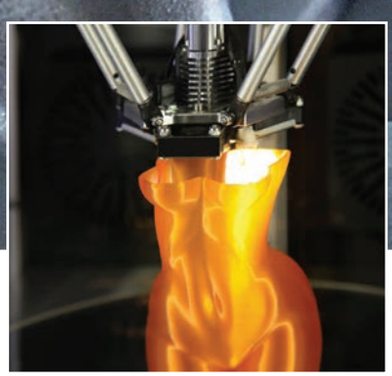

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Plastic Packaging:
Moulding a Plastic World

As the Indian mould and die industry has finally begun exploring opportunities outside its comfort zone (automotive), plastic packing industry offers a conducive growth environment for mould makers to explore and grow.

Debarati Das &
Nishant Kashyap

Packaging is one of the fastest growing markets and in that, plastic packaging has proven to be one of the most cost effective, efficient and flexible modes of packaging available.

Packaging Industry Association of India (PIAI) points out that packaging is the fifth largest sector in India's economy and is one of the highest growth sectors in the country at a growth rate of 22% to 25% per annum.

A study by trade and commerce trade association ASSOCHAM and global consulting firm EY revealed that the packaging industry in India is anticipated to reach $73.6bn by the 2020 due to India's growing population and income levels.

Plastic packaging is increasingly being used in wide range of applications including food and beverages, personal care, household care, consumer electronics, and construction.

Furthermore, rapidly increasing use of rigid packaging containers and canisters for industrial applications in construction, energy, and automotive sectors is expected to boost the market growth.

In the medical segment, increasing penetration of bottles and pouches in various medical applications is also expected to benefit market growth. These products are being used for storage in the form of medicine organisers and packaging of medicines and drugs, on account of better chemical resistant properties.

In Focus

Factors influencing plastic packaging

Over the years, consumers have shown an increasing inclination toward plastic packaging among other packaging options as plastic packages are lightweight and easier to handle, convenient and flexible with better handling and disposal and greater visual appeal. Manufacturers too prefer using plastic packaging solutions because of their lower cost of production.

Apart from this, the industry is driven by factors like rising population, increase in income levels and changing lifestyles. Demand from rural sector for packaged products is also rising due to increasing awareness via media and internet penetration. Organised retail and boom in e-commerce industry has further boosted the growth of plastic packaging.

Given the changing dynamics of the industry, manufacturers of plastic packaging products are continuously trying to adapt different packaging designs, materials and innovative packaging approaches to cater to different requirements of the consumers.

For instance, cosmetics is one of the key consumers of plastics packaging to cater the booming beauty and personal care industry which includes oral, skin care, and niche categories such as men's grooming and baby care. Manufacturers are launching innovative pack formats, sizes, and functional packaging to meet consumer's demand for convenience.

Furthermore, with rising demand to adopt environment friendly plastic solutions, packaging industry is undergoing a whirlwind of changes in the way plastic packagings are made. A lot of emphasis is being put on using better grade plastics for packaging. This is also changing the way new materials are handled and moulded. For instance, pharmaceuticals, which is heavily dependent on plastic packaging is looking towards new solutions which are recyclable and sustainability.

In the liquid packaging segment, there is an increasing use of polyethylene terephthalate (PET) and high-density polyethylene (HDPE) polymers in plastic packaging applications. HDPE plastic bottles are among the popular packaging choice for milk and fresh juice products.

The demand for lighter forms of packaging which provides greater ease and convenience of use is expected to drive the growth of flexible plastic solutions. All this is bringing in new sets of possibilities for the mould makers to change the way they handle new materials and make new designs for convenient packaging solutions.

Sector growth for mould makers

Here is a look at some of the major industrial sectors where plastic packaging will play a key role and where mould makers must work towards innovative ways of dealing with plastic packaging solutions.

Pharmaceutical packaging

Pharmaceutical industry is one of the fastest growing industries in India and hence pharmaceutical packaging market is expected to double its growth in the near future. India's pharmaceutical packaging market is working towards creating innovative packaging features like digital timers and alarms on pill bottles, dose monitoring and innovative mechanised blister packs which will require new and innovative moulds for manufacturing.

Retail packaging

India's e-commerce revenue is predicted to be the highest in the world, growing at an annual rate of 51% and increasing to $120 billion in 2020 from $30 billion in 2016, according to an ASSOCHAM-Forrester report. Hence, the e-commerce retail packaging will also grow in sync with the industry growth. Convenience, flexible yet strong packaging solutions is the need of the hour to prevent potential damage to the products.

Food and beverage packaging

Food industry is probably where the packaging action is. Consumers want their food products to be

hygienic, safe and at the same time to look attractive. Packaged food consumption has grown rampantly and not just with various kinds of food items available in the super market but also because packaged food deliveries have heightened. Busy lifestyle has leveraged the demand for online food ordering companies which are mushrooming fast and hence the need for 100% tamper-proof packaging too has gone up. Adding to this, the Food Safety and Standards Authority of India (FSSAI) announced new packaging regulations to replace the former 2011 provisions. The new regulations calls for new plastic packaging materials.

On the other hand, India's beverage packaging mainly consists of materials such as glass and rigid plastics which account for 70% of the total packaging market. PET is the material most used to package water, accounting for around 55% of India's packaged water sector. The demand for packaged water has increased rampantly due to increased health concerns and prevention of waterborne diseases.

Projected to reach a CAGR of 4.17% to $142.2 billion by 2023, it is predicted that the country will see continued demand for PET bottles, along with a new demand for liquid packaging cartons due to their longer shelf life and ease in transportation.

Overall, a high degree of potential exists for almost all user segments including processed foods, hard and soft drinks, fruit and marine products.

Growth potentials

According to PIAI, The Indian packaging industry has made a mark with its exports that comprises flattened cans, printed sheets and components, crown cork, lug caps, plastic film laminates and packaging machinery, while the imports include tinplate, coating and lining compounds and others. In India, the fastest growing packaging segments are laminates and flexible packaging, especially PET and woven sacks.

In recent times, the packaging industry is driving technology and innovation growth in the country and adding value to the various manufacturing sectors including agriculture and FMCG segments.

With advancement in technology, general awareness, and abundant availability of raw materials, the packaging sector in India is a well poised industry. The industry is adopting various upgraded technologies such as aseptic packaging, retort packaging and biodegradable packaging to enhance the life of food product. Despite various issues, PIAI points out that the plastic packaging market is expanding rapidly registering a growth of 20-25 per cent per annum and is valued at 6.8 million tonne. The growth in the packaging industry will be defined by the increasing use of innovative packaging equipment, rising flexible packaging market and innovative solutions and designs for new age packaging requirements.

Some of the major challenges that hamper the growth of the industry include:

- Rapid changes in technology
- Shortage and rising cost of raw material
- Costly skilled manpower
- Rising input costs
- Highly inadequate credit flow
- Lack of exposure to best management and manufacturing practices
- Lack of commitment to the quality standards
- Lack of marketing, distribution and branding

Packaging technologies for mould makers

Packaging has always been one of the key drivers of tooling industry because of its unique demands, complexities and materials. Tooling for custom packaging is the physical component that has to be created to fit your specific packaging requirements, almost like packaging DNA. Usually, no two types of custom packaging are the same, which means manufacturers will likely not have existing tooling

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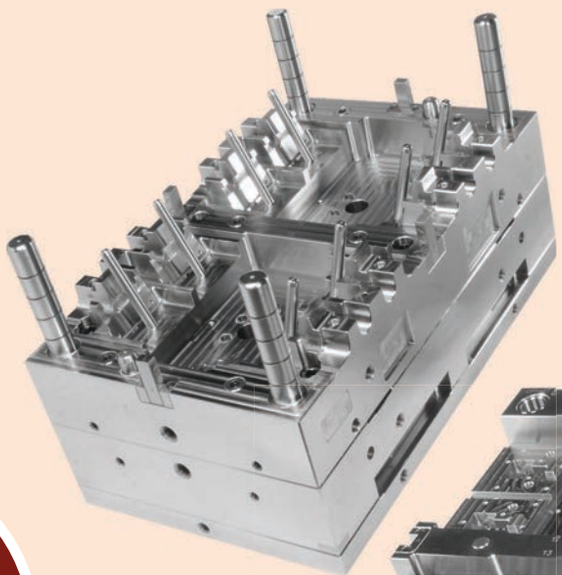

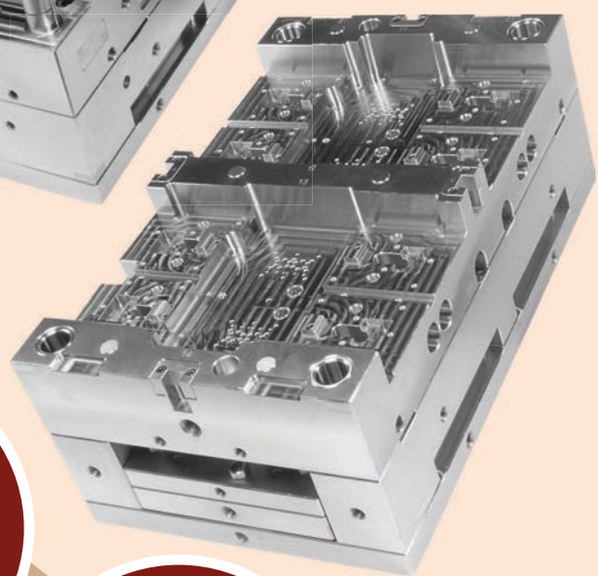

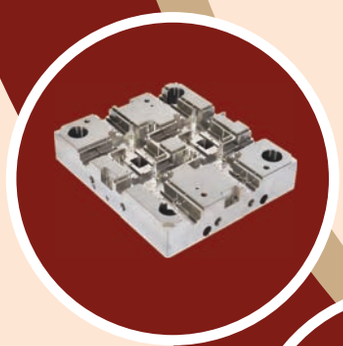

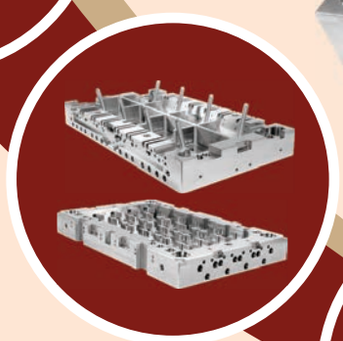

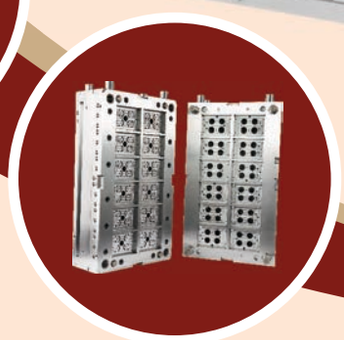

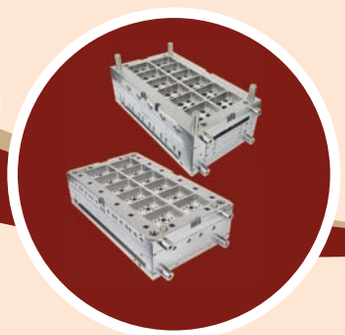

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that would fit your specific custom packaging. Because of this nature, the industry demands huge number of tools for packaging. Also, one has to keep in mind that the packaging is needed in almost all types of industry, be it FMCG, pharmaceuticals, home appliances, among others. Some of the widely used methods for the packaging mould manufacturing are as follows:

Blow Moulding

Blow moulding of containers for food products or cleaning products is a little more complex because the bottles often begin with an injection moulded neck that is threaded with parasin attached. The parasin mould that produces the neck does well when high diamond polished and then flash chromed. In addition, the neck ring inserts that actually form the threads are made from steel and tend to wear. When that happens, micro welding them for repair, followed by polishing and chrome plating to re-establish the original surface properties, has been very successful.

Once the parasin is formed during the injection moulding process, it is then transferred to a blow mould to form the bottle. Blow moulds are typically made from aluminum and require a high diamond polish to aid lubricity and part appearance. Like most moulds, they also require periodic maintenance.

Vacuum Moulding

As mentioned previously, aluminum vacuum moulds are commonly used for things such as toy packaging, but also are used to mould re-sealable, disposable containers that we use for deli meats or leftovers and carry-out packaging. In these cases, the moulds usually require only a paper finish because the type of plastic being moulded takes on the impression of the moulds, but doesn't adhere so tightly to the mould surface that it needs more than a basic draw polish on its side walls to aid release.

After applying a paper finish, use either an electroless nickel-P.T.F.E. or electroless nickel boron nitride coating for added hardness and release benefits. These electroless nickel co-depositions are an advantage because they will not plug the vacuum holes in the mould; and, therefore will not hinder the vacuum moulding process.

Blown Film Extrusion Dies

Blown film extrusion dies produce the thin film of plastic, or plastic sheeting that is used in vacuum forming. Examples of packaging products commonly moulded using blown film are t-shirt bags, barrier food packaging, trash can liners, garbage bags and peat bags. These are often steel co-extrusion dies (though single extrusion dies also are used) that require a heavy deposit of 0.001 electroless nickel over a high diamond (usually an A-2, which is equal to 4-6 RMS) polish on all melt-flow surfaces. Nickel also is used for improved wear and corrosion resistance. This is a very high-speed process, and a single blemish on the die surface can result in thousands of feet of film with a defective line through it. So, it's necessary to perform proper, regular maintenance to maintain a flawless surface finish.

Injection Moulding

Tooling for cosmetics packaging produces high profile products whose appearance helps sell them to customers; therefore, they require a decorative finish using high diamond polishing to aid aesthetics and add that sparkle to the part. There is a wide array of decorative detail in such things as lipsticks, mascaras and blush or powder compacts, so an A-1 diamond polish is most desired. It is also recommended to use flash chrome to protect that diamond finish, so the mould runs longer between maintenance checks and produces a higher number of flawless parts.

Caps for packaging, while they do contribute to shelf appeal, are approached from a slightly different angle than the cosmetics packaging discussed above. In the world of high production, high cavitation injection moulds, any edge that can help reduce cycle times is seen as a tremendous advantage.

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Tooling with as many as 240 cavities in a single cycle is possible and with that kind of cavitation, even a small reduction in cycle time can mean a notable increase in both part quantities and profits. One way to achieve this is by using the proper finishes and release coatings because:

- by reducing the coefficient of friction, it allows the resin to fill the mould more easily using less injection pressure; and,
- better release properties equate to fewer imperfect parts and smoother production. These two factors combined help to achieve faster cycle times.

Experience has shown that applying an electroless nickel boron nitride or electroless nickel-P.T.F.E. coating has been particularly beneficial. Some moulds also call for a diamond finish or a satin finish depending on the material being moulded and the aesthetics of the part.

Single-cavity injection mould tools such as those that produce buckets and coffee cans often have longer cycle times than cap moulds. But they can still benefit from better release on the core, corrosion protection on the cavity and core, as well as more efficient material flow.

Overall, it has been found that better mould production is experienced when they are paper finished and electroless nickel or nickel-P.T.F.E. plated. It should be noted that these moulds can actually benefit from a range of finishes including a diamond polish, a draw polish, a satin finish or even a combination of these. It depends upon the customer's production goals and objectives.

There are many, many more instances in which coatings and finishes can benefit moulders of plastic packaging products.

Future Prospects

Given the current instability in the market wherein most mould makers have been affected due to the falling automotive growth, it is best advised that mould makers broaden their horizon of opportunities. The growing plastic packaging market offers that opportunity to explore, expand and enhance their chances to success.

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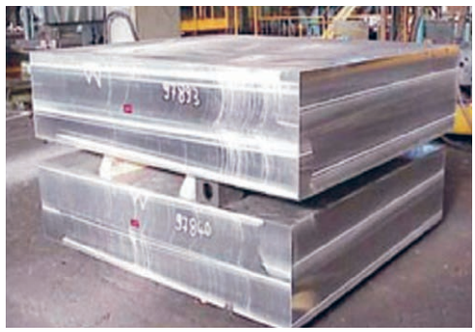
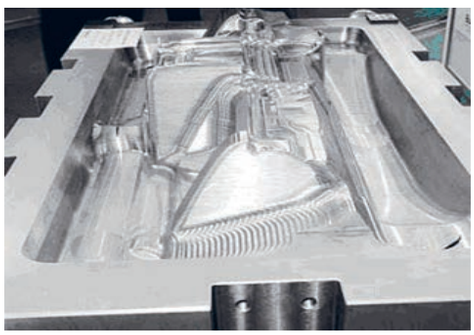
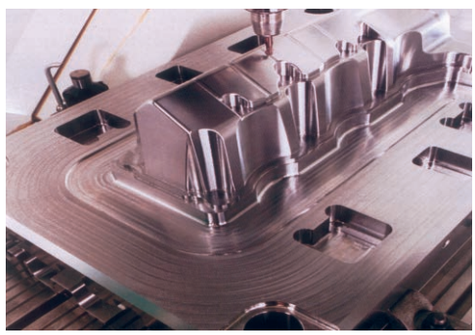


6 Sides milled with Lifting hole



3D pre-Milled Dash board Mold



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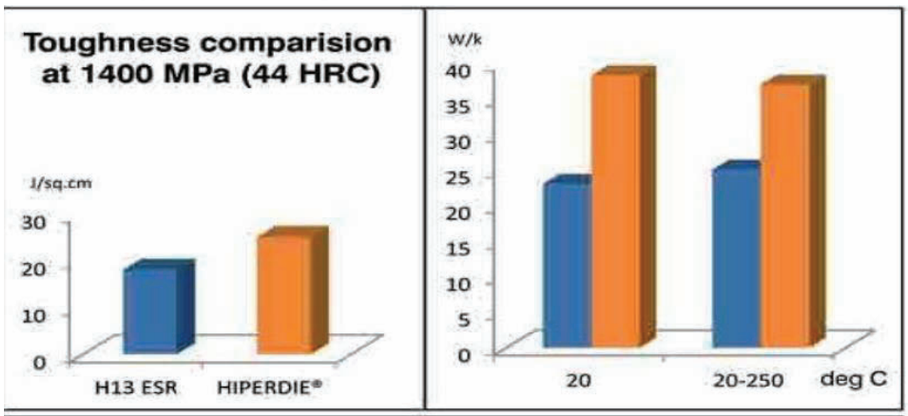

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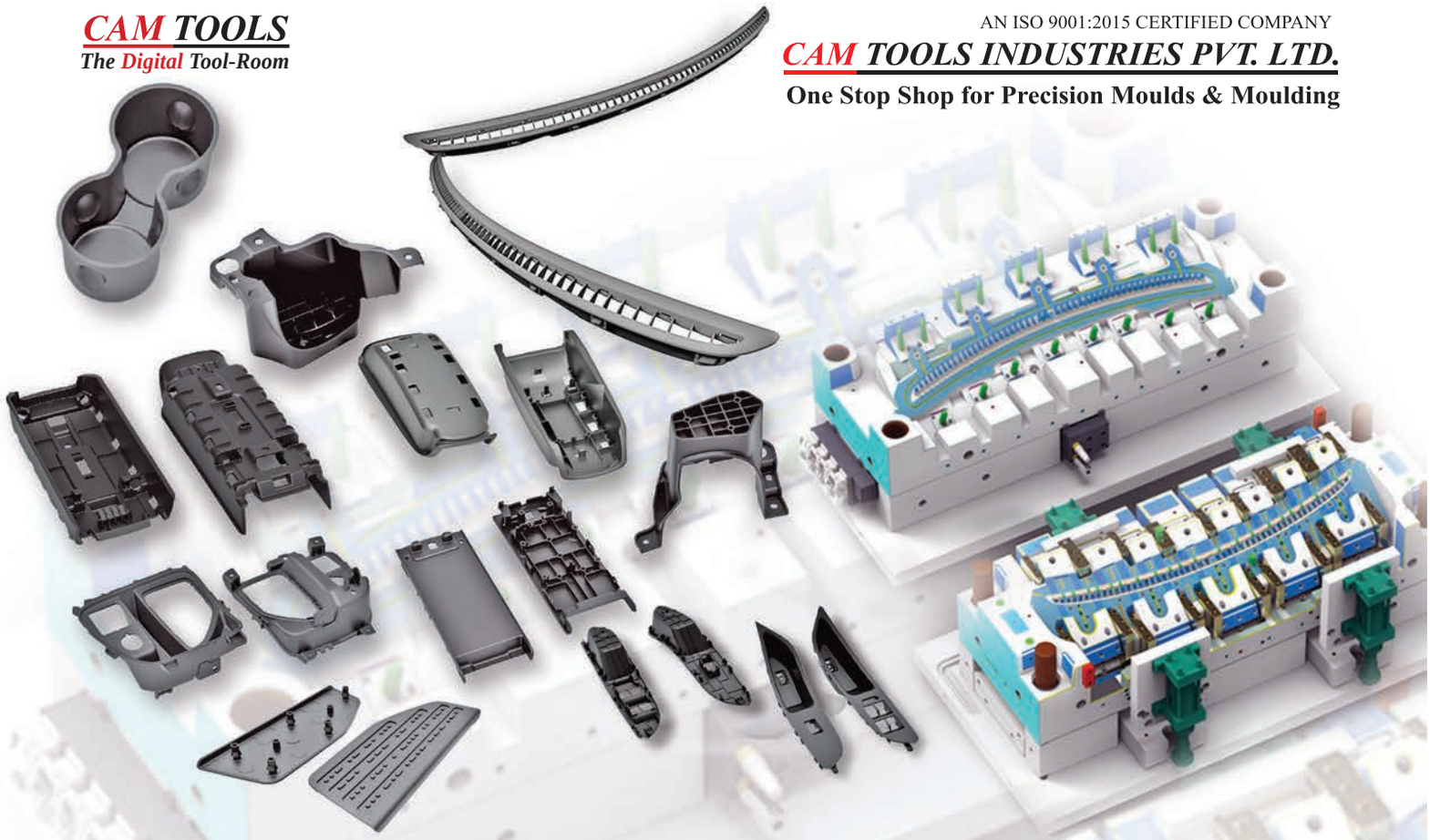

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"India is a progressive market with a huge domestic demand"

Mr. Stephen Harris, Director of EDM Sales & Technical at MWI, Inc, USA, talks at length about the measures that the Indian industry should take to be a step ahead of global competition.

Q Tell us about your company

MWI-INC is a sister company of the Tokai Carbon Group of Japan.

Tokai Carbon is the world's leading manufacturer and supplier of carbon black, graphite electrodes, fine carbon, friction materials, Graphite/Carbon furnace parts for industrial furnaces and related products. Tokai Carbon is dedicated to developing Graphite/ Carbon products that are indispensable to various industries for more than a century as a comprehensive carbon manufacturer. We have been working with Prime Industries in India to supply our solutions to Indian market.

As far as EDM graphite is concerned, our company is leading in the world as we are the only ones who developed new materials in the last 20 years. The speciality of our material is that they have very low electrical resistance which is suitable for EDM operation. EDM is an electrical transfer process- the lower the electrical resistance process, the more heat is transferred to the steel for the melting process, making it more efficient.

Q For which processes is your product mainly used by mould manufactures?

Our products are used for anything to do with plastic and aluminium such as bottle tops, TV, DVD player, Automotive Engine parts etc.

Q Tell us about your Indian footprint

As a company, Tokai Carbon has been doing business in India for about 20 years. In my extensive travel to India and dealing with customers here, I have realised that the Indian companies are coming out of their old laborious work and adopting new technologies rapidly. As more and more modern machines are coming into the country, mould makers here are not lagging behind in adopting the same procedures as the rest of the world. With continuous improvement programs, I would say Indian companies are coming very close to their peers from the developed world in terms of productivity and efficiency.

Q Your views on Indian mould makers

The issue in India has never been about knowledge or technology. The issue here has always been about investment. I think, there are many companies that are just happy working in the same environment with the same machine and with the same set of customers.

They are not able to realise the potential they have, and the kind of opportunities India holds for them. Of course, Indian companies are exploring technologies and manufacturing methods the same as other countries, but we are beginning to see a movement in a certain set of companies. There are still a large number of companies who need to upgrade themselves.

I think India is a very progressive market with huge

domestic demands. I find people here are interested in learning new technologies, but they lack training support. Skill development is one area which needs immediate attention.

Q Your suggestions to Indian mould makers.

I think they need to learn more about technology and how to use it to their advantages. They need to speed up their up-gradation process and work on skill development. With regard to materials, companies in India need to be careful while choosing tool steel and graphite materials for their EDM process as it defines the overall productivity of the mould.

Q How we can work on skill development?

Communication is the key. The communication between OEMs, customers and suppliers is very important. They need to work closely for skill development. All OEMs must provide extensive training support to their customers and partners as they are the machine suppliers and it's their responsibility to pass the knowledge to the users.

Apart from this, there should be more training centres on core manufacturing technologies in the country for practical knowledge. India is such a vast country with so many young engineers, you need more training centres to accommodate such an aspiring new generation of engineers.

Q Challenges you face in India

Infrastructure in India such as roads, railways are not up to the same level as in developed world. In countries like China, Germany or the USA, parts can be delivered the very next day. However, in India, sometimes it's difficult to get the truck out of Mumbai for two days, forget about reaching the destination in a short period. This is one of the biggest challenges in India. Infrastructure has to improve to accommodate the kind of demand you have in India. Having said that, I have seen considerable improvement in the infrastructure front, although there is still a long way to go.

Another challenge is to attract people in the industry, although this is a global challenge. The beauty of India is that 60% of the population is under 30 so you have smart, educated people coming through. I think keeping these people interested in core manufacturing technologies would be the key as world over, the industry is facing a huge challenge in attracting talent.

Q How do you see the future of this market?

India has grown tremendously over the years. With the continuous investment from industries like automotive, aerospace, packaging, white goods, among others, the demand for the moulds has increased and it will continue to grow.

You must remember that the Indian market itself is so huge that you can continue to serve the domestic demands and make good profits as there are many companies that I met on this tour who are having order bookings for coming 6 months.

The middle-class income is growing, and the country has the highest number of young people in the world. They will demand new gadgets, TVs, home appliances and many other things; this demand will propel the business for tool makers in the country.

Of course, there is some economic slowdown in most markets globally but countries like India cannot afford to be down for so long. The industry will bounce back and will continue to enjoy the economic growth as everyone is expecting.

Keeping all the factors in mind, I have no doubt that India will rise further.

"Quality, Time lines, Cost Prerequisites for Tool Makers"

Arvind Chawla, Managing Director, ZAHORANSKY MOULDS AND MACHINES PVT. LTD. talks at length about the opportunities for die mould makers in plastics industry and that the opportunity comes only with quality.

Nishant Kashyap

Q Tell us about your business operations

ZAHORANSKY is known for reliability, precision, and sophisticated technology. The foundation of the company was laid in 1902 by Anton Zahoransky, who produced the first devices and machines for automation and brush production in his small workshop in Todtnau, Germany.

In 2002 ZAHORANSKY decided to start its operations in India and trained the first employees from India in our mould plants in Rothenkirchen and Freiburg, and in March 2003 we then started in Mumbai under very difficult circumstances with managers from Germany.

In 2008, ZAHORANSKY moved to Coimbatore in a rented place, at the same time separated from our partners. We changed to Indian management which was really the right thing to do, because from then on we moved forward, increasing both our mould and machine building capabilities and sales significantly.

In 2013, we built our own plant in Coimbatore and recently did the extension of our plant to make it more than double the area. We are the first IGBC certified "Platinum" rated green factory of Tamil Nadu, and now with 93 points, became the highest rated green factory of India.

This year, we expect to have sales higher than ₹ 110 crores (14 million Euros). In our five years plan, we aim to exceed ₹ 160 crores (20 million).

Q What are the latest trends and technologies in die mould industry?

Man (woman), Machine and Method are the deciding factors for any trend and technology. In die mould industry also, it has been changed drastically over few decades.

Manpower is much skilled/educated. You only need to provide proper environment so that young people can improve in skills.

Machines are much sophisticated/advanced-you need to select the right one to suit your needs.

and Methods are much optimised/proven now, you just need to analyse it.

CAD/CAM supported by improved software are reducing the design time, increasing precision of machining in much lesser time, hence the cost also is reduced.

In India, ZAHORANSKY is in to manufacturing of very precise high cavitation tooth brush moulds and SPM for tufting and trimming. We have seen the trend changing from low cavity manual transfer cold runner moulds to high cavity automated hot runner moulds. Customers are asking for good mould quality in very less price. So, the right balance between a good quality and a good price underlines our competitiveness.

Q Your views on Indian die mould industry. Do you think Indian mould makers are as good in providing efficiency and productivity as their counterparts from China and Taiwan?

As we are in India, we see more competition with China and Taiwan, but now there is a bigger price war going on in mould making in the European market. The demand is going down and so is the price of moulds.

There was always a huge vacuum for good tool or mould makers in Indian market. Mould import was a costly option, hence customers were not having enough choice, and we never upgraded ourselves to cater the market needs. Now the import of mould is easier, cheaper and has become a better option than making it in India. Required quality, quick time line, reasonable cost and professional approach are equally deciding factors to increase import.

Indian Mould making business is now going through a tough phase due to dip in demand from some sectors, but we must learn some lessons on how to fight competition. Indian mould makers have everything which is needed for making a good quality mould, but I think change in approach is required. The demand is still more than supply.

With ZAHORANSKY's strategy to make moulds in Coimbatore and in Germany, we complete project much faster and can survive or better said win this price war.

Q In your opinion, what Indian tooling industry lacks and ways they can improve?

Most of the time we know where we are lacking, and also know how to improve, but we only wish to improve with no commitment to improve.

I believe, we must improve in following three things,

1. Quality
2. Time lines
3. Cost

If we are costly, we can still survive. If we are costly with higher lead time, then also we have the possibility of survival, but if we miss the quality then there is no possibility of survival.

In most of the Indian Mould maker cases, they try to compensate quality with low cost and loose business.

Q Do our mould makers put 100% efforts to give their best quality?

It looks very simple, but hard to follow. We have followed it and our tool room can produce best moulds possible, in terms of parting lines, precision, time lines and cost.
Better Project management is added advantage.

Q The packaging industry has always been one of the largest consumers of moulds, your views on the same

Packaging Industry is one of the largest consumer of moulds, but with growing trend of green concept, ban on single use plastic, it is going to change in coming years.

As you know, packaging should be eye catching, but very low cost, hence there will always be a good demand for any new concepts.

It is a risk of investment for end user as any new concept of better production can change the production process, but hope mould making will always be in demand for any new concept.

ZAHORANSKY is one of the leading mould supplier for FMCG. Cost competition is too tough to survive, but now from Coimbatore we are again coming back in a big way.

Indian Mould makers can supply highly automated tools in very less cost when compared to Europe, and definitely better quality than China or Taiwan.

Q How the demand differs in packaging industry as compared to automotive?

Globalisation is in favour of Indian mould industry either for Packaging or for Automotive demand. Both have different type of demand, volumes and mould making pattern.

Customers are still looking for better mould makers and number of mould import is more than enough to know how much potential is lost here.

Q What are your suggestions to mould makers who want to explore business opportunities in the packaging sector?

Packaging sector is a very unique area wherein budget for mould cost is lowest and precision expectation is highest. Doing first time right is the only suggestion, because any short cut leads to rework and if the first trial is not good enough then every next trial will drain out the profit, ending mould maker in loss.

- Part design review for ease of manufacturing
- Brain storming on Mould design to optimise gating, cooling and ejection.
- Usage of best steel grades.
- Use of best machining strategy, and good machining surfaces.
- Use of best measuring instrument to control the dimensions, while manufacturing.
- Least manual work for assembly.
- Good HRS and controllers.

These are some basic steps which if followed then not only packaging, but any mould making will be a good business choice.

Q Future of Indian tooling industry

Very Very bright. Condition applies!!

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Advantages and disadvantages of beryllium-copper in the manufacturing of injection mould

Beryllium-copper alloys are used worldwide in the manufacture of injection molded parts in the plastics industry. Estimates show that about 50% of plastic injection molding companies use this material. The advantages are obvious, and it is easy to understand why mold makers choose this material. The superior thermal properties of beryllium-copper alloys help to quickly dissipate heat from the plastic parts, reducing cycle times by 15-20 %. At the same time, the hardness of the material reduces the need to repair and overhaul molds. However, there are also concerns about the material, especially when it comes to food packaging. Beryllium-copper can be toxic to humans in special circumstances and there are fears that the substance could be transferred to food.

Copper may just be the best kept secret and secret weapon of the plastics industry. Like any material, it has the potential to be improved by being mixed with other materials. One common mix including copper is the alloy known as beryllium-copper.

Beryllium is a silvery-white metal discovered in 1797. The element has unique qualities that make it well-suited for industrial use. It belongs to the lightest metals and has one of the highest melting points among them at 2348.6 degrees Fahrenheit (1287 degrees Celsius). Beryllium is about one-third more elastic than steel, but six times stronger, while weighing 30 % less than aluminum. It is also nonmagnetic and resistant to concentrated nitric acid, has great thermal conductivity and resists oxidation in air at normal temperatures.

The exact properties of beryllium-copper depend on the mixing ratio used. The standard ratio is 1,85 % beryllium, 98,15 % copper. If conductivity is to be emphasized, the amount of beryllium is reduced to 0,2 - 0,7 %. If hardness is the priority, the amount is increased to 1,6 - 2,05 %.

In the fully heat treated and cold worked condition, beryllium-copper is the hardest (HV 100-420) and strongest (tensile strength 410-1400 N/mm2) of all copper alloys that there are. When it comes to mechanical properties, it is similar to many high strength alloy steels but has better corrosion resistance than any of them, comparable to nickel-silvers. At the same time, it comes with higher electrical conductivity (16-65 % IACS) and higher thermal conductivity (210 W/m*C).

	Beryllium-containing Alloys		Beryllium-free Alloys	
Chemical Composition (%)	**AMPCOLOY® 83**	**AMPCOLOY® 95**	**AMPCOLOY® 944**	**AMPCOLOY® 940**
Be	2,0	0,5	-	-
Co	0,5	2,0		
Ni			7,0	2,5
Cr			1,0	0,4
Si			2,0	0,7
Cu	balance	balance	balance	balance
Mechnical Properties				
Rockwell Hardness (HRB/HRC)	38 C	100 B	29 C	95 B
Brinell Hardness (HBW)	360	240	280	210
Tensile Strength MPa (KSI)	1175 (170)	830 (120)	860 (125)	650 (94)
Yield Strength MPa (KSI)	1000 (145)	550 (80)	725 (105)	500 (73)
Elongation A5 %	4	10	5	12
Physical Properties				
Elec. Conductivity % IACS	20	52	30	48
Thermal Conductibity W/m*K (BTU/ft hr °F)	106 (61)	220 (127)	150 (87)	208 (120)
Density g/cm^3 (lbs/in^3)	8.26 (0.298)	8.75 (0.316)	8.7 (0.314)	8.71 (0.315)
Working Temperature limit °C (°F)	300 (572)	450 (842)	400 (752)	450 (842)

The above are nominal values. If specific minimum figures are required, plrease contact your local AMPCO METAL representative

Beryllium-copper alloys are used for example in springs, electrical contacts, valves, pumps, different kinds of tools – and, of course, injection molds. They are also popular in the mining, gas and petrochemical industries because they do not spark.

Additionally, its unique combination of strength plus electrical and thermal conductivity makes berylliumcopper an ideal alloy for miniaturized components in mobile phones, tablets and laptops.

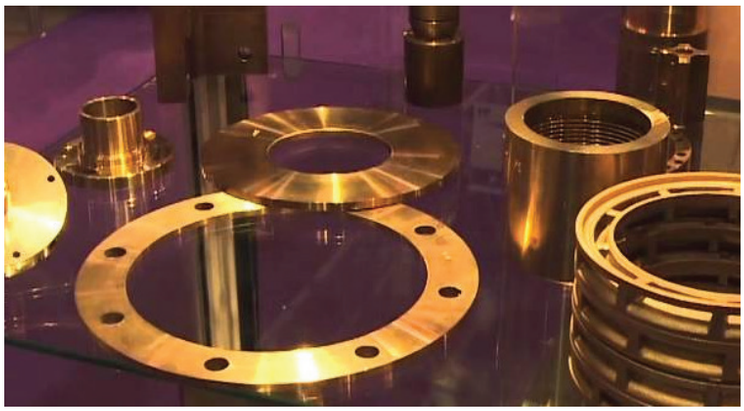
What are the special applications in the plastics industry?

80 % of the beryllium used in the EU is used in beryllium-copper alloys (0.1 - 2.0 %), which are used to exploit an unsurpassed combination of physical properties to produce highly reliable components of systems. Beryllium-copper has established itself in the plastics industry and is mainly used in the manufacture of the following products and tools:

- inserts in steel and aluminum molds for higher cooling rates in critical areas
- sealing tools
- cooling inserts
- nozzles & needles for Hot Runner Systems
- injection molds and blow molds in the highpressure range
- inserts in aluminum molds for higher strength and wear resistance

The advantages and special advantages in the plastics industry are:

- known to produce highest quality plastic parts and minimum total production costs compared to other competing molding materials
- optimal combination of hardness, wear resistance, thermal fatigue and thermal conductivity
- beryllium-copper, with high thermal conductivity compared to steel, offers significant advantages in minimizing the distortion of the part, spatial control and cycle time
- thermal fatigue and strength allow for a longer tool life and less downtime
- higher productivity and efficiency
- excellent resistance to the corrosive by-products of molding operations, such as hydrochloric acid



- the high strength and wear resistance offer superior performance in neck, thread and bottom areas when combined with other materials
- beryllium-copper inserts and molds can be joined together and repaired by resistance welding, TIG and MIG welding. However, precautions must be taken against softening and oxidation of the material. Additive metal of the same alloy should be used, and oxides, oil and dust should be removed from the parts before welding.

What are the health risks of beryllium-copper and what do I have to pay particular attention to when processing it?

Beryllium is something of a double-edge sword for the industry: on the one hand, it is significantly useful, on the other hand, it can be a health hazard. In this chapter, we will briefly lay out the problems with beryllium and explain when it is dangerous and when it is not.

Beryllium is highly toxic and classified as a carcinogen. However, these dangers are only present under certain circumstances. Beryllium is only really dangerous when finely divided and airborne. During machining like grinding, welding and solution annealing, alveolar particles can be formed and inhaled. Repeated inhalation of these particles may cause berylliosis, a dangerous lung disease, in about 3-4 % of the population.

Therefore, the metal, its alloys and its salts should only be handled in accordance with specific work codes. Turning, milling and drilling of beryllium presently pose no risk when done wet with the proper coolant.

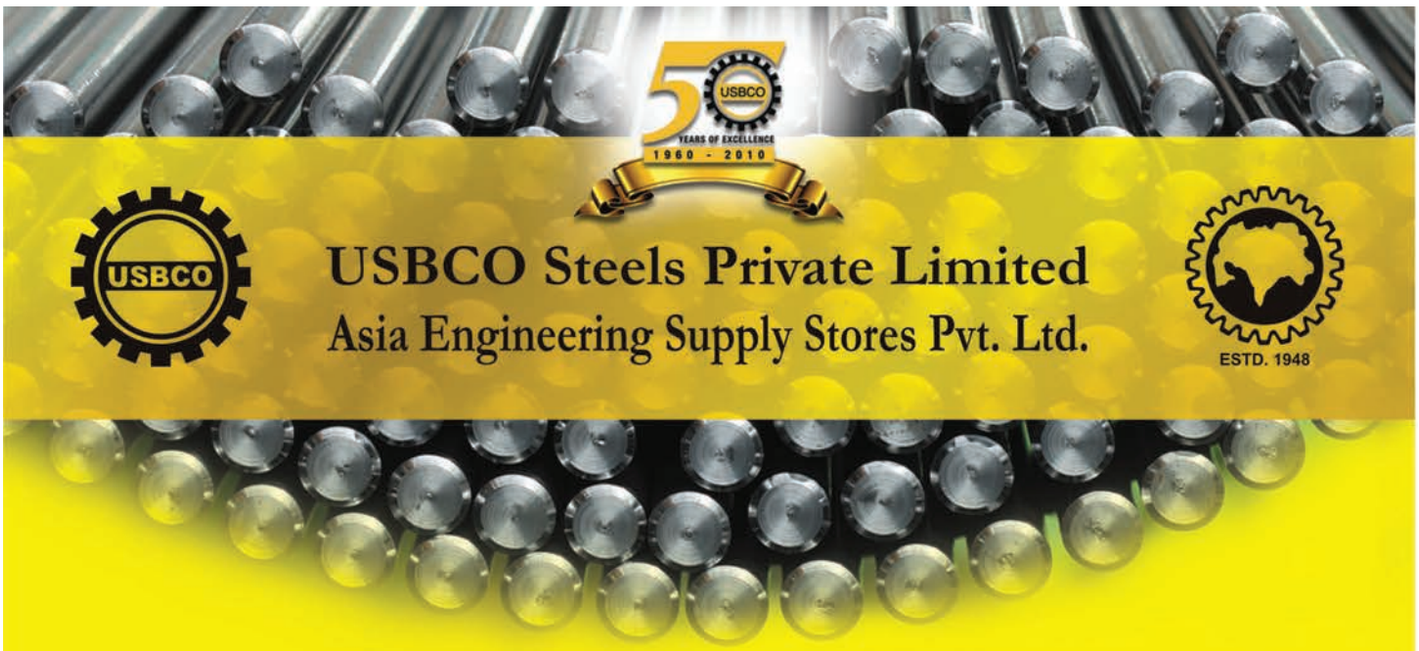
There are concerns that products made in factories where beryllium is used may be dangerous. Could plastic containers manufactured in injection molds made of berylliumcopper be poisonous? Such concerns are unfounded, as a 1990 study by Foley Occupational Health Consulting found. It came to the conclusion that beryllium levels in finished plastic items produced in molds containing beryllium-copper alloys were below a detectable limit of 100 parts per billion (ppb). Another industry major company also came up with its own study that also showed no risk of a significant transfer of beryllium to the finished molded-plastic product.

A 2001 Concise International Chemical Assessment Document (CICAD) from the World Health Organization determined that a tolerable amount for a human to ingest is 0.002 mg per kilogram of body weight per day. For a 60-kg (132-pound) person, this amounts to 0.12 mg of beryllium per day. Using this estimate, the Council of Europe in 2013 set a "specific release limit" (SRL) of 0.01 mg/kg per day, meaning that a reasonably safe oral intake level of beryllium is 10 % of the CICAD's toxicological limit of 0.002 mg per kilogram of body weight per day, assuming a person with a weight of 60 kg consuming 1 kg of food. For manufacturers that use beryllium-copper to make molds, the SRL serves as a guide about how much beryllium can be released from plastic food-storage containers made from such molds into food without endangering the health of consumers. The specific release (SR) is measured as the difference between the concentration of the element in the food before and after contact with the metal or alloy, so the naturally occurring quantities of the element are also taken into account. If the SR is below the SRL, the mold manufacturers are in compliance with safety guidelines recommended by the European council.

Overall, it can be said that beryllium is a very useful material that has to be handled with some care. Its health hazard should be taken into account, but most of the time, beryllium is not dangerous, and if the right measures and precautions are taken, working with and using beryllium is not problematic. Nevertheless, there are alternatives to it if you prefer not to. Ask us about beryllium-copper and other copper alloys. AMPCO METAL has decades of experience working with beryllium-copper and copper in general.

Are there alternatives to beryllium-copper?

AMPCO METAL introduces a new copper-nickel-silicone-chromium alloy developed as an alternative to beryllium-copper for industrial applications requiring a combination of strength and high



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thermal conductivity. These unique properties of AMPCOLOY® 944 are attained through specially-developed and proprietary manufacturing processes and complex alloy compositions.

Indeed, this ground-breaking new copper alloy, AMPCOLOY® 944, provides the right balance between an average hardness of 28 HRC and a thermal conductivity of 150 W/m*K, 4 to 5 times greater than P20 tool steel, and electrical conductivity of app. 35 % IACS.

The following Table gives a good comparison between this new alloy and other commonly used materials:

	Thermal Conductivity (W/m.K)	Rockwell Hardness (HRB/C)
AMPCOLOY® 940	208	95 HRB
Be Cu (0.5% Be)	208	98 HRB
AMPCOLOY® 944	150	28 HRC
Aluminum (QC-7)	135	85 HRB
Aluminum (7075)	135	80 HRB
Be Cu (2.0% Be)	120	38 HRC
Tool Steel (P-20)	30	33 HRC
Tool Steel (H-13)	26	53 HRC
Stainl. Steel (420)	23	52 HRC

AMPCOLOY® 944 is the answer to our customer needs and requirements to reduce both material scrap and machining time. Typical applications include mold tooling for plastics processing, highly suitable for the injection and blow mold inserts for a wide range of plastics materials due to the alloy's very good corrosion resistance to PVC resins as well as excellent results in thermoforming.

Plastics processors rely on AMPCOLOY® 944 for cores and cavities, where it reduces molding cycle times, decreases postmold part distortion, produces more parts per hour, increases design flexibility, removes heat uniformity and improves dimensional stability of the plastic parts. Greater hardness also lengthens

service life of the mold and lowers machining and production costs, as AMPCOLOY® 944 requires no additional heat treatment. AMPCOLOY® 944 can be used for applications requiring higher hardness levels such as cores, core inserts, cavities-inserts, runner-less molding systems, hot runner nozzles, core pins, blow pins, ejector sleeve core combinations, sprue bushings, neck and tail pinch-offs.

With its great electrical conductivity properties of app. 35 % IACS, AMPCOLOY® 944 can also be used in resistance welding applications and Integrated Circuit Chip production fields. AMPCOLOY® 944 is now available from stock in round rods with a diameter between 1" and 4" (dia. 25 mm up to dia. 100 mm) and plates with a thickness of up to 4" (100mm thickness). Other forms available on request include forged shapes made-to-order and finished-machined parts on the basis of customer drawings. AMPCO METAL's complete family of mold and tooling alloys consists of the following products:.

Courtesy: AMPCO METAL

	AMPCO® 18	AMPCO® 21	AMPCO® 940	AMPCO® 944	AMPCO® 88	AMPCO® 91	AMPCO® 83
Tensile Strength 20 °C MPa	725	760	690	850	890	700	1200
Yield Strength 20 °C MPa	360	415	535	730	680	550	800
Elongation % in 2"	14	1	13	5	14	5	3
Hardness HB	192	286	210	275	275	215	360
Hardness Rockwell	92Rb	29Rc	95Rb	28Rc	28Rc	98Rb	38Rc
Thermal Conductivity (W/m.K)	62	46	210	150	230	208	105

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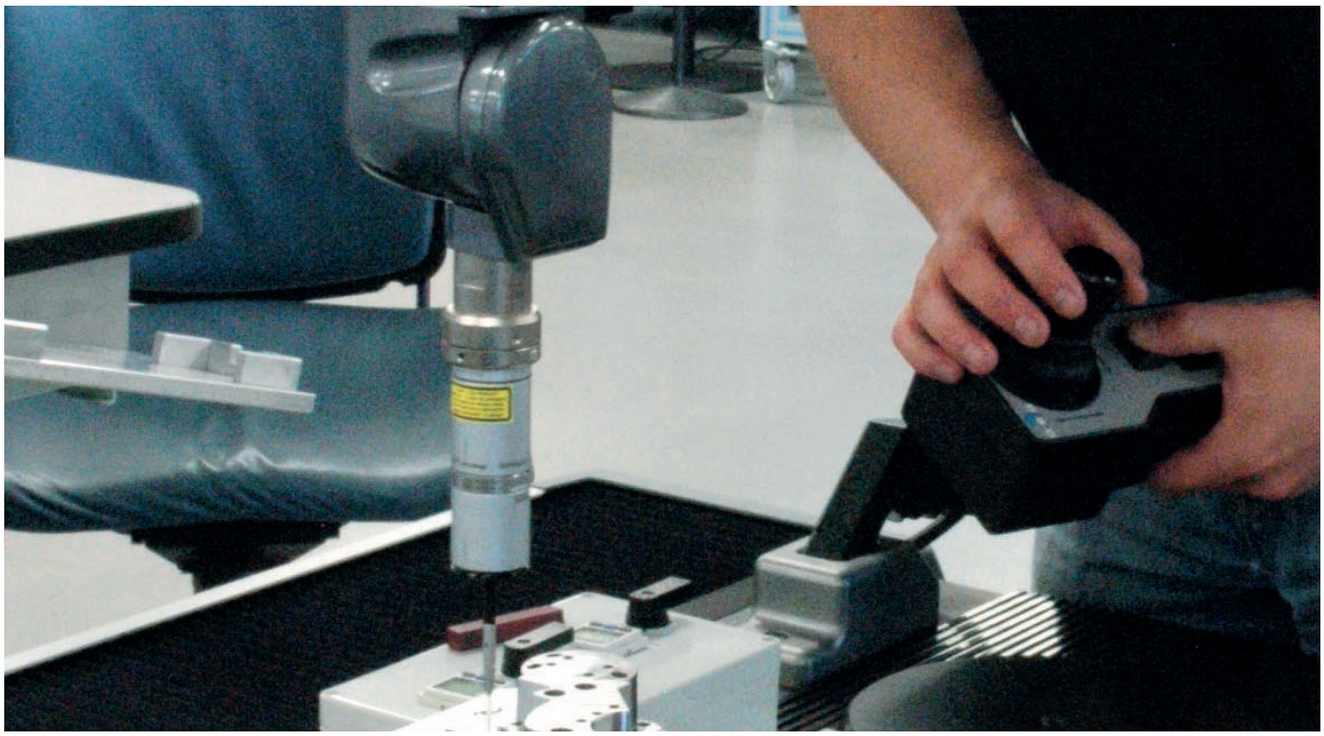
Modern architecture houses the high-tech: the main building at Wild & Küpfer AG in Schmerikon, Switzerland, on the bank of Lake Zurich.

Pre setting and measuring for semi automated tool making with the DEA GLOBAL and PC-DMIS



A black cube with an imposing glass facade. You almost think you are in front on a museum for contemporary art. The visitor is not actually so far off with this impression, as what is behind the facade is truly a work of art. The organisation Wild & Küpfer based in Schmerikon on the east bank of Lake Zurich specialises in plastic parts

From top to bottom: instruments for eye surgery, optics carriers, home controllers

for a very wide range of sectors. Every part is unique, every tool is custommade. The accuracy of the tools is ensured with the aid of a DEA GLOBAL Advantage and the software PC-DMIS. As a result Wild & Küpfer has reduced the errors during pre-setting by 90%. Furthermore: measuring is easier.

Showcases in the bright, spacious offices at Wild & Küpfer show off the business's products in a favourable light. The exhibits provide a view of the varied industrial landscape of Europe: here there are plastic gear wheels for gearboxes, as well as displays for home controllers, complete optics carriers, electricity meter housings, sockets, parts for coffee machines, housings for electrical tools, surgical instruments for eye surgery... Wild & Küpfer is at home in countless industries.

"We have a wide customer base with the emphasis on medical technology. Cleanroom production is currently commencing", says Daniel Wild, Head of Technical Division. "We offer our customers everything related to plastic injection moulding – from development and design, through mould building and injection moulding, to component assembly. A series starts with a few 100 pieces and can be as large as several million pieces."

Coordinate Metrology Right in the Middle of the Action

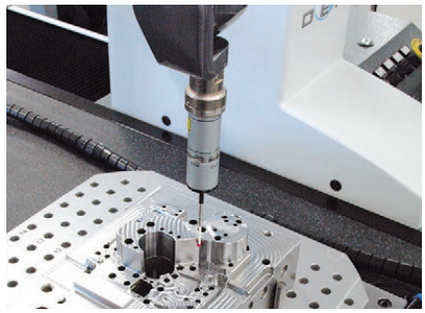
However, before it is possible to get started with the core business, injection moulding, the toolmakers must do their bit. In its semi-automated tool making facility, Wild & Küpfer has everything to make the heart of a passionate toolmaker race: milling, drilling, turning, grinding, wire cut EDM, die-sinking EDM, even laser cutting. In the middle of the fully air-conditioned workshop: a DEA GLOBAL Advantage series coordinate measuring machine with the software PC-DMIS plus software add-on PC-DMIS EDM Preset & Measure. The machine is integrated into the high level toolmaking data management system that is controlled by Workshop Management from System 3R.

Wild & Küpfer AG uses the measuring machine to determine the offset data for the tools and the electrodes. The electrodes are subsequently used for die-sinking EDM. Using the DEA GLOBAL the team also measures the electrodes and workpieces after the individual machining steps. The coordinate measuring machine has a volumetric length measurement error of 1.5 + L/333 microns – and is therefore optimally suited to the inspection of workpieces at Wild & Küpfer where tolerances are a few microns. The DEA GLOBAL is also able to tackle the largest tool with dimensions of 600 x 700 mm thanks to its measuring range of 700 x 1000 x 600 mm.

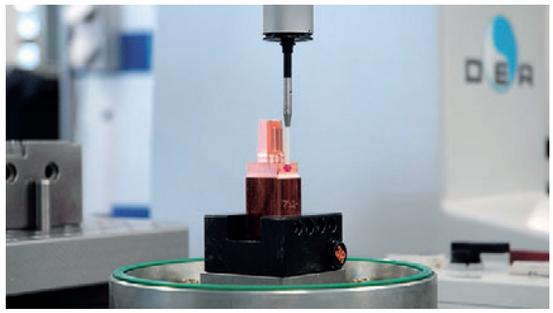
The Chip Provides The Link

Wild & Küpfer AG uses a palletising system from System 3R for the majority of the workpieces in

The dynamism that emanates from Daniel Wild, a member of the senior management, infects not only the 100 employees, but also the machines themselves. In the fully air-conditioned production building, 65 modern, some of which are fully electrical, injection moulding machines move continuously. Nonstop. 24 hours a day. 7 days a week.



A probe on the motorised indexable TESAS-TAR-m measuring probe acquires the measure-ment points on the workpiece.



Every pallet - here with one electrode - is equipped with a chip with which the link to the high level job management system is established.

mould building. Each pallet carries a chip that can be used to identify it. Obviously, this process involves countless bits and bytes. Among other tasks, the SIGMA software is responsible for the data transfer in the workshop using the chip system. Workshop Manager comprises a tree-structure in which each module represents a machining program. Data such as workpiece number, milling program number, item number,measuring program, CAD data etc. for each pallet are saved in the software. Each machine is therefore "fed" with data from a central point.

"First we clamp the pallet with the part on the measuring machine and identify the pallet using the chip reader. In this way the link to the tree structure in SIGMA is established", says Daniel Wild. "During the pre-setting of the workpieces and the electrodes, we use the measuring machine to acquire the offset data using single point measurement. In this way we measure the displacement and twist in relation to the zero point of the clamping system. This data then flows back to the job management system and is saved centrally. The data can then be accessed later, for instance, by the machining centre. This process reduces the set-up times."

Toolmaking is right beside the production building in a fully air-conditioned room with a stable temperature – the daily fluctuations are limited to plus/minus 0.5 degrees. The GLOBAL with the PC-DMIS software forms the heart of the system and provides offset data and measured data to the machine tools.

Pre-Setting and Measuring with one Software Package

After pre-setting, the coordinate measuring machine also has direct control functions with the measurement of the electrodes and workpieces between the individual machining steps. The GLOBAL coordinate measuring machine with PC-DMIS offers both scanning measurements and also single point measurements. During the measurement of the workpieces and electrodes, the employees measure individual points that PC-DMIS subsequently combines into lines and geometries. The values measured are checked against the CAD model the designers prepared earlier using Unigraphics software. The toolmakers revert to the measurement of a large number of measurement points by scanning if the workpiece has free-form surfaces or inclined faces.

The tools from Wild & Küpfer AG are one-offs, there is no series production. Every day the team faces different machining geometries, a measuring program must be prepared for every tool. Nevertheless, the organisation has managed to simplify the preparation of the measuring programs for electrodes.

"With PC-DMIS EDM Preset & Measure we have been able to make the programming of the measuring processes for electrodes easier by utilising macros. For each electrode size there is now a standard program that the operator can open easily and run immediately."

It is clear: tool making at Wild & Küpfer AG is as modern as contemporary art. Also thanks to the GLOBAL in combination with the sophisticated two-in-one measuring software from Hexagon Metrology. Wild & Küpfer AG has chosen not just the right metrology business, but also the right architects. The black cube makes a clear statement: we look forward.

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Conference on Trends in Die & Mould manufacturing

Prime Industries had recently organised the multi-city seminars on "Trends in Die & Mould Manufacturing" in association with TAGMA INDIA & leading OEM's HAAS (Phillips Machine Tools India) & Mitsubishi EDM/Laser.

India's leading Graphite Supplier, Prime Industries, based in Nasik, recently conducted multi-city seminars to highlight trends and demands in the die and manufacturing industry in Noida, Gurugram, Pune and Mumbai from 18th to 21st Nov, 2019. The objective of the event was to share the recent technology trends, business outlook, discuss about challenges & possible solutions related to the Tooling industry. All events received overwhelming responses across the locations as many senior industry leaders, technology partners, customers and users participated at the events.

The presentations started by Mr. Sagar Bhagwat from Prime Industries. Mr. Sagar Bhagwat shared Prime Industries journey, company mission and expansion

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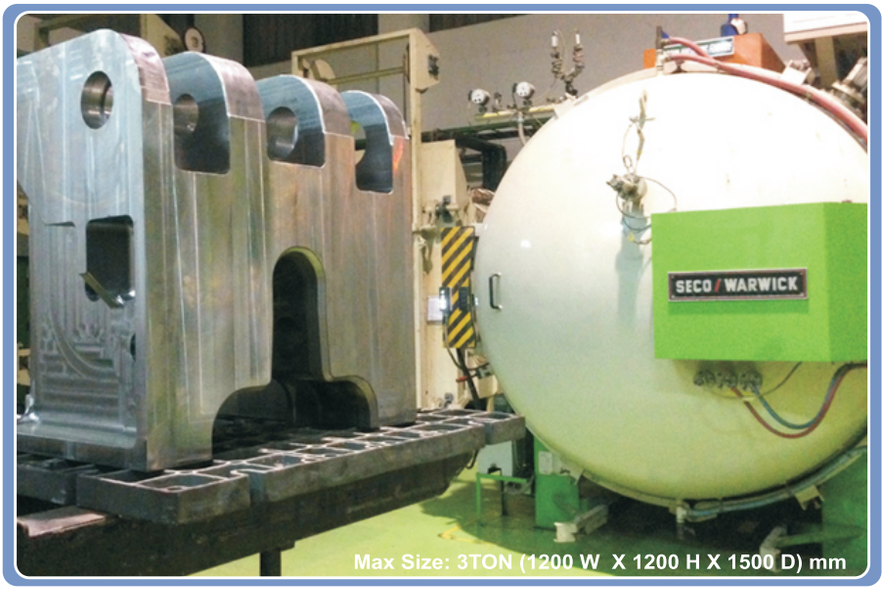
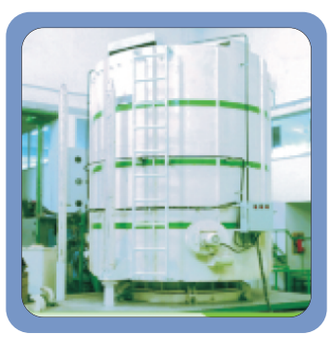


PLASMA NITRIDING PULSPLASMA® PLATEG GERMANY

PROCESSES

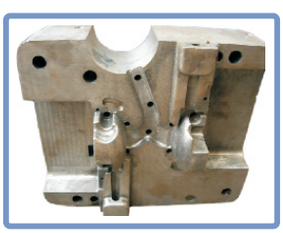
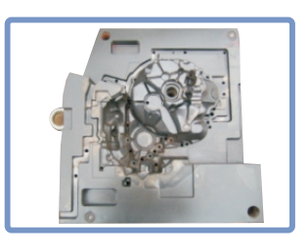
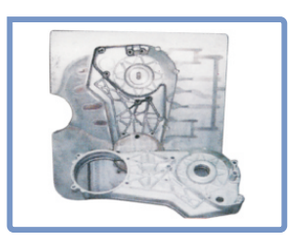
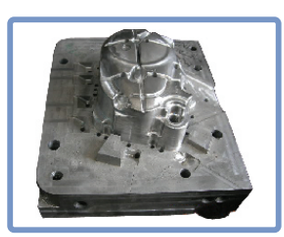
- Plasma Nitriding (PulsPlasma®)
- Plasma Nitrocarburising
- Pre & Post Oxidation
- Oxynitrocarburising
- Plasma Assisted Carbonitriding

VACUUM GAS NITRIDING STANGE GERMANY



PROCESSES

- Vacuum Nitriding
- Gas Nitriding
- Gas Nitrocarburizing
- Pre & Post Oxidation

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of business. It was followed with presentation from Mr. Toshifumi Il, Sales department, Tokai carbon co. ltd. In his presentation Mr. Toshifumi highlighted about the graphite manufacturing & their global presence. Prime Industry is the India representative of Tokai Carbon.

Further the presentations included from event partners HAAS and Mitsubishi. Rupesh Ranjan from Haas spoke about the latest developments and benefits of 5 Axis machining solutions for mould making, while the next presentation was based on IoT Remote monitoring & support service by Mitsubishi EDM / Laser shared by Mr. Sadananda Koppalkar & Mr. Arun Marathe jointly. In their presentation Mr. Sadananda & Mr. Arun spoke about how IoT remote monitoring & support services can save time, enhance productivity and increase efficiency in any production environment. They also extensively spoke about the factories of the future.

Mr. Stephen Harris, Director of EDM Sales & Technical at MWI, Inc, USA also gave the Insight of Global Market scenario in Mould making with challenges & opportunities in the industry. Mr. Stephen majorly highlighted about the scope for toolmakers in exploring business in Aerospace & other critical applications with using different variety of grades for more efficient & productivity improvements of Graphite made by Tokai carbon. Then the concluding presentation was made by Mr. Ashish Varma, CEO, Prime Industries about the 3 growth levers in slowdown with interesting case studies. Mr. Ashish emphasised the customers / tool makers should focus on outsourcing job work to related industries to able to focus on their core areas rather than to highly invest in capital / increasing machineries. He also highlighted case studies where with optimising right EDM machine parameters & right synthetic dielectric oil can play a crucial role in overall EDM productivity improvement.

The event was graced by the presence of Mr. D K Sharma, President, TAGMA India & Business Head, Godrej Tooling as he attended the Pune event as key note speaker. While addressing the gathering, he first spoke about the key challenges in the industry and why it's important for us to work together in order to overcome all the challenges. "The industry should focus on collaborative approach and work together to learn from each other's expertise. Tool makers should also aim for diversification to tackle the economic slowdowns," said Mr. Sharma. He also stressed upon skill developments, trainings and attracting young talents for the growth of the industry. "In the present volatile market situation, innovation is the key aspect to sustain for every toolmaker. Therefore, research & development plays a crucial role in every organisation for future development," added Mr.Sharma. Finally he shared his vote of thanks to Prime industries & participating OEM's for creating such platforms for sharing best practices beneficial to Die & Mould industry.

Many customers like Arihant Dies, Shinwa Moulds, Viniel Hitech, Sigma Electric, Endurance Tech, Aakar Dies, Creative Engg, Sridevi Tools, Technocraft Industries and many more marked their presence for the events.

Customers attending the events shared positive responses about the technical, informative presentations & technologies highlighted in the seminars. Such kind of networking platforms are very essential to gather together & share best practices towards betterment of the Indian Tooling industry.

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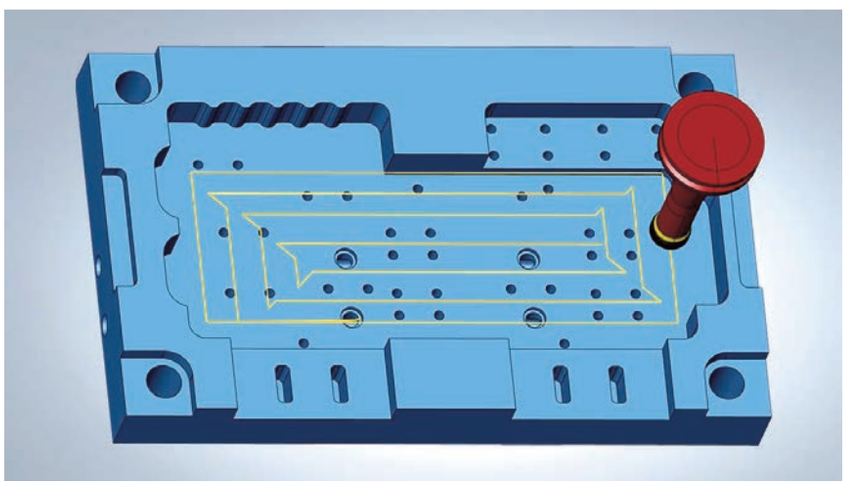

CAD for CAM

The CAD for CAM solution from OPEN MIND truly stands out in mould and die making as well as for related complex tasks. From data import to CAD-for-CAM functions to utilities to support EDM processes, the hyperCAD®-S CAD software with its comprehensive interface package allows CAM users to process a wide variety of CAD data quickly and reliably. hyperCAD®-S also impresses with its customised filter functions: Along with filters for common attributes such as layer and color, hyperCAD®-S also features user-defined filters based on popular geometries and on system properties. Intelligent element management is also provided. Whether it's rectangles, point clouds, polygon meshes and even toolpaths, CAM-relevant elements are already included in the CAD kernel, which significantly speeds up all processes.

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PROPAK India 2019 is an international processing and packaging trade event for India. October, 21-23, 2019; Bombay Exhibition Centre, Mumbai.

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Tel: +91 98196 15657
Email: sameer.mithia@ubm.com
Web: www.propakindia.com

ENGIMACH 2019

IDEAL exhibition for machine tool manufacturers, the event offer a quintessential launch pad for new ideas, products and services; Dec 1-8, 2019; The Exhibition Centre, Gandhinagar.

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DIEMOULD India 2020

THE 12th edition of the DIEMOULD Show all set to showcase the latest in the world of tooling industry and bring together leading brands and key players from the die mould and machine tool segment on a single platform, April 22-25, 2020; Bombay Exhibition Centre, Mumbai.

Contact Details:
TAGMA, A- 33, Nand Jyot Industrial Estate, Safed Pool,
Andheri - Kurla Road, Mumbai
Tel: 22 28526876
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Fax: +49 (0) 7025 9206-880
Email: info(at)schall-messen.de
Web: www.schall-messen.de/en/

Formnext 2019

FORMNEXT is the leading exhibition and conference dedicated to additive manufacturing and all of its upstream and downstream processes, November 19-22, 2019, Frankfurt, Germany.

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Germany
Tel: +49 711 61946-0
Fax: +49 711 61946-96
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Web: www.formnext.mesago.com

ASIAMOLD

THE premier platform for mould, additive manufacturing and forming technologies, February 26–28 2020; Guangzhou, China.

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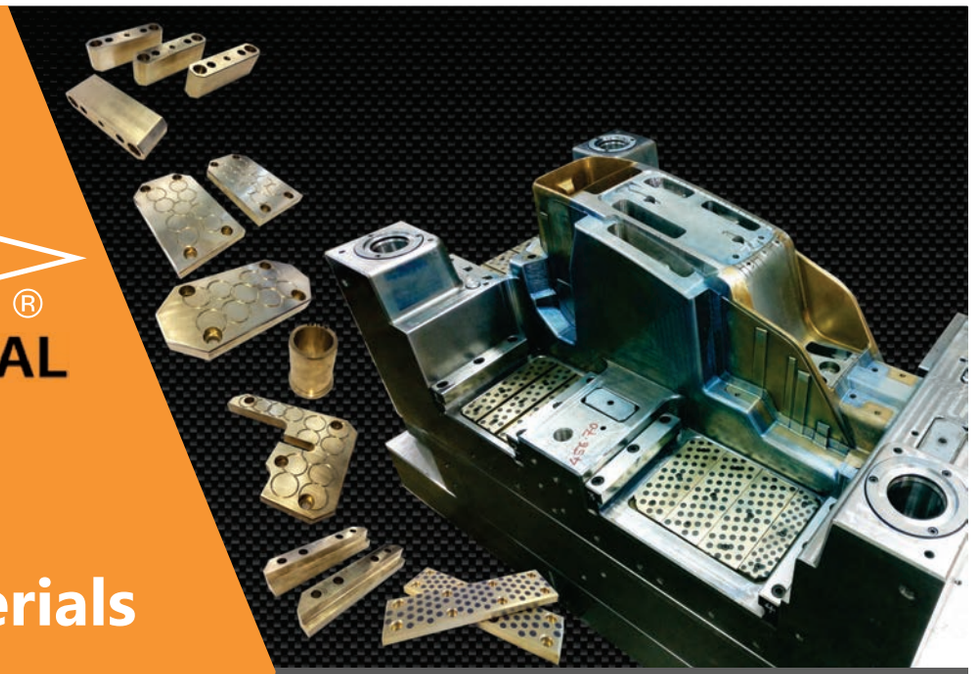

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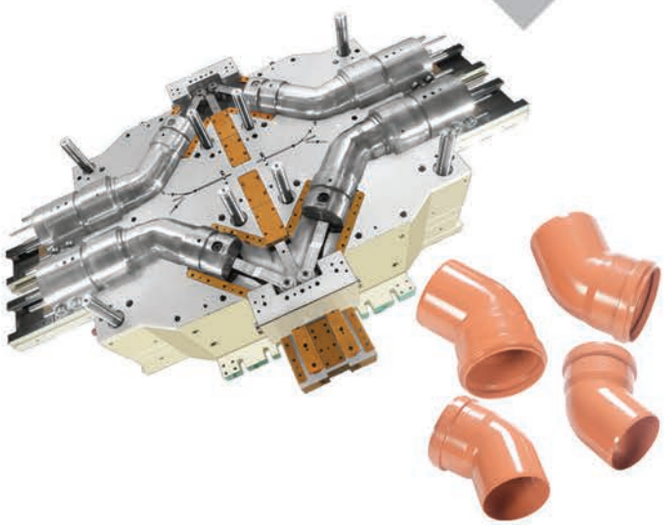

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