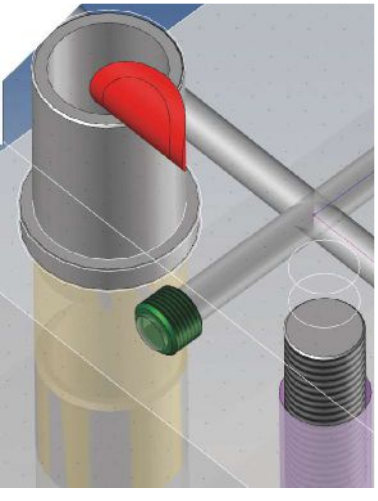
ENGINEER / BUILD / MAINTAIN

MoldMaking TECHNOLOGY

JULY 2019

2019

Technology Review and Sourcing Guide




MMT moldmakingtechnology.com

MORE THAN 1,000 COMPANIES
In Print & Online!

A review of this year's moldmaking product developments alongside a supplier sourcing grid

A property of Gardner Business Media VOLUME 22 / NUMBER 7

"Our customers expect reliable, consistent performance. By specifying Progressive, we deliver long-term, profitable results."

Jeff Jacquemin, R&D/Leverage

CUSTOMER SATISFACTION

Manufacturers of high production tooling know that taking shortcuts today will lead to problems tomorrow. Progressive meets your most demanding requirements:

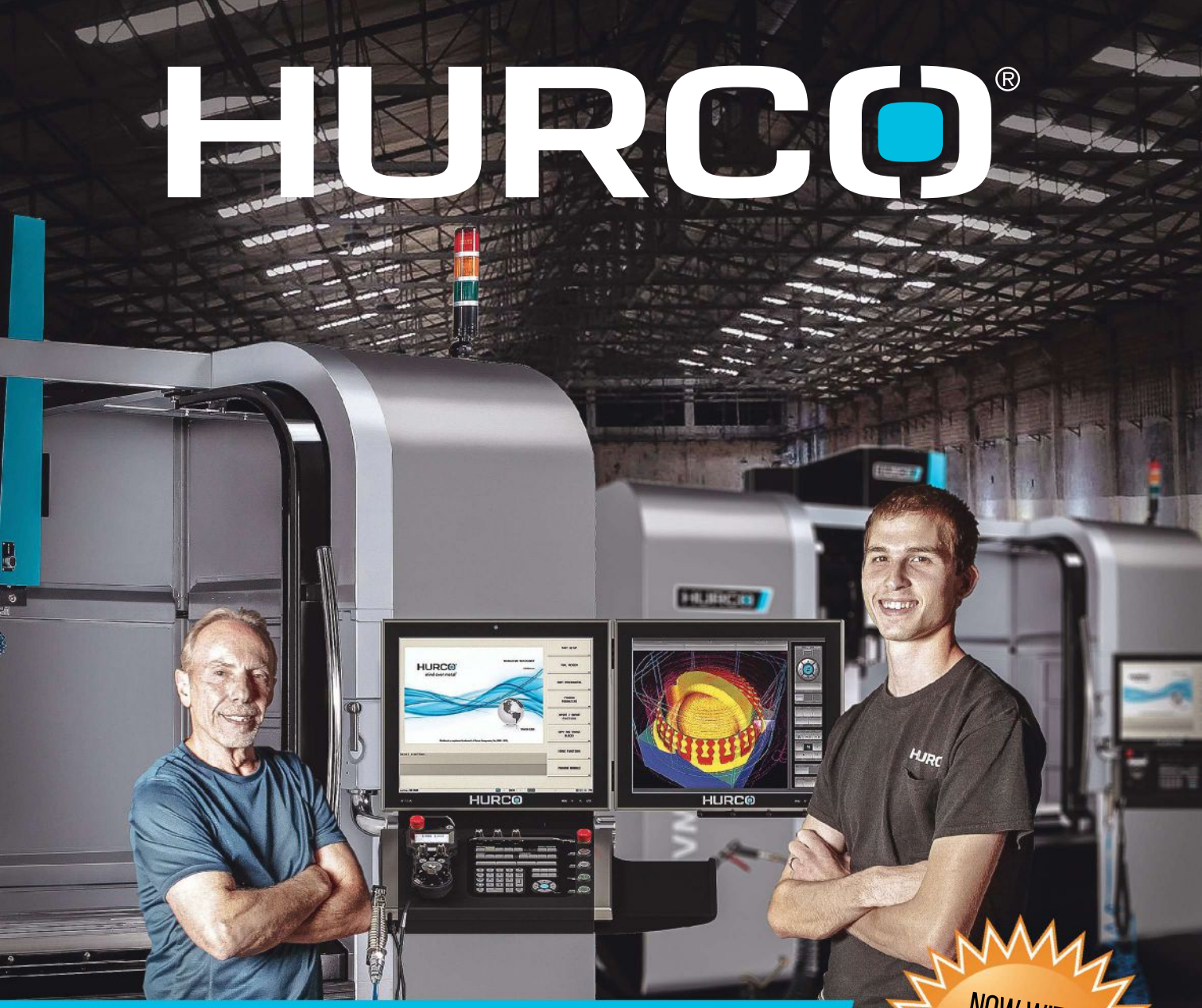
- Precision Ejector Pins for thin running resins
- Alignment Locks proven and guaranteed to last
- Innovations for sequencing multi-parting line tools

It's your name on the outside of every mold, and with Progressive inside, your customers achieve maximum productivity and long-term profitability.

PROGRESSIVE COMPONENTS

CALL **1-800-269-6653** TO LEARN MORE OR SEE NEW PRODUCTS AT **PROCOMPS.COM/NEW**

HURCO®



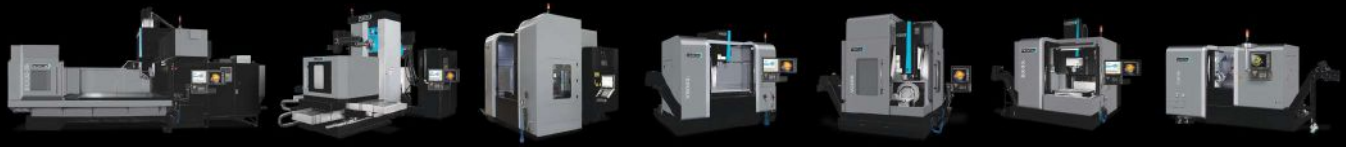
A CONTROL FOR EVERY GENERATION.

NOW WITH 3D SOLID MODEL IMPORT

For over 50 years, Hurco has been empowering machinists of every generation with cutting-edge control technology that's easy to learn and easy to use. See which one of our 65+ models of CNC machines is right for you—rigid and reliable CNC machines equipped with the control that makes shops more productive and more profitable.

NEW! Hurco's 3D Import feature includes 3D DXF technology that now displays all CAD geometry, including splines and Z-depths.

Visit HURCO.com/3DImport



Double Column | **Boring Mills** | **Horizontals** | **3-Axis Vertical** | **5-Axis** | **Double Column Bridge** | **Turning Centers**

Hurco Companies, Inc. | One Technology Way | Indianapolis, IN 46268 | 800.634.2416 | info@hurco.com | HURCO.com | Machines shown with options. Information may change without notice.

Streamlining Your Investment Plans

A wise mold builder recently said, "Technology is how you make money. We can't do what we do with old technology." And it is with that in mind that I present to you *MoldMaking Technology's 2019 Technology Review and Sourcing Guide.*

This annual directory takes an accurate, comprehensive, easy-to-read and use approach to displaying data on current equipment, products and services, simplifying a mold builder's decision-making process when evaluating technology and relevant suppliers *before* making the investment.

Let's face it, this stuff is expensive, and it's often difficult to keep up with the capital investments needed, so we want to help ease the burden a bit by equipping you with information that can quickly connect you with the technology experts.

Our printed guide and online database offer more than 1,000 manufacturers, distributors and suppliers for more than 200 product and service categories that you employ daily. To keep this information current, *MoldMaking Technology* surveys and updates its supplier database every spring with the latest company contact information and product/service offerings.

This month's *Technology Review and Sourcing Guide* includes a portion of that database alongside special tips, features and technology reviews published throughout the past year. The format includes key supplier profiles preceding a sourcing grid tailored to match suppliers with their respective product/service offerings (*advertisers are noted in boldface type*), followed by technical product and service reviews, tips and features.

The past year's moldmaking product developments within mold engineering/design, build and maintenance/repair are organized into the following 10 sections: software, additive manufacturing, mold materials, hot runners, mold components, cutting tools, machining, EDM, inspection/measurement and mold maintenance, repair and surface treatment.

The data within this year's condensed grids appears in its entirety online at moldmakingtechnology.com/suppliers. We encourage you to continue your search for even more of the latest in supplier and product information by visiting the various zones at moldmakingtechnology.com.

We hope this annual guide provides you with some investment insight during your decision-making process. Please contact us via e-mail at cfuges@gardnerweb.com with any comments or feedback. MMT

Christina Fuges

Christina M. Fuges
Editorial Director

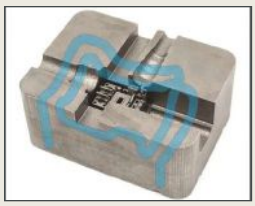
Follow MMT on: Follow @MMT_ChristinaF

THIS MONTH ON moldmakingtechnology.com

SUPPLIERS

Browse our entire database of moldmaking suppliers at moldmakingtechnology.com/suppliers. You can search by company name or by product category name, including automation, CAD/CAM, cutting tools and toolholders, EDM, hot runner systems, inspection/measurement, machining centers, mold components, mold maintenance, repair and surface treatment, mold materials, molds/tools/dies and additive manufacturing.

NEW PRODUCTS



At moldmakingtechnology.com/products/new you can access hundreds of product announcements provided to us by companies. Browse the most recent write-ups or search by category to keep up on what's currently on the market.

ZONES

Visit moldmakingtechnology.com/zones to view a special area of *MoldMaking Technology* online where you'll be able to find deep collections of information on technology-specific suppliers, products and other important business and management topics, which includes past *MoldMaking Technology* articles relevant to the topic, products and suppliers. Plus, you can search articles within each zone for more specific information.

- Additive Manufacturing
- Automation
- Software
- CAD for Die/Mold
- ERP Management & Related Software
- Cutting Tools
- EDM
- Hot Runners
- Inspection/Measurement
- Machining
- CNC and Machine Controls
- Mold Components
- Mold Maintenance & Repair
- Mold Materials
- Surface Treatment
- Business Strategies
- The Next Generation

MMT
MoldMaking TECHNOLOGY®

July 2019 Volume 22 / Number 7

For more product and supplier information, visit moldmakingtechnology.com.




Cover images (left to right) courtesy of TopSolid/Missler Software Inc., CNC Software Inc., Moldtrax and Omega Tool Inc.

GARDNER Business Media, Inc.

6915 Valley Avenue
Cincinnati OH 45244-3029
P 513-527-8800
Fax 513-527-8801
gardnerweb.com
moldmakingtechnology.com

Subscription Inquiries:
For questions or issues related to your subscription, please call 513-527-8800 or email subscribe@moldmakingtechnology.com

ALSO PUBLISHER OF

- *Modern Machine Shop*
- *Products Finishing*
- *Plastics Technology / PT Handbook*
- *Production Machining*
- *CompositesWorld*
- *Additive Manufacturing*
- *IMTS Directory*
- *Products Finishing Directory*
- *NPE Official Show Directory*
- *Automotive Design & Production*
- *Modern Machine Shop Mexico*
- *Products Finishing Mexico*
- *Techspex*

MoldMaking Technology (ISSN 1098-3198) is published monthly and copyright © 2019 by Gardner Business Media Inc. 6915 Valley Ave., Cincinnati, OH 45244-3029. Telephone: (513) 527-8800. Printed in U.S.A. Periodicals postage paid at Cincinnati, OH and additional mailing offices. All rights reserved.

POSTMASTER: Send address changes to *MoldMaking Technology* Magazine, 6915 Valley Ave., Cincinnati, OH 45244-3029. If undeliverable, send Form 3579.

CANADA POST: Canada Returns to be sent to IMEX Global Solutions, P.O. Box 25542, London, ON N6C 6B2. Publications Mail Agreement #40612608.

THE COMPETITIVE ADVANTAGE FOR U.S. MOLD BUILDERS.

American Mold Builders Association
7321 Shadeland Station Way, #285
Indianapolis, IN 46256

Phone: 317-436-3102
Fax: 317-913-2445

AMBA.org

PRODUCTS/SERVICES

Workforce Development

Through workforce development and recruitment, the AMBA provides tools, resources and information to attract, train, develop and retain top mold building talent. Resources offered include specialized pages on the AMBA website, such as recruitment tools, an area dedicated to developing a career in mold building and a resume posting page, as well as industry-wide scholarships and an AMBA-certified Skills Certification Program.

Strategic Networking

AMBA offers many strategic networking opportunities for both members and non-members, which drive high-impact takeaways that manufacturers can take back and implement in their businesses. Through opportunities such as the annual AMBA conference, plant tour workshops, industry-specific webinars, the members-only AMBA Discussion Forum and virtual peer networking sessions, members can find meaningful ways to engage and connect with one another.

Benchmarking and Publications

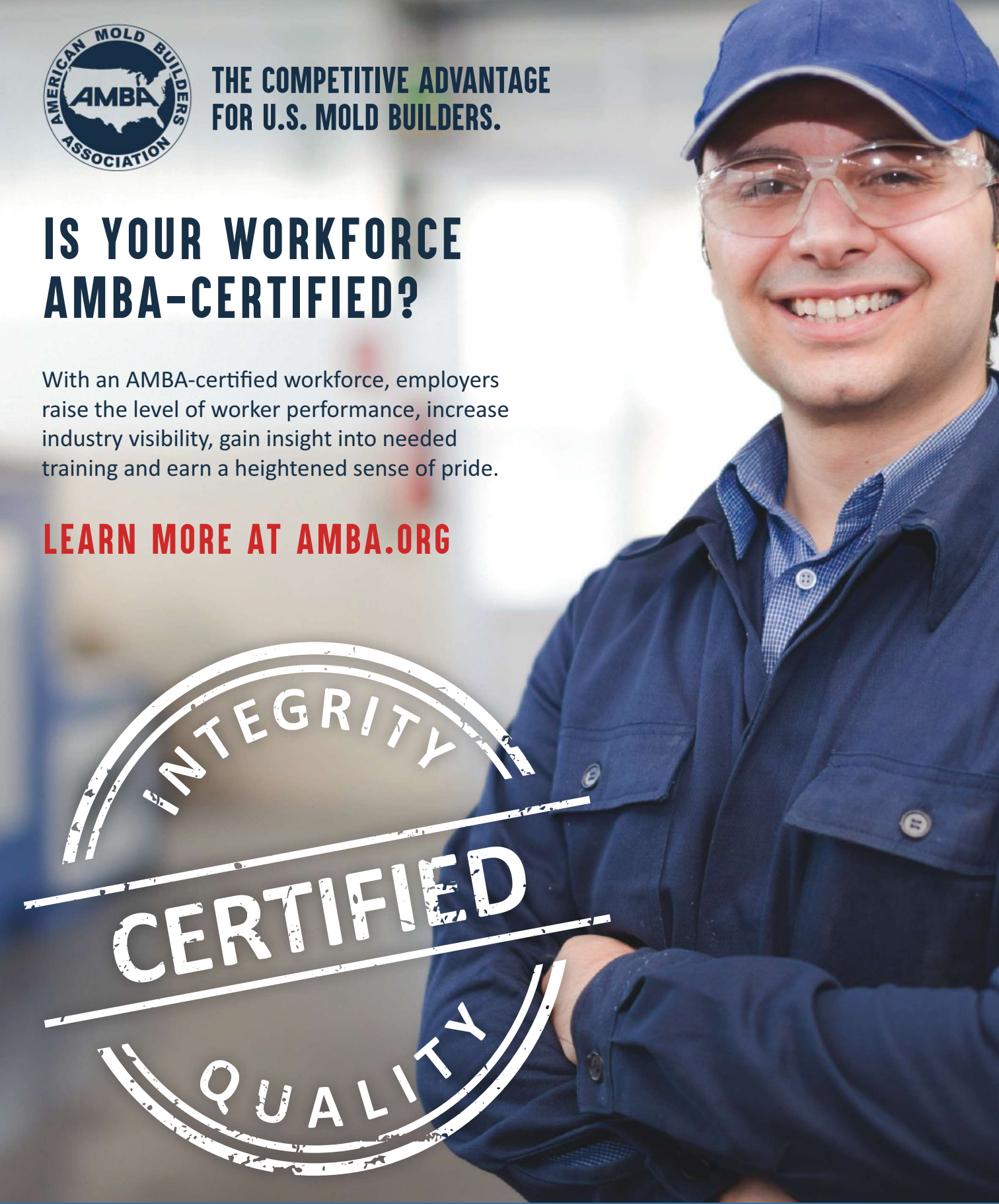
By identifying best practices and benchmarking standards, AMBA empowers mold manufacturers with the most up-to-date data and industry news. Through publications like *The American Mold Builder*, online resources such as the americanmoldbuilder.com and popular benchmarking reports, including the annual *Wage and Benefits* and *Business Forecast* reports, AMBA provides access to knowledge that its members use to impact their bottom line.

WEBSITE

The American Mold Builders Association is dedicated to elevating the competitive advantages of U.S. mold builders. Through varied resources, such as workforce development initiatives, strategic networking, benchmarking reports and industry publications, AMBA provides its members with the tools they need to impact the bottom line.

PRODUCT CATEGORIES

- **Find a Mold Builder (online search tool)**
- **Annual AMBA Conference**
- **Plant Tour Workshops**
- **Virtual Peer Networking**
- **Benchmarking Reports**
- **Industry Scholarships**
- ***The American Mold Builder* magazine**
- **Cost-Reduction Programs**
- **Recruitment Tools**


AMERICAN MOLD BUILDERS ASSOCIATION
AMBA
THE COMPETITIVE ADVANTAGE FOR U.S. MOLD BUILDERS.
IS YOUR WORKFORCE AMBA-CERTIFIED?
With an AMBA-certified workforce, employers raise the level of worker performance, increase industry visibility, gain insight into needed training and earn a heightened sense of pride.
LEARN MORE AT AMBA.ORG
INTEGRITY
CERTIFIED
QUALITY
GET THE COMPETITIVE ADVANTAGE FOR YOUR COMPANY.
AMBA.ORG | INFO@AMBA.ORG | 317.436.3102

MMT

ENGINEER / BUILD / MAINTAIN

WHY BECOME A LEADTIME LEADER?

MoldMaking TECHNOLOGY®

The Leadtime Leader Awards, presented by *MoldMaking Technology*, honor those outstanding North American mold manufacturers who best demonstrate overall innovation, efficiency, quality and commitment within their moldmaking operations while raising the bar in terms of mold engineering, building, repair and management.

By entering your business into *MoldMaking Technology's* annual Leadtime Leader Awards competition, you'll gain industry recognition, build brand awareness, attract new customers, boost morale in the shop and distinguish your shop as an industry leader.

Winners Earn These Benefits:

- A feature in *MoldMaking Technology*
- A video feature on moldmakingtechnology.com
- A special, targeted advertising program with *Plastics Technology*
- A complementary 10' x 10' booth space at Amerimold 2020, on June 10-11, 2020 in Novi, MI
- *And much more!*

How becoming a Leadtime Leader impacted our past winners:

"Becoming a MoldMaking Technology *Leadtime Leader really shows the industry that change is good. Teamwork is essential, and new technology wins the race. Being recognized as the industry leader by* MoldMaking Technology *has resulted in a noticeable boost in employee morale and has presented opportunities that may not have been available to us prior to the win."*

Brian Bendig, President, Cavalier Tool & Manufacturing

"Winning the Leadtime Leader Honorable Mention Award was an honor for the entire Dynamic team. We have worked hard and will continue to do so to differentiate ourselves in this highly competitive market with technology, customer service and our dedicated team of employees."

David Miller, President, Dynamic Tool & Design

NOMINATE YOUR SHOP TODAY AT

short.moldmakingtechnology.com/leader

PRESENTED BY:

MoldMaking TECHNOLOGY®

SPONSORED BY:

PT Plastics Technology

amerimold The Event for Mold Manufacturing 2020

For complete information, eligibility requirements and nomination forms, please visit short.moldmakingtechnology.com/leader, or contact Editorial Director Christina Fuges at cfuges@gardnerweb.com or at (513) 338-2187

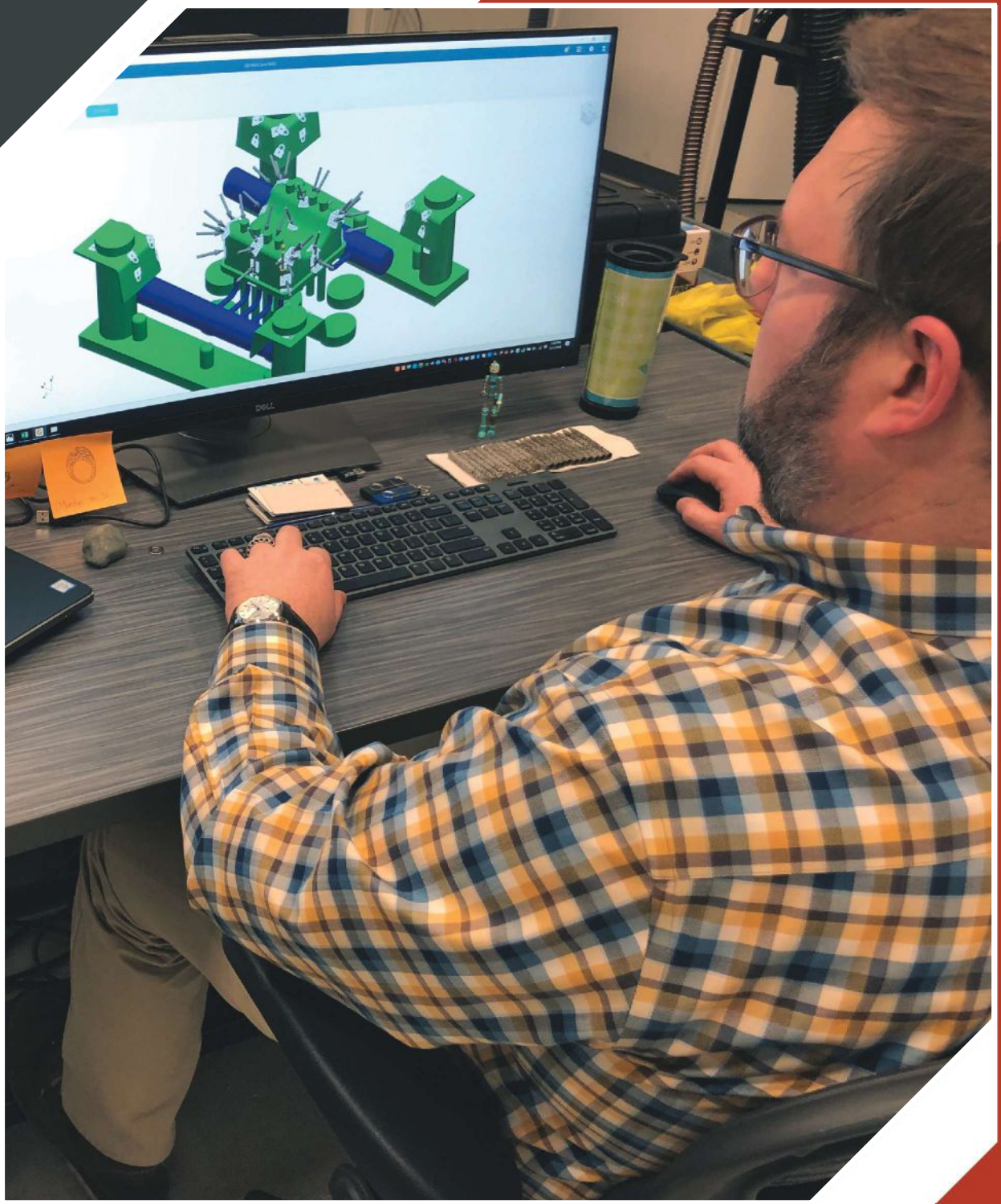
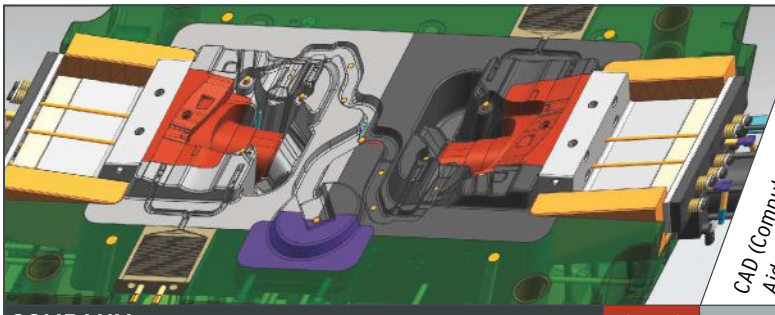


Image courtesy of Next Chapter Manufacturing.



COMPANY Advertisers are listed in bold type.	See Ad	Design: 1 CAD (Computer Aided Design)	2 CAE (Computer Aided Engineering)	3 CAM (Computer Aided Manufacturing)	4 CIM (Computer Integrated Manufacturing)	5 Mold Design Services	6 Mold Flow and Simulation Services	7 Reverse Engineering Software
3D Systems - Cimatron Software – Novi, MI, 248-596-9700		1		3				
Autodesk – San Rafael, CA, 415-507-5000		1	2	3				
Beaumont Technologies, Inc. – Erie, PA, 814-899-6390			2			5		
BobCAD-CAM – Clearwater, FL, 727-442-3554		1		3				
CAE Services Corporation – Batavia, IL, 630-761-9898			2			5		
CAM-Tool by CGS North America, Inc. – Oldcastle, ON, 519-737-6009		1		3				
CAMWorks/Geometric Americas, Inc. – Scottsdale, AZ, 480-367-0132		1	2	3	4			
CGTech – Irvine, CA, 949-753-1050		1	2	3				
Creative CNC LLC – Hartland, WI, 262-347-3939		1		3				
Dassault Systemes – Waltham, MA, 781-810-5011		1	2	3				
DME/Milacron – Madison Heights, MI, 248-398-6000	**Back Cover**						**6**	
DZynSource LLC – East Killingly, CT, 860-933-2917		1	2					
Edgecam – Forest Lake, MN, 866-334-3226		1		3				
Epicor Software Corporation – Austin, TX, 512-328-2300								
ESPRIT by DP Technology – Camarillo, CA, 805-388-6000		1	2	3	4			
GibbsCAM by 3D Systems – Moorpark, CA, 805-523-0004		1		3				
JDL Technical Services – LaSalle, ON, 519-919-7391								
JobBoss – Bloomington, MN, 800-777-4334		1						
Kubotek3D – Marlborough, MA, 508-229-2020		1		3				7
Master3DGage by Verisurf – Anaheim, CA, 714-970-1683		1		3				7
Mastercam / CNC Software – Tolland, CT, 860-875-5006		1	2	3				7
Moldex3D, EPS FloTek – Naperville, IL, 630-778-7773		1	2	3	4			
MoldTrax LLC – Ashland, OH, 419-291-0790								
OPEN MIND Technologies USA Inc. – Needham, MA, 339-225-4557		1		3				
Siemens PLM Software – Plano, TX, 800-498-5351		1	2	3				7
Sigma Plastic Services Inc. – Schaumburg, IL, 847-558-5600			2					
SIMCON – Weursele, Germany, +49 2405 645710						5		
Smart Attend Inc. – Aurora, ON, Canada, 866-210-9630								
SolidCAM Inc. – Newtown, PA, 866-975-1115		1	2	3				
SpaceClaim Corp. – Concord, MA, 978-482-2100		1	2	3				
Surfcam – Thousand Oaks, CA, 818-991-1960		1		3				
Synergetic Eng. & Manufacturing Services – Windsor, ON, 519-903-0303		1	2	3		5		7
Tebis America Inc. – Troy, MI, 248-524-0430		1		3				7
TopSolid / Missler Software, Inc. – Lombard, IL, 630-889-8055		1	2	3	4	5		
TST Tooling Software Technology, LLC – Clarkston, MI, 248-922-9293		1	2	3		5		7
Verisurf Software, Inc. – Anaheim, CA, 714-970-1683		1		3	4			7
VISI by Vero Software – Clarkston, MI, 248-922-9293		1	2	3		5		7
Volume Graphics Inc. – Charlotte, NC, 704-248-7736								
WorkNC – Southfield, MI, 248-351-9300		1		3	4			
XMD - Expert Mold Designer Software – Windsor, ON, 519-903-0303		1	2	3		5		

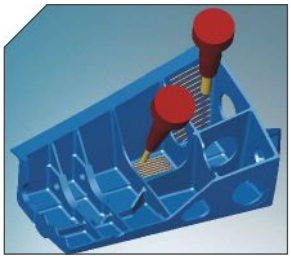
For more supplier listings, go to moldmakingtechnology.com/suppliers.

	Manufacturing Software					Other Software						
	CNC Software	Coordinate Measuring Machine (CMM) Software	Manufacturing Automation Software	NC Simulation and Verification Software	Data Management Software	Data Translation Software	Mold Flow and Simulation Software	Mold Quoting Software	Production/Inventory Control Software	Scheduling Software	Shop Floor/Plant Layout Software	
	8	9	10	11	12	13	14	15	16	17	18	WEBSITE
				11			14					cimatron.com
			10	11	12	13	14				18	autodesk.com
							14					beaumontinc.com
												bobcad.com
							14					caeservices.com
												camtool.com
				11		13						camworks.com
				11	12		14					cgtech.com
	8											creativecnc.met
				11	12	13	14					solidworks.com
												dme.net
					12			15				dzynsource.com
			10	11								edgecam.com
					12							epicor.com
				11								espritcam.com
	8			11		13						3dsystems.com/gibbscam
			10		12			15	16	17		JDLTech.ca
			10		12				16	17	18	jobboss.exactamerica.com
						13						kubotek3d.com
		9	10			13						verisurf.com
	8		10	11								mastercam.com
							14					epsflotek.com
	8				12							moldtrax.com
				11								openmind-tech.com
		9		11	12	13	14	15			18	siemens.com/plm
							14					virtualmolding.us
							14					simcon-worldwide.com
			10		12				16			smartattend.com
				11								solidcam.com
												spaceclaim.com
			10	11								surfcam.com
				11		13						synergeticgroup.com
				11	12	13						tebis.com
						13						topsolid.com
	8	9		11	12	13	14	15		17		tst-software.com
		9				13						verisurf.com
			10	11	12	13	14					visicadcam.com
		9										volumegraphics.com
			10	11	12			15				worknc.com
						13						synergetic-xmd.com

Image courtesy of Maximum Mold Group.

CAM Software Improves Workflow, Enables Machine Simulation

Open Mind Technologies's HyperMill CAM software includes greater blending capabilities, 3D-optimized roughing and finishing, global fitting, rotational abilities for CAD electrode applications and virtual machining simulation.



Virtual machining enables real-time communication between the machine tool controller and a remote simulation, which improves workflow. For 3D Z-level Shape Finishing, the Automatic Face Extension capability can be used to extend selected milling surfaces, reducing the need to modify the milling faces. Barrel cutters can also be used for 3D Z-level Shape Finishing. 3D Optimized Roughing improves machining when using free tool geometries. The Maxx Machining finishing module enables the use of conical barrel cutter technology to reduce machining cycle times. It is suitable for planar, ruled and curved surfaces found in five-axis components. The module offers functions for finishing, roughing and drilling.

Open Mind Technologies USA Inc. / 888-516-1232 / openmind-tech.com

Software Update Ensures High-Quality Finishes

CGS North America releases an updated version of CAM-TOOL, V15.1, a CAD/CAM system corresponding to five-axis machining centers for molds and dies. In this version, a five-axis conversion algorithm significantly decreases the occurrence of inefficient interference avoidance or warning exit by interference by automatically calculating un-interfered fixed tilt angles on simultaneous five-axis automatic conversion function. Simultaneous five-axis auto is to ensure high-quality finished surfaces through heightening machining accuracy by minimizing sudden interference avoidance actions and the number of axes that move at the same time. Users can create high precision and high efficiency five-axis machining data optimized with this algorithm by choosing an angle value that indicates interference avoidance.

CGS North America / 519-737-6009 / cgsinc.com

Software Platform Updates Provide Improved Functionality

Version 2018 R2 of the Visi software platform from **Vero Software** provides a module for reverse engineering, along with improvements for CAD and CAM processes. The platform is useful for the mold and die market.

The reverse engineering modules enable loading of a points cloud and the relative mesh created by setting different options for refining and smoothing.

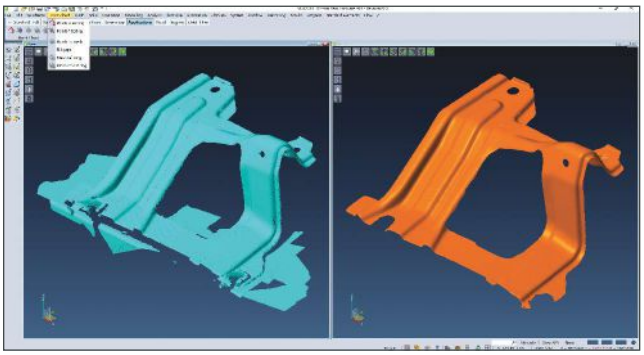
The platform contains almost 250 new items, including updates to direct-modeling capabilities that provide additional editing for both solids and surfaces.

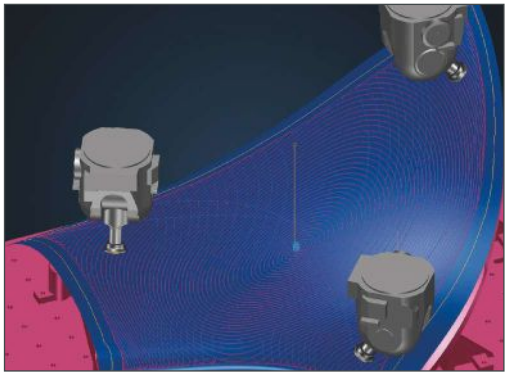
The Edit Face module provides the ability to edit solid bodies by moving or pulling selected faces. Concentric faces can be automatically selected and edited as well. Enhancements to both Surface Extension and Fill Holes enables the user to work directly on a solid body's faces and not just on the surfaces, which saves time.

Toolpath Mirroring copies the current project, mirroring all its toolpath operations. This can be achieved on any two-axis, three-axis, 3+2-axis, four-axis or five-axis toolpath. Improved workplane management, improved face selection on solids, and new contextual toolbars are additional features.

Workplane management eases use as a workplane is automatically orientated as soon as the desired face of a solid is selected during any operation. Updates to the faces selection tool enables matching faces to be selected by providing specific conditions such as planar, cylindrical and fillet face types, along with radius condition, orientation and colors.

Vero Software / 855-443-9638 / verosoftware.com





CAD/CAM Software Optimizes Five-Axis Milling

Version 4.0 of **Tebis America**'s CAD/CAM software provides optimized functions in five-axis simultaneous milling. Features include adaptive and contour parallel roughing strategies, simple machining of connected milling areas in isoparametric surface layout, and integrated tilt direction preview when milling between vectors.

The company is also displaying its ProLeis Manufacturing Execution System (MES) for single-part manufacturing. The system's comprehensive data management, manufacturing planning and manufacturing control functions enable effective control of all individual parts for dies and injection molds at all stages of production.

Tebis America Inc. / 248-524-0430 / tebis.com

Redesigned Chucks Connect to Smartphones Via Bluetooth

Erowa's SmartChucks line has been redesigned to combine precision and stability with wireless signal transmission. The design includes an integrated LED strip that displays the status of the chuck while in operation. It is able to indicate if the chuck is open, closed, improperly clamped or has insufficient clamping force. This functionality enables an operator to check the status at a glance.

The company has also developed a mobile app that compliments the chucks, which is said to retrieve clamping equipment data on a smartphone. Status requests and additional information regarding the life-cycle can be checked at any time via Bluetooth technology.

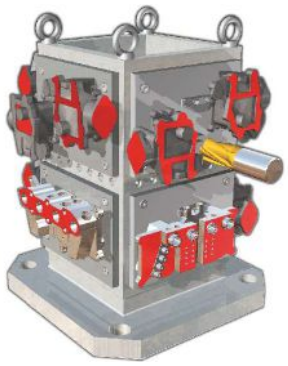
Erowa Technology Inc. / 800-536-4894 / erowa.com

CNC Interface, Workholding System Integrate Automation

VersaBuilt, with **Universal Robots**, offers two products for collaborative robot and CNC integration: the CNC Communication URCap interface and MultiGrip workholding system. The URCap interface supports UR cobots executing any machining program stored on the CNC directly through the cobot's teach pendant. The interface maintains all Haas safety interlock features and works with Haas, VersaBuilt and other third-party automatic door openers. The MultiGrip workholding system includes an automatic vise, machinable jaws and an end-of-arm tool for UR robots. The system enables robot and CNC to share a set of MultiGrip machinable jaws, resulting in reduced engineering costs, easier robot programming, faster setup time, and enhanced processing capabilities.

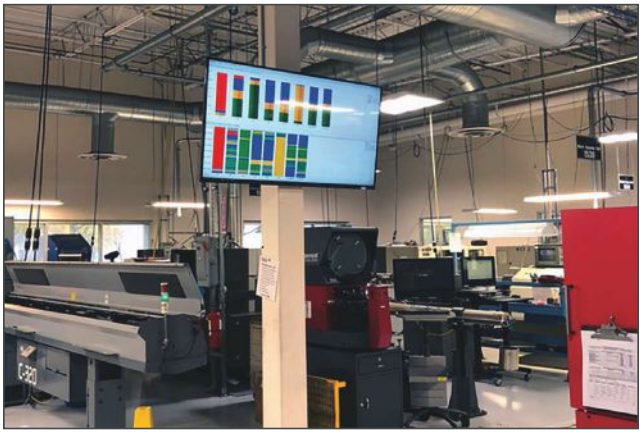
Universal Robots USA, Inc. / 631-610-9664 / universal-robots.com

CAM Software Improves Productivity, Extends Tool Life



Missler Software has launched version 7.12 of its TopSolid'Cam CAD/CAM software. The software offers features aimed at reducing production times and features several improvements over previous versions. Barrel cutter tool paths facilitate efficient programming. The Dynamic Machining module for turning and milling is said to reduce cycle times, extend tool life and lessen machining malfunction. Improved algorithms enable users to spend less time in the modeling phase. The software also provides the ability to machine a group of parts in a single program.

Missler Software - TopSolid / 630-889-8055 / topsolid.com



Software's Data Collection Reduces Machine Downtime

Version 2018.04.10 of the DataXchange software from **Shop Floor Automations** offers several improvements over previous versions. The software's Data Entry screen provides operators with an interface to track machine downtimes and includes a "notes" field to alert others on the shop floor of critical actions. This notification system reduces downtime.

An E-Learning program enables users to take online courses. Configuring reporting options, software installation, initial configuration, shift options, modifying existing machine data and understanding the machine data collection sources are some of the topics covered. The classes are a combination of videos and text modules with a quiz at the end of each lesson. The program is accessible for 12 months. Courses can be repeated for refreshers, and unlimited users have access to the program with one username and password.

In addition, the software gives users the option of monitoring machine data on-site or from the cloud. Text and email notifications alert users to machine issues. It is compatible with MTConnect, OPC UA, FANUC Focas and ModBus.

Shop Floor Automations / 877-611-5825 / shopfloorautomations.com

How to Implement **CAM Software**

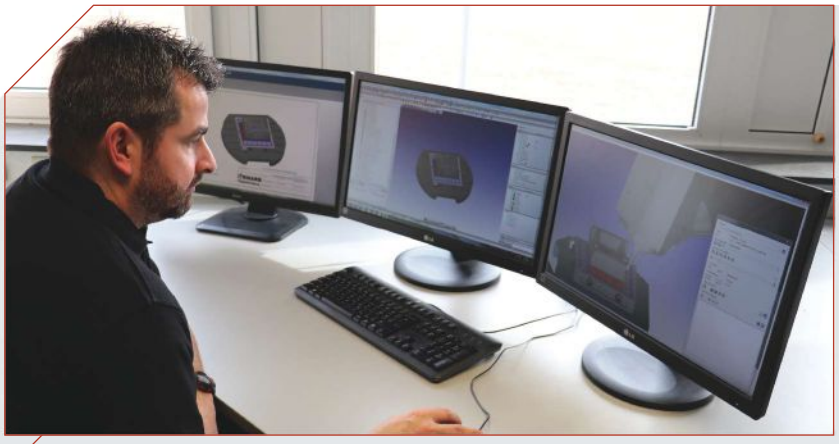


Image courtesy of Knarr Group.

New software implementation requires management support, out-of-pocket costs and labor planning.

By Alan Levine

Every new technology has a learning curve. For example, properly implementing CAM software poses challenges. When the implementation is done improperly, it can hinder a shop from moving forward technologically. If unable to navigate the implementation, the shop owner faces potential stagnation by staying with existing technology. These challenges are more prevalent in small and medium-sized shops that may not have the formal business processes and labor support to manage the transition to new technology easily. However, shops can overcome these challenges.

New software technology implementation requires management support, out-of-pocket costs and labor planning. The shop should manage and track this implementation as another project, requiring labor and machine allocation. In the short term, a loss of billable time from the machine tool is possible. The owner should only move forward with new software implementation if he or she can realize a return on investment over a defined period. Large capital investment may require a return that is measured in a few months or as long as a few years. Smaller items or more focused productivity improvements can sometimes generate ROI over one subsequent project.

Also, shops can attribute labor savings or machine savings to fundamental components of cost recapture. Other savings and return to the business may be from shorter delivery times or larger part volumes, the ability to win more orders and the ability to win more complex orders that come with higher shop rates.

Reducing Risk

Ultimately, risk is the key factor to manage during a transition. Risk is associated with unknown variables or those that are hard to measure. Risk can lead to indecision. For a business plan with a projected return on investment, reducing risk can be identified by asking, "What is the probability that the shop will achieve the business plan?"

Here are some pointers for reducing risk:

- *Plan for sufficient training*. This can be standard classroom training or e-training, but often, hands-on custom training will have a more direct impact.
- *Enable workers to use new software*. Consider uninstalling the previous software program—even if temporarily—to give the programmer a clear management statement to support the workflow change.
- *Focus the implementation on manageable tasks*. Start with one project on one machine, and with one or two employees. Later, expand on the best approaches for the entire shop.
- *Build long-term support structures.* This includes a tool database and a programming macro database. Look for other opportunities to automate regular tasks. This will save time on future work and instill a culture of adhering to work standards.
- *Acknowledge the risk of post-processor development and implementation*. Not all post-processor suppliers are the same. Find a software developer whose process is supported by a pool of similar successful implementations. Seek a test of the machine performance. Define change requests as functional or cosmetic. Test in all conditions, including 2D, 3D, indexing, five-axis, canned cycles, turning and so on.
- *Use machine simulation to ease implementation*. It can be a means to confirm new processes without tying up machining production.

While the short-term solution may favor maintaining the status quo or adding new, trained staff on the current software product, the best long-term answer is often to invoke change. Following a training and implementation period, new software technology can provide a strong return to the business and be key to long-term success. MMT

CONTRIBUTOR

Alan Levine is managing director of Open Mind Technologies USA Inc.

FOR MORE INFORMATION

Open Mind Technologies USA Inc. / 888-516-1232 / openmind-tech.com

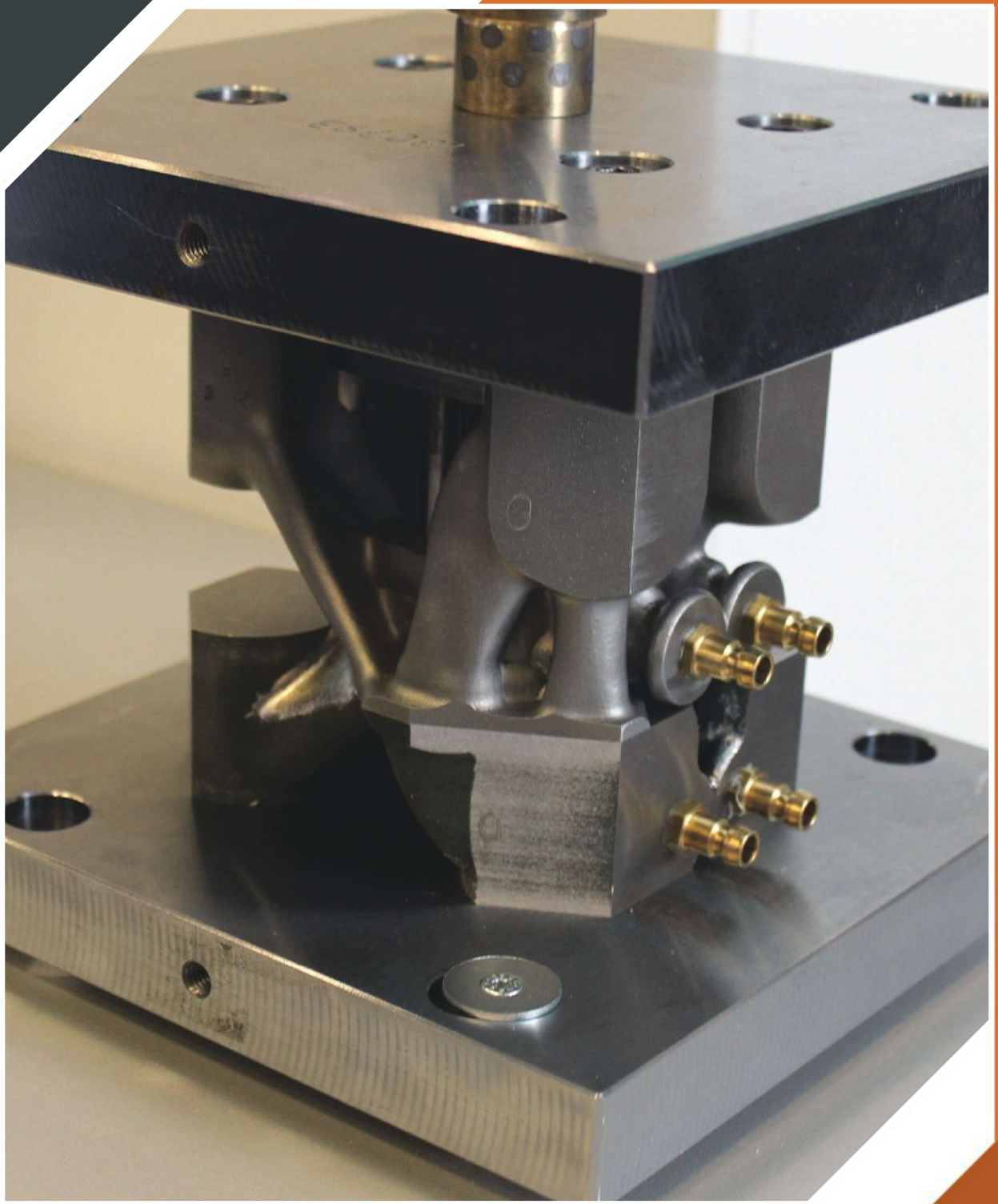


Image courtesy of Barbara Schulz.

COMPANY Advertisers are listed in bold type.	See Ad	1 Additive Manufacturing Machines- Binder Jetting	2 Additive Manufacturing Machines- Directed Energy Depostion	3 Additive Manufacturing Machines- Material Extrusion	4 Additive Manufacturing Machines- Material Jetting	5 Additive Manufacturing Machines- Powder Bed Fusion	6 Additive Manufacturing Machines- Vat Polymerization	7 Additive Manufacturing Machines for Ceramic Parts	8 Additive Manufacturing Machines for Composite Parts	9 Additive Manufacturing Machines for Metal Parts
3Dprintedparts.com – Grand Rapids, MI, 616-871-9889					4	5	6			
3D Hybrid Solutions – Seal Beach, CA, 309-264-4834			2							9
3D Systems – Rock Hill, SC, 803-326-3900							6			
Absolute Machine Tools Inc. – Lorain, OH, 440-960-6911										
AddiFab ApS – Jylinge, Hovedstaden, DK, 45 2 6803 210							6			
AddUp Inc. – Greenville, SC, 240-707-9147			2			5				9
ARBURG, Inc. – Rocky Hill, CT, 860-667-6500				3						
ARCAM EBM – Molndal, Sweden, 46 31 710 32 00		1	2			5				9
Baker Industries – Macomb, MI, 586-286-4900										
BeAM Machines – Cincinnati, OH, 513-745-4510			2							9
Centorr – Nashua, NH, 800-962-8631										
CGTech – Irvine, CA, 949-753-1050										
Concept Laser – Grapevine, TX, 817-328-6500			2			5				
DMG MORI – Hoffman Estates, IL, 847-593-5400			2				6			9
EnvisionTEC – Dearborn, MI, 313-436-4300							6	7	8	
EOS North America – Novi, MI, 877-388-7916						5				9
Evolve Additive Solutions – Minnetonka, MN, 952-314-2161										
ExOne – North Huntingdon, PA, 724-863-9663		1						7		9
Formlabs – Somerville, MA, 617-702-8476										
GF Machining Solutions – Lincolnshire, IL, 847-913-5300						5				9
GPI Prototype & Manufacturing Services, Inc. – Lake Bluff, IL, 847-615-8900						5				9
Linear AMS – Livonia, MI, 734-422-6060										
Mazak Corporation – Florence, KY, 859-342-1700										
Met-L-Flo Inc. – Sugar Grove, IL, 630-409-9860										
Methods 3D, Inc. – Sudbury, MA, 978-443-5388						5	6		8	9
O.R. Lasertechnologies GmbH – Dieburg, Germany, +49 6071 209 890			2			5				
Proto Labs, Inc. – Maple Plain, MN, 763-479-3680										9
Renishaw Inc. – West Dundee, IL, 847-286-9953			2							9
Roland DGA Corp. – Irvine, CA, 949-727-2100										
SARATECH – Mission Viejo, CA, 949-481-3267				3		5	6		8	9
Sciaky, Inc. – Chicago, IL, 708-594-3800			2							9
SLM Solutions NA, Inc. – Wixom, MI, 248-243-5400						5				9
Sodick, Inc. – Schaumburg, IL, 847-310-9000	**97**					**5**				**9**
Star Rapid Ltd. – Guangdong, China, +86 760 2222 255							6			
Stratasys Direct Manufacturing – Valencia, CA, 661-295-4400							6			
Stratasys Inc. – Eden Prairie, MN, 800-937-3010				3	4				8	
Trumpf Inc. – Farmington, CT, 860-255-6000			2							
voestalpine High Performance Metals Corp. – Elgin, IL, 630-883-3000										
voxeljet AG – Friedberg, Germany, 49 821 7483 100										
Xometry – Gaithersburg, MD, 240-252-1138		1		3						9

For more supplier listings, go to moldmakingtechnology.com/suppliers.

Additive Manufacturing Machines for Polymer Parts	Hybrid Additive Manufacturing Machines	Material for Additive Manufacturing-Ceramics	Material for Additive Manufacturing-Composites	Material for Additive Manufacturing-Metal	Material for Additive Manufacturing-Polymer	Material-Handling Equipment for Additive Manufacturing	Part & Tooling Production Services-Additive Manufacturing	Postprocessing Equipment for Additive Manufacturing	Safety Equipment for Additive Manufacturing	Software for Additive Manufacturing-Job & File Management	Software for Additive Manufacturing-Part Design	Training and Consultancy Services-Additive Manufacturing	WEBSITE
10	11	12	13	14	15	16	17	18	19	20	21	22	
10				14	15		17					22	3dprintedparts.com
	11												3dhybridsolutions.com
				14	15		17						3dsystems.com
	11												absolutemachine.com
10				14	15								addifab.com
				14			17		19			22	addupsolutions.com
10													arburg.us
				14									arcam.com
							17						bakerindustriesinc.com
													beam-machines.com
								18					vacuum-furnaces.com
										20			cgtech.com
													conceptlaserinc.com
	11			14		16	17	18		20	21	22	dmgmori.com
													envisiontec.com
10				14	15	16						22	eos.info
10					15								evolveadditive.com
							17						exone.com
10		12											formlabs.com
													gfms.com/us
							17						gpiprototype.com
							17						linearmold.com
	11												mazakusa.com
							17						metlflo.com
													methods3d.com
	11												or-laser.com
10			13	14			17						protolabs.com
													renishaw.com
				14	15								rolanddga.com
10			13	14	15		17			20	21	22	saratech.com
							17						sciaky.com
				14									slm-solutions.us
													sodick.com
				14	15		17						starrapid.com
				14	15		17						stratasysdirect.com
10	11		13		15	16	17	18		20	21	22	stratasys.com
													us.trumpf.com
				14									voestalpine.com/highperformancemetals
							17						voxeljet.com
10				14	15								xometry.com

Image courtesy of Bryne Tool & Design.

Hybrid CNC Boosts Multitasking Capability with FSW Technology

Mazak Corp., through its acquisition of MegaStir, adds friction stir welding (FSW) technology to its VTC-300C CNC's multi-tasking capabilities. FSW is a solid-state joining process that uses frictional heat and forging pressure to create full-penetration, defect-free welded joints with greater strength than conventional welding methods. The process, developed by Provo, Utah-based MegaStir, utilizes a non-consumable tool to join two metal plates without melting the workpiece. Commonly considered a forging process, FSW is well-suited for joining alloys with low melting points, including aluminum, copper and brass, among others.

Mazak first collaborated with MegaStir on the development of the Mazak VTC-800 FSW vertical five-axis machining center and they recently introduced the Mazak VTC-300C FSW. Designed and manufactured in Kentucky, the VTC-300C FSW features Mazak's Mazatrol SmoothG CNC, a 40-taper spindle, full traveling-column design and a fixed table for the machining of extremely long and heavy workpieces (or multiple work-holding fixtures). The FSW package adds friction stir welding capability to the spindle via a unique tool holder and includes closed-loop FSW process control as well as FSW programming software that enhances the speed and capability of the process.

Mazak Corporation / 859-342-1700 / mazakusa.com

Industrial-Scale 3D Printer Facilitates Cost-Effective Production

EOS North America's EOS P 500 3D printer is intended for laser sintering applications on an industrial scale. The printer is designed to produce high-quality, cost-effective polymer parts. Its software tools are intended for ease of use. The machine offers materials flexibility with operating temperatures as high as 300°C. Its modular design enables integration with future machine adaptions.

EOS North America / 877-388-7916 / eos.info

Hybrid Machine Fuses Laser Sintering with Milling

Matsuura's Lumex Avance-25 metal laser sintering hybrid milling machine fuses laser sintering with high-speed milling technology. Using 3D data for digital engineering, the machine serves the precision mold and die market. Complex geometries can be fabricated in one piece, shortening lead times and reducing manufacturing costs.

Internal geometry can also be incorporated into molds, such as 3D cooling channels that increase cooling efficiency and enable high-cycle injection molding.

Matsuura Machinery USA Inc. / 651-289-9700 / matsuurausa.com

3D Printers Create High-Performance Parts

Shopware Inc. adds to its Mastercam product line with printers built for the shop floor. MarkForged 3D printers free designers and engineers from long lead times and high costs of traditional manufacturing and machining. Customers can 3D print high-performance parts on-premise in under 24 hours, such as carbon fiber for parts that are as strong as, but lighter than, aluminum.

The company provides shop floor applications, such as soft jaws, end of arm tooling, inspection fixtures and welding fixturing that can fit customers' needs and budgets. They also offer a metal printing line that can be less expensive than alternative metal additive manufacturing technologies or traditional fabrication technologies like machining or casting.

Shopware, Inc. / 847-428-4350 / shopwareinc.com

3D Printer Package Produces Crisp Details

Gesswein & Company introduces Formlabs' Form 3 3D printer package, which produces a smooth surface and crisp detail for general purpose applications from prototyping to capturing small details. The build platform can fit approximately 60 small parts, and the laser spot is 40% more dense and smaller to ensure accurate, repeatable prints. Perpendicular printing provides crisp edges on prints, and soft release from a flexible resin tank enables easy clean up by requiring small and minimal supporting. Resins do not require mixing between every layer, achieving quicker print times depending on item complexity and resin used. Users can export .stl or .obj files from PreForm Software to ready designs for printing. Remote printing enables overnight or out-of-office printing.

The printer package includes a two-year warranty and comes complete with a two-year pro service plan, which includes a customized training session, phone support, hot swap (repair or replacement) and priority email support. It also includes gray resin which is dark, opaque and matte and supports print resolutions of 100, 50 and 25 microns.

Gesswein / 203-366-5400 / gesswein.com

Medium-Format AM Machine Reduces Downtime

Trumpf Inc.'s TruPrint 3000 is a medium-format additive manufacturing machine geared toward the large-scale production of complex metal parts. The machine can make parts from a variety of weldable materials including steel, nickel-based alloys, titanium and aluminum. The machine uses laser metal fusion (LMF) technology and processes parts measuring as large as 300 mm in diameter and 400 mm tall. The laser's beam diameter measures between 100 and 500 microns. The system supports preheat temperatures ranging to 200°C.

The TruPrint 3000 features exchangeable build and powder supply cylinders to enable quick change-over and reduce downtime to as little as 30 min. between build jobs, the company says. The exchangeable cylinders save operators time by enabling them to prepare a new set of supply chambers or unpack a finished build outside of the machine in a separate unpacking station. The system is equipped with two 75-L supply cylinders that contain enough powder to complete an entire manufacturing process.

Trumpf Inc. / 860-255-6000 / trumpf.com

3D Printer Can Run for a Week Hands-Free

Sodick's large-capacity OPM350L metal 3D printer/CNC machining hybrid expands the usable work area over its OPM250L model, and introduces the Material Recovery System (MRS) unit. With the MRS unit in place, the printer can run for a week without any human intervention, the company says, consuming just 30 kg of metal powder. The machine and the MRS unit enable manufacturers to 3D print metal parts nearly 14" in the X, Y and Z axes and machine these surfaces to below 9 root square mean in one setup. With an in-process correction system, the printer can recover from would-be build failures without operator intervention.

Sodick Inc. / 888-639-2325 / sodick.com

3D Printing Platform Enables "High-Speed Digital Molding"

3D Systems's Figure 4 3D printing series consists of Figure 4 Production, Figure 4 Standalone and Figure 4 Modular models. The light-based UV curing process offers reduced production time compared to heat-based curing processes. The platform is said to deliver Six Sigma repeatability (Cpk > 2) across all materials, and data on Figure 4 Production show part-print speeds ranging to 100 mm/hr. The Figure 4 platform uses a process that 3D Systems describes as "high-speed digital molding," providing manufacturers the accuracy, reliability, repeatability and uptime of traditional molding but producing parts without the costs and time-consuming aspects of tooling.

3D Systems / 919-447-8201 / 3dsystems.com

3D Printing Considerations

Photo courtesy of 3DEO.

Parts smaller than a golf ball are typically more cost-effective to 3D print than larger ones, but size is just one consideration. These sample parts were made using a proprietary Intelligent Layering technology.

By Christina M. Fuges

Digging into metal additive manufacturing (AM) quickly reveals how expensive it can be, as some parts produced using incumbent technologies, such as laser sintering and binder jetting, can cost thousands of dollars. If there's one lesson Matt Sand, President of 3DEO, a Los Angeles, California-based metal AM parts supplier, has learned over the last few years, it's that cost is everything when it comes to serial production.

"If you are not cost competitive, you're not at the table," Sand says. So, to get the *total* cost structure down, 3DEO developed an end-to-end manufacturing process around Intelligent Layering, a very low-cost metal additive manufacturing technology the company's founders invented. Based on binder jetting technology, Intelligent Layering uses a proprietary spray system to bind the entire layer, and then uses a CNC end mill to cut the perimeter of the part and any internal features.

Although 3DEO's Intelligent Layering process offers a new take on additive, the company's differentiator is that "we are not trying to sell machines, we're only selling parts," Sand says. The competition for its additive process is not metal 3D printing; it's traditional manufacturing. 3DEO is competing against CNC machining and metal injection molding and is already cost competitive with both of these technologies when it comes to small and complex metal parts, according to Sand.

There are three key factors he considers in determining whether it will be cost-effective to 3D print a given part:

1. Part Size

Is it bigger/smaller than a golf ball? One thing Sand has learned over the last few years is that as part size increases, the cost increases on an exponential curve.

Smaller (golf ball-sized) parts manufactured traditionally are price competitive. However, as the part size starts to reach softball size and greater, the cost skyrockets. It's not uncommon in laser sintering for very large parts to cost $20,000 or more.

2. Assembly

Is the cost of assembly less than the cost of printing a consolidated part? Sand believes there is often a disconnect from reality when it comes to parts consolidation. "For example, a customer wants a five-piece automotive assembly printed as one piece. What they typically overlook is that the cost of the individual components and assembly is still very low," he says. "The total cost of the metal 3D-printed part needs to be less than the total cost of the assembly. Given consolidated assemblies are large, it's usually much more expensive to print versus assemble."

3. Complexity

Does the part have complex features like conformal cooling, and is it likely to require substantial postprocessing? Conformal cooling is a hot trend in additive manufacturing, but 3DEO tries to be realistic with interested customers. The reality is that high-value tools are the best fit, because when it comes to laser sintering (the most common method used to make conformal cooling channels) the cost is high and the after-print surface finish still needs postprocessing.

3DEO's strategy is not to provide the near-net shape component, but instead, provide the block with the channels already created. They focus on where CNC adds value and where 3D printing adds value. 3DEO believes that if you're going to have to finish that block anyway, then there's no point in trying to achieve extremely tight tooling tolerances.

"For example," Sand says, "if the part needs to be a hemisphere, we'll print the block with the internal channels, so the customer can have the conformal cooling, and ship the block to the customer in an unfinished state because they have to machine it anyway. This then brings the cost of the tool from thousands of dollars down to hundreds. If you don't have to achieve extremely tight tolerances, it's a lot less expensive. These tooling inserts can be very low cost from creating internal channels, but still allow the customer to reap the benefit of 3D printing." MMT

FOR MORE INFORMATION

3DEO / 310-694-6847 / msand@3deo.co / www.3deo.co

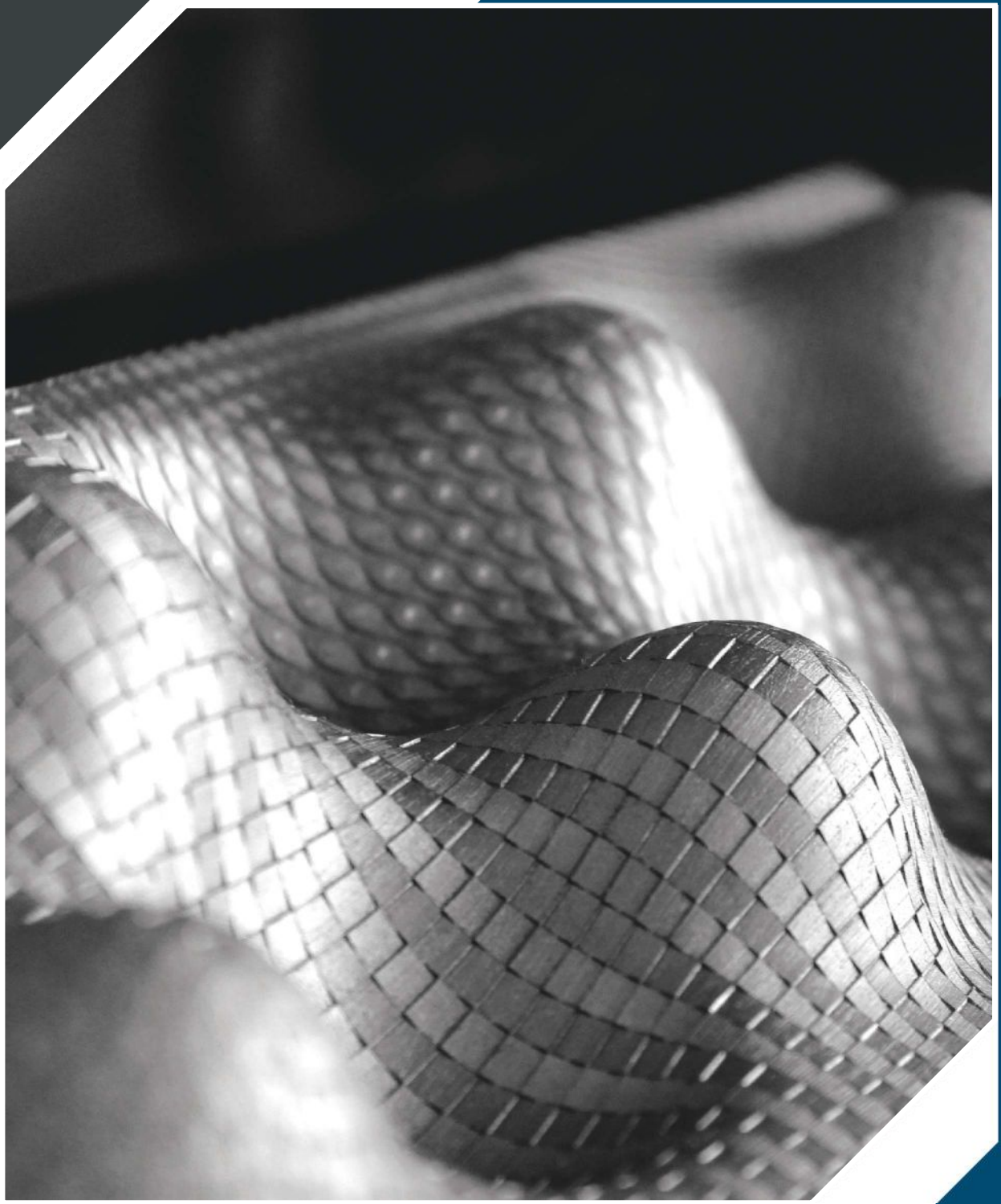


Image courtesy of Reichle Technologiezentrum.

EDRO Engineering and Specialty Steels, Inc.

AS9100D / ISO 9001:2015 CERTIFIED

California / Pennsylvania / Illinois
EDRO EAST 888-368-3376
EDRO WEST 800-368-3376

info@edro.com
edro.com

PRODUCTS/SERVICES

Innovative Tooling Solutions

Specialty Steels, Aluminum, Copper, Custom Mold Bases and PVD/DLC Coatings

EDRO is a leading manufacturer of custom mold bases and specialty steels for the plastics and rubber tooling industries. EDRO also offers a comprehensive line of premium tool steels, aluminum and copper alloys, and PVD/DLC Coatings.

RoyAlloy Stainless Steel

BÖHLER Tool Steels

QC-10 Aluminum

MOLDMAX Mold Alloys

eifeler

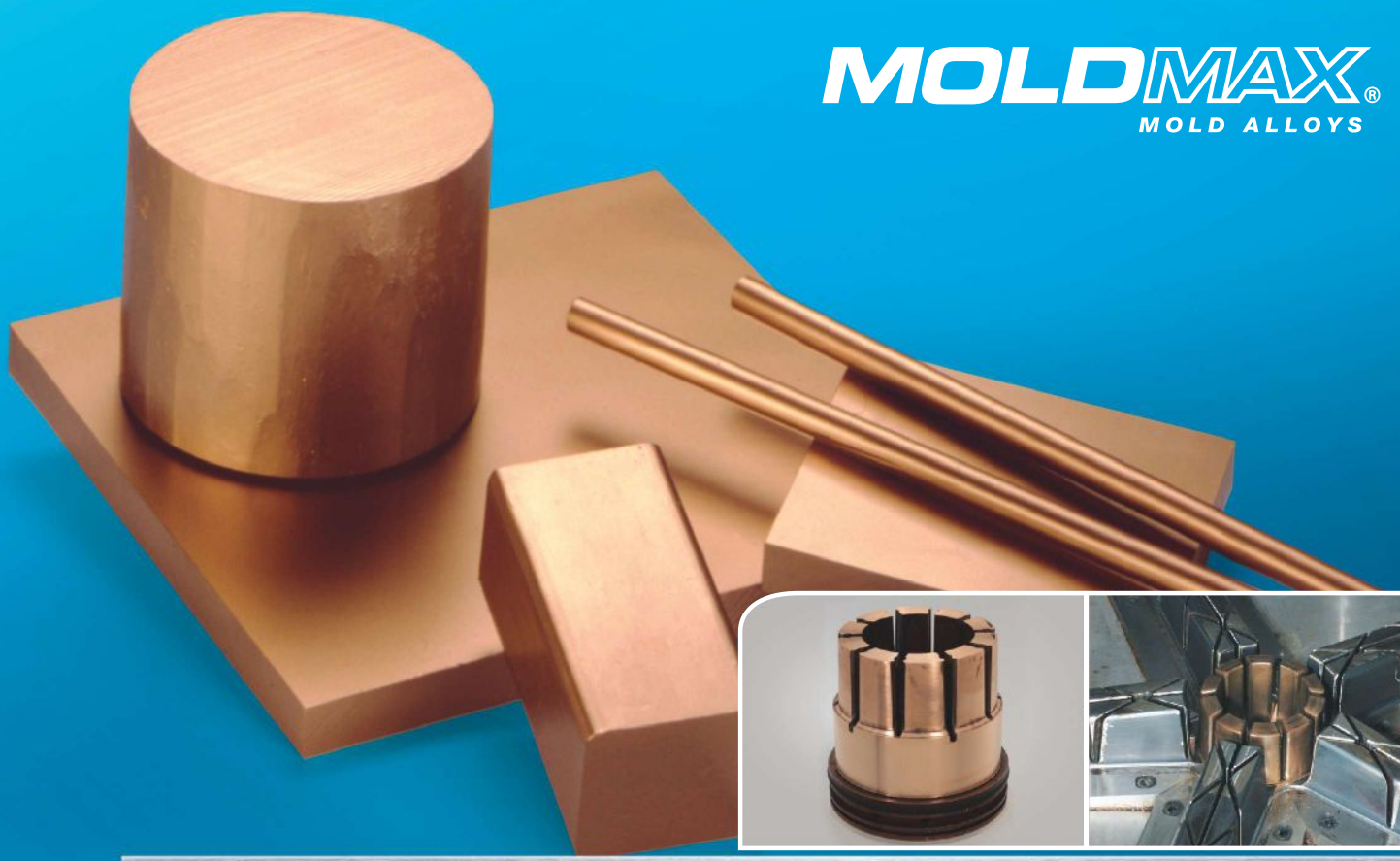
WEBSITE

EDRO is a leading manufacturer and distributor of custom mold bases, specialty steels, aluminum and copper for the plastics tooling industry, consisting of two main divisions that service a diverse range of customers.
edro.com

PRODUCT CATEGORIES

- **Custom Mold Bases**
- **Precision Machining Services**
- **Stainless Steel**
- **Tool Steel/Mold Steel**
- **Aluminum**
- **Copper Alloys**
- **PVD/DLC Coatings**

MOLDMAX®
MOLD ALLOYS



EDRO is now a proud distributor of MOLDMAX® MOLD ALLOYS tooling alloys

MOLDMAX®
MOLD ALLOYS

High conductivity alloys for the plastic mold industry

- **MoldMAX HH®**
- **MoldMAX LH®**
- **PROtherm™**
- **MoldMAX XL®**
- **MoldMAX® V**

INFO@EDRO.COM
(888) 368-3376 | EDRO.COM

EDRO

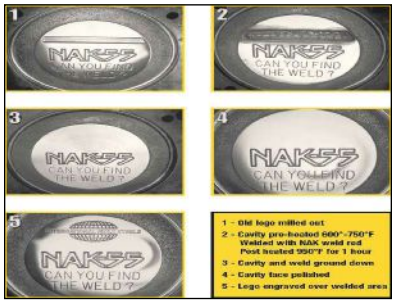
INTERNATIONAL MOLD STEEL, INC.

International Mold Steel
6796 Powerline Drive
Florence, KY 41042

Phone: 859-342-6000
Toll-Free: 800-625-6653
Fax: 859-342-6006
Email: britt@imsteel.com

imsteel.com

PRODUCTS/SERVICES



Nak 55

Pre-hardened to 38-42 HRC. Uniform hardness even in large cross sections of material. Never needs stress relieving. Machines 30-40% faster than P20. Highly weldable without showing any evidence on the plastic part. EDM layer is easy to remove. Material stocked up to 12-3/4" thick. Rounds available up to 22" in diameter.

Nak 80

Pre-hardened to 38-42 HRC. Uniform hardness even in large cross sections of material. Never needs stress relieving. Machines 10-15% faster than P20. Highly weldable without showing any evidence on the plastic part. EDM layer is easy to remove. Polishes up to a lens-quality finish. Material stocked up to 12-3/4" thick. Rounds available up to 5" in diameter.

S-Star ESR

Plate product comes in the annealed hardness range and can be heat-treated up to 50-53 HRC. Round product comes in the pre-hard condition (31-34 HRC), however this can also be heat-treated to 50-53 HRC.

Excellent corrosion resistance, Superior mirror-finished surface. Minimal distortion, less than +/-0.03% after heat treatment.

WEBSITE

International Mold Steel supplies specialty mold steels. IMS also provides value-added processes such as surface grinding, squaring, milling, laser engraving and CNC machining.
imsteel.com

PRODUCT CATEGORIES

- **Band Saws**
- **Grinding Machines**
- **Laser Engraving**
- **Milling Machines**
- **Tool Steel/Mold Steel**
- **Vertical Machining Centers**

KNOCK-OUT

THE COMPETITION WITH THE ONE-TWO PUNCH!

FROM DAIDO STEEL

PLASTIC & RUBBER MOLD STEELS

NAK80 (38-42 HRC)

High Polish – lens quality SPI A-1 Finish
Easy to Machine – no hard spots
Very Stable – does not need stress relieving
Capable of the perfect weld – polished and textured surfaces

&

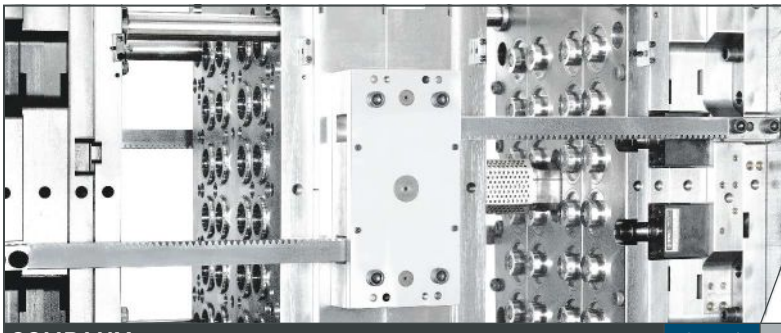
NAK55 (38-42 HRC)

Easy to Machine – 30-50% easier than P20
Very Stable – does not need stress relieving
Capable of the perfect weld – polished and textured surfaces

INTERNATIONAL MOLD STEEL, INC.

A DAIDO STEEL PARTNER COMPANY

INTERNATIONAL MOLD STEEL, INC. WWW.IMSTEEL.COM | 800.625.6653

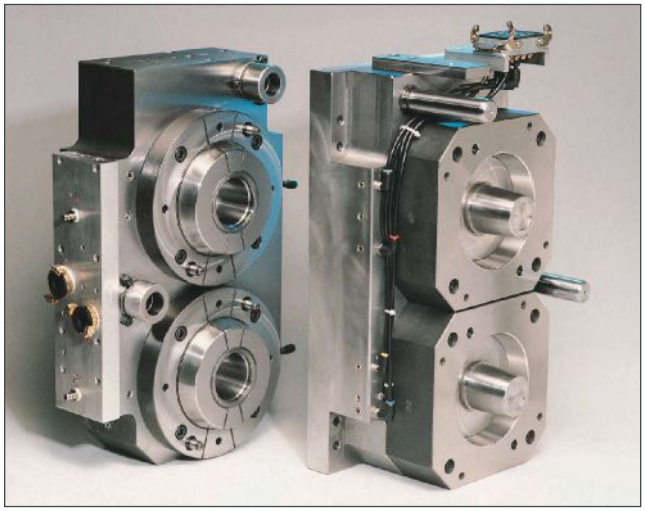


COMPANY Advertisers are listed in bold type.	See Ad	1 Aluminum Alloys	2 Aluminum Cast Plate	3 Beryllium Copper	4 Beryllium Copper Substitute Alloys	5 Brass
Alpase – Chino, CA, 951-685-2155		1	2			
Alro Steel Corporation – Jackson, MI, 517-787-5500		1	2	3	4	5
Ampco Metal Inc. – Arlington Heights, IL, 847-437-6000					4	
Aviva Metals – Houston, TX, 800-231-0771				3	4	5
BMS Burns – Medina, OH, 800-345-7693						
Buderus Edelstahl GmbH – Tecumseh, ON, Canada, 519-562-6651						
Clinton Aluminum and Stainless Steel – Clinton, OH, 330-882-6743		1	2			
Diehl Tool Steel Co. – Cincinnati, OH, 513-242-8900						
Dix Metals Inc. – Huntington Beach, CA, 888-810-9660		1	2			
DMS – Oldcastle, ON, 519-737-6743		1				
Dow Corning Corporation – Midland, MI, 989-496-6000						
Edro Engineering and Specialty Steels, Inc. – Walnut, CA, 909-594-5751	**21**	**1**	**2**	**3**		
Ellwood Specialty Steel – New Castle, PA, 724-657-1160			2			
Finkl & Sons Co., A – Chicago, IL, 773-975-2510						
Finkl Steel Canada – Brampton, ON, 905-457-2501						
General Plastics Manufacturing Co. – Tacoma, WA, 253-473-5000						
Hasco America, Inc. – Fletcher, NC, 828-650-2600	**45**	**1**				
IBC Advanced Alloys – Franklin, IN, 317-738-2558				3	4	
Industeel USA, LLC (Arcelormittal) – Coatesville, PA, 610-383-3000						
International Mold Steel Inc. – Florence, KY, 859-342-6000	**23**					
Ipsco International – Attleboro, MA, 508-226-1776						
Materion Performance Alloys – Mayfield Heights, OH, 216-383-6800				3	4	
National Tool & Manufacturing – Wheeling, IL, 847-806-9800						
Omni Mold Systems – Lisbon, CT, 888-666-4755						
OnlineMetals.com – Seattle, WA, 206-285-8603		1	2	3	4	5
PCP Canada – Saguenay, QC, 418-677-3939			2			
Performance Alloys & Services Inc. – Germantown, WI, 262-255-6662					4	
Precision Marshall Steel – Washington, PA, 724-222-2100						
Rudolph Bros. & Co. – Canal Winchester, OH, 800-375-0605						
Schmolz+Bickenbach USA, Inc. – Carol Stream, IL, 630-682-3900				3		
Sturdell Industries – Rochester, NY, 585-464-0800						
Superior Die Set Corporation – Oak Creek, WI, 414-764-4900		1				
TCI Precision Metals – Gardena, CA, 800-234-5613		1	2			5
Tekcast Industries RI – Warwick, RI, 401-785-9500						
thyssenkrupp Materials - Copper and Brass Sales – Southfield, MI, 800-926-2600		1	2	3	4	5
Uddeholm USA – Elgin, IL, 630-883-3100				3	4	
Vista Metals Corp. – Fontana, CA, 909-823-4278		1	2			
voestalpine High Performance Metals Corp. – Elgin, IL, 630-883-3000						
Wacker Chemical Corp. – Adrian, MI, 517-264-8500						
Yarde Metals – Southington, CT, 860-406-6061		1	2			

For more supplier listings, go to moldmakingtechnology.com/suppliers.

Bronze	Copper Alloys	Foams	Liquid Rubber	Polyurethane Prepolymers	Stainless Steel	Tool Steel/Mold Steel	
6	**7**	**8**	**9**	**10**	**11**	**12**	**WEBSITE**
							alpase.com
6	7			10	11	12	alro.com
6	7						ampcometal.com
6	7						avivametals.com
					11	12	bmsburns.com
						12	buderus-steel.com
					11		clintonaluminum.com
					11	12	diehlsteel.com
					11	12	dixmetals.com
							dmscomponents.com
		8	9				dowcorning.com
	7				**11**	**12**	**edro.com**
					11	12	ess.elwd.com
						12	finkl.com
						12	sorelforge.com
		8					generalplastics.com
6					**11**	**12**	**hasco.com**
6	7						ibcadvancedalloys.com
					11	12	industeel.info
					11	**12**	**imsteel.com**
					11		ipscointernational.com
	7						materion.com
					11	12	ntm.com
					11	12	omnimold.com
6	7			10	11	12	onlinemetals.com
							pcp-canada.com
6	7						moldstar.com
						12	pmsteel.com
		8	9	10			rudolphbros.com
	7				11	12	schmolz-bickenbach.us
					11	12	sturdell.com
						12	superiordieset.com
	7					12	tciprecision.com
			9	10			tekcast.com
6	7				11		tkmna.com
	7				11	12	bucorp.com
							vistametals.com
						12	voestalpine.com/highperformancemetals
			9				wacker.com
					11		yarde.com

Image courtesy of Schmolz + Bichenbach.



Modified Remelting Process Improves Material Purity

Bohler M333 Isoplast is a development from Bohler that is exclusively available from **Edro** in the United States. The material has been developed for mold inserts with high demands for toughness, polishability, corrosion resistance and thermal conductivity. It is supplied in the soft, annealed condition and used after heat treatment to 50HRC using Bohler heat-treatment specification recommendations. Edro says that M333 Isoplast is produced using an optimized chemistry, a modified production process and the latest steel re-melting technology known as Pressure Electroslag Remelting (PESR), which is a modified remelting process that results in improved purity and homogeneity. Nitrogen is added as an alloying constituent during the PESR process.

M333 Isoplast has toughness that has been increased to the same high level as H13ESR at 50HRC. It has approximately three times the toughness of 420ESR at similar hardness levels. According to Edro, the unique chemical composition coupled with the modified production process results in improved corrosion resistance and thermal conductivity.

Edro Engineering and Specialty Steels Inc. / 800-368-3376 / edro.com

Steel Resists Wear from Abrasive Resins, Extends Tool Life

International Mold Steel says that DC53 is a fully hardenable mold steel with good machinability, a wide range of applications and hardnesses, good polishability and excellent wear. DC53 heat treats consistently and stably, reduces rework and eases grinding. According to the company, one moldmaker that used DC53 reported that the material significantly reduced its tooling costs, the time it took to make cores and cavities and the amount of necessary preventive maintenance. The same client said that DC53 withstood wear from glass-filled ABS carbon resin, and that the material is now its preferred mold steel for projects with highly abrasive resins.

International Mold Steel Inc. / 800-625-6653 / imsteel.com

Technical Specialist Helps Customers Choose Ideal Alloy

Ellwood Specialty Steel has been actively stocking and marketing aluminum alloys to the molding industry for three years. Stocks of 5083, 6061 and 7075 aluminum tooling plate and Alumold 500 alloys are available from 0.25" to 42.00" thick, depending upon the alloy. Ellwood technical representatives are available to assist customers in choosing the most suitable aluminum for a given mold project. They can advise on matters pertaining to aluminum alloys and plastic compounds, projected process temperatures, part tolerances and estimated product volumes.

Ellwood Specialty Steel / 800-932-2188 / ess.elwd.com

Pre-Hardened Steel Designed for Machinability

Hasco's 1.2714HH is a pre-hardened EU tool steel that is designed for dimensional stability and toughness. It has a maximum hardness of 400 HB. Benefits to users include excellent material properties for machining, welding, surface coating and use in injection molding tools, the company says. Other applications for the material include the production of cavity inserts, cores and sliders. The steel also is designed for wear resistance and polishing and etching properties. It can be nitrided, coated at temperatures below 510°C. Plates made from this steel are readily available from stock. Special dimensions as well as P and K20 plates of 1.2714HH are available on request.

Hasco / 877-427-2662 / hasco.com/hasco/en

AM Powder Designed to Create Conformal Cooling Channels

Uddeholm announced the launch of Corrax additive manufacturing powder, a product designed for the additive manufacturing of tooling components. Uddeholm says that using Corrax additive manufacturing powder enables the creation of conformal cooling channels to reduce cycle times. Uddeholm maintains that Corrax powder is excellent for additive manufacturing tooling applications because of high demand, short run series and the ever-increasing need for shorter lead times.

Uddeholm announces its 350th anniversary as a manufacturer of industrial tool steels in 2018. Based in Hagfors, Sweden, Uddeholm has delivered high-alloyed steels since opening in 1668. Uddeholm provides tooling solutions through technical know-how, advice and support to customers from over 90 countries. Uddeholm serves customers in a wide range of industries, providing local stocking and technical support for tool steels, mold materials and specialty alloys. Uddeholm says that continuous development of new products and solutions has shaped the success of Uddeholm today. Uddeholm opened its first facility in the United States in 1925.

Bohler-Uddeholm Corp. / 800-638-2520 / bucorp.com

A Look at AM Powder for Tooling

Image courtesy of Voestalpine.

The most common application for AM powder for tooling is conformal-cooled inserts to reduce cycle times.

By Sami Arsan, P. Eng, PMP, CAM-F

Materials development in additive manufacturing (AM) is a growth area and one that mold builders should keep their eyes on as they consider offering alternate mold manufacturing solutions for their customers. The start of any good product is the raw material, and that includes AM powder for tooling.

The key to AM is determining the most appropriate path of production for the part. Once you design the part and determine the method of manufacturing, material selection is the next step. The three elements of a quality additively produced part are powder, parameters and the system. Let's focus on the powder. The five material aspects to consider for AM powder for tooling are:

- Chemical composition
- Particle size distribution
- Particle shape
- Particle flowability
- Particle density

Changing any of these five powder aspects will impact the quality of the part you are building with AM, and each one varies across the available AM technologies. For example, particle size distribution for powder-based fusion technology requires 15 to 45 microns compared to direct energy deposition (DED) which can be 50 to 150 microns. As a result, some mold material suppliers have invested in a lot of R&D to study AM powder material and to ensure their materials meet industry standards and customer requirements.

The five material aspects to consider for AM powder for tooling are chemical composition, particle size distribution, shape, flowability and density.

One such AM powder is tailored for tooling and was developed with the appropriate corrosion and wear resistance properties as well as polishability. This material is both a traditional tool steel and AM powder with the same properties. Its microstructure, hardness (36-50 HRC, achieved by an aging treatment in the temperature range 790-1110°F) and mechanical properties are similar. Its main application is conformal-cooled inserts to reduce cycle times due to the high demand, short-run series and ever-increasing need for shorter lead times. Current development also includes a powder for high-pressure die casting.

If a mold shop is ready to select an AM powder on its own or if the shop is working with an AM partner, inspection reports can verify powder characteristics. For example, for particle size distribution, use a laser to examine a sample of the powder; for particle shape, use a microscope to determine how spherical the powder is as well as the aspect ratio, and for flowability, measure the number of seconds it takes to flow 50 grams of the powder. These are all industry standards used to identify the quality of a powder. A mold builder should also be aware of the need to control for humidity and oxygen content during any handling processes to ensure powder quality.

The key is to get data before you build.

Simulations can also prove the effectiveness of AM powder for tooling, such as finite element analysis (FEA) for structure and computational fluid dynamics (CFD) for flow and plastic component. A shop itself, or with its AM partner, can take the AM tooling powder data sheet (chemical composition and mechanical properties) and enter the information into simulation software to simulate the performance of the injection process. The key is to get data before you build. MMT

CONTRIBUTOR

Sami Arsan, P. Eng, PMP, CAM-F, is Vice President, Advanced and Additive Manufacturing Technologies in North America for the Voestalpine Additive Manufacturing Centers.

FOR MORE INFORMATION

Voestalpine High Performance Metals
800-665-8335 / sami.arsan@voestalpine.com
voestalpine.com/additive / voestalpine.com/hpm/usa

Image courtesy of Mold Hotrunner Solutions Inc.

MILACRON®

Mold Masters®

Mold-Masters Limited
Armstrong Ave., Georgetown, ON L7G 4X5, Canada
Phone: 905-877-0185

milacron.com/hotrunners

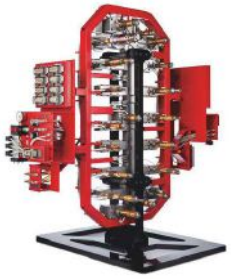
PRODUCTS/SERVICES

Master-Series

The benchmark in hot runner performance and reliability. Proven to deliver consistent high performance processing capabilities for exceptional part quality. Compatible with a wide range of resins, Master-Series is the ideal choice for almost any application across any industry. Advanced molding capabilities include high cavitation, tight pitch, inside gating, side gating, stack molds and multi-material.

FEATURES: Incorporates Mold-Masters original technology including Brazed Heater Technology which delivers precise thermal profile, superior reliability and energy efficiency. Eliminate spare heater costs and minimize downtime. Available industry leading 10 year warranty. iFLOW manifold technology delivers industry leading mold balance and rapid color change performance.

Fusion Series G2



Drop-in, connect and inject. A completely pre-assembled and pre-wired hot runner system which allows for quick and easy one step installation and connection. Focused on high quality economical production of medium to large parts. Ideal for automotive, appliance and logistic applications. Supported by our global support network and rapid spare part supply.

FEATURES: Precise thermal profile. Nozzle lengths up to 1m. Shot range <15g to 5,000g+ (per gate). Field replaceable components. New Waterless Actuator Technology simplifies mold construction and facilitates faster mold changes.

DURA+

The clear choice for automotive lenses. The specialized hot runner system for producing high quality automotive lenses with exceptional clarity. Engineered to perform with today's challenging resins, it is compatible with corrosive resins such as PC, PC-ABS & PMMA.

FEATURES: Nozzles available in lengths up to 1m with shot range from 50g to 3,500g+. Enhanced system thermal profile helps prevent resins burns while maintaining molded part quality and strength. Stainless steel construction helps prevent contamination defects and extends service life. Field replaceable components minimizes downtime.

WEBSITE: THE FUTURE IS IN STORE

The Milacron eSTORE instantly connects you to the products you need, day or night. Mold-Masters customers are able to quickly and easily order the standard spare parts they require to stay in production. eStore features thousands of parts and supplies across all industry leading Milacron brands including Milacron, Mold-Masters, DME and Ferromatik. Go online and see for yourself what the future has in-store.

store.milacron.com

PRODUCT CATEGORIES

- **Hot Runners & Control Systems**
- **Hot Runner Manifolds**
- **Sprue Bushings**
- **Hot Halves**
- **Auxiliary Injection Units**
- **Temperature Controls, Monitors and Sensors**

SeVG® PLUS

Mold Masters®

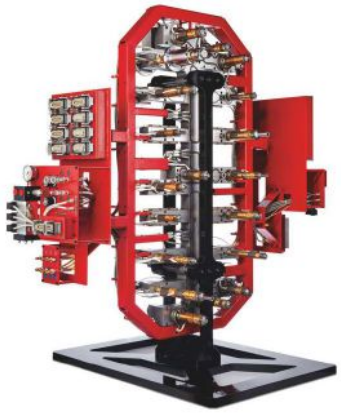
SUPERIOR PROCESS CONTROL FOR DEMANDING APPLICATIONS

Flow front accelerations and hesitations can cause visible surface defects, especially on large parts.

LIGHTING

EXTERIOR

INTERIOR



SeVG+ (Sequential electric Valve Gate) is a servo driven actuation system that provides absolute control and precision over individual valve pin opening and closing profiles. Fully adjust pin position, acceleration, velocity and sequence. Critical capabilities that greatly enhances molded part quality by controlling resin flow that can cause surface defects and other issues. Available for all molding applications including large automotive and optical lenses requiring Class "A" surface finishes.

Contact us today to unlock your operation's full potential or visit **milacron.com/sevg+** to learn more.

2019 K–23 October Düsseldorf Germany

KSHOW 2019
16-23 October | Düsseldorf, Germany
Hall 1, Booth 1C05

MILACRON®

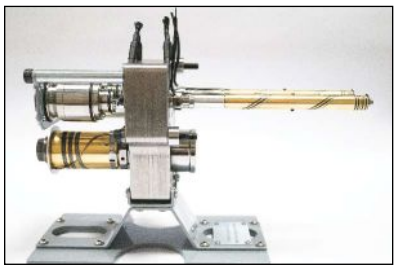
HRS FLOW HOTRUNNER TECHNOLOGY | Passion for expertise

HRSflow
920 74th Street SW
Unit 100
Byron Center, MI 49315

Phone: 1-616-228-6900

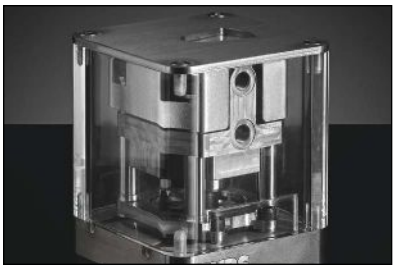
hrsflow.com

PRODUCTS/SERVICES



SA SERIES NOZZLES

With the new, small-sized hot runner SA series nozzles, HRSflow has expanded its range. The screwed-in nozzles are suitable for the injection molding of techno-polymers with a shot weight starting from 0.5 g and for wall thicknesses below 1 mm. The shape and material of the tip, the channel section and the contact surface of the end ring with the cavity are designed to have the optimal thermal conditions which enable a high flexibility in processing engineering polymers.



HRSCOOL

HRScool is the innovative solution for hot runner injection molding in which the water cooling of the associated actuators can be eliminated. Support columns with optimized contact surfaces minimize the heat transfer from the hot tool plate to the cylinder, while a height-adjustable cover plate made of a highly thermally conductive material ensures the maximum heat dissipation from the cylinder to the plate. By removing all elements required for active cooling, HRScool eliminates issues associated with clogged cooling circuits.

EXTENDED CYLINDER PORTFOLIO

Now includes compact hydraulic cylinders, which require small cut-outs in the tool and provide increased thermal insulation due to components material and optimized contact surface. Heat transfer to the manifold is minimized and energy consumption is reduced. Also, a version with needle damping is available, along with a microswitch version for the double needle end position detection as well as the possibility of adjusting the position of the needle by ± 1 mm without mechanical reworking. And, all our cylinders are designed for Quick Tooling Change.

WEBSITE

Discover HRSflow's innovative solutions for all your demanding applications on our multi-language website. The site features product information, worldwide customer service contacts, company news, case studies, downloads, and videos.
hrsflow.com

PRODUCT CATEGORIES

- **Hot Halves**
- **Hot Runner Manifolds**
- **Hydraulic Valve Gate Nozzles**
- **Pneumatic Valve Gate Nozzles**
- **Servo Valve Gate Nozzles**
- **Temperature Controls, Monitors, Sensors**
- **Thermal Edge Gate Nozzles**
- **Thermal Hot Tip Nozzles**
- **Valve Gate Controllers**
- **Mold Flow and Simulation Services**

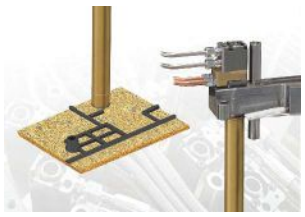
INCOE Corporation
2850 High Meadow Circle
Auburn Hills, MI 48326

Phone: 248-616-0220
Fax: 248-616-0227

incoe.com

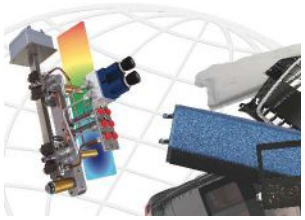
PRODUCTS/SERVICES

INCOE Hot Runner Systems are the heart of the injection molding process, managing and controlling Melt Logistics® inside the mold. For over 60 years, the plastic injection molders for all markets have come to rely on the technology, service, filling simulation and on-site technical support INCOE offers. By providing customers innovative and creative solutions helps ensure they remain productive and competitive. INCOE's global commitment is to be your partner, producing value in your process, and ultimately delivering satisfaction where it counts.



DIRECT-FLO™ Gold hot runner systems offer proven performance advantages, unitized leak-proof reliability and cost effectiveness in the most demanding applications. Features include custom and standard system configurations, non-valve and valve gate systems, mold flow analysis and exclusive OPTI-FLO® manifold systems; all designed to reduce cycle times with improved part quality.

HEM miniature hydraulics are powerful and highly compact and widen the choice of possible gating points while creating enough space for supply lines—not just because of the smaller dimensions, but because the outlets for the cooling lines can be arranged in four different directions. The new patented and improved thermal separation of distributors and cylinders prevents the hydraulic oil reaching critically high temperatures. This helps protect moving parts and seals and means no cooling down is required once production work is complete.



SoftGate® valve pin speed control is an important core product for process optimization through hot runner technology. Instead of an abrupt sudden opening of the valve gate nozzle, the flow cross-section is continually opened and released through SoftGate® and the nozzle opening time required for optimum quality can be set and a careful injection is thus reproducibly ensured. For example, all changes in pressure and speed of the melt occurring during the process are much better coordinated, resulting in a continuous melt stream reducing or eliminating hesitation marks.

WEBSITE

The multi-language website is a resource and information tool for customers in any market. Features include product search, RFQs, videos, and an array of product guides, manuals and brochures in PDF format for easy download.

incoe.com

PRODUCT CATEGORIES

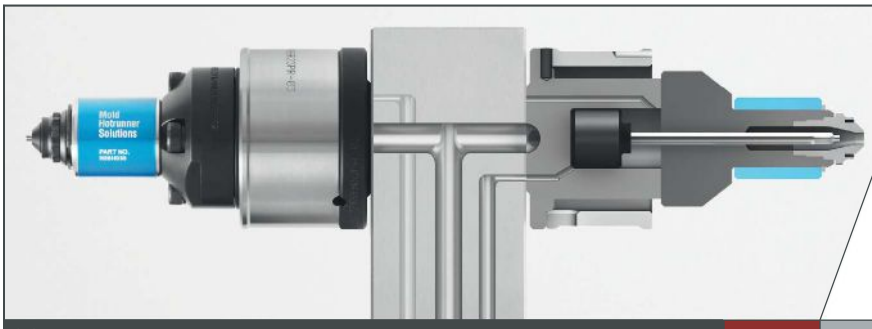
- **Hot Runner Systems for Micro- to Large-Part Applications**
- **Thermal Tip, Sprue and Valve Gate Designs**
- **Temperature, Sequential and Valve Gate Controls**
- **Complete Hot-Half Systems**
- **Stack Molding Systems**
- **Single-Nozzle Systems**
- **Screen Pac Melt Filtration**
- **IMN (Injection Machine Nozzle)**

Your partner
for successful mold making

INCOE provides Mold Makers with Hot Runner Technology solutions throughout the entire process — from engineering mold review and filling simulation to on-site technical support.

Our global commitment is to be your partner — producing value in your process — and ultimately delivering satisfaction where it counts.

INCOE®
HOT RUNNER SYSTEMS
www.incoe.com
North America | Europe | Asia | South America



COMPANY Advertisers are listed in bold type.	See Ad	1 Hot Halves	2 Hot Runner Manifolds	3 Hydraulic Valve Gate Nozzles	4 Mechanical Valve Gate Nozzles	5 Mold Cleaning Services
Alliance Specialties and Laser Sales Inc. – Wauconda, IL, 847-487-1945	**113**		**2**			**5**
Ampco Metal Inc. – Arlington Heights, IL, 847-437-6000				3		
Athena Controls – Plymouth Meeting, PA, 610-828-2490						
Dalton Electric Heating Co., Inc. – Ipswich, MA, 978-356-9844						
DME/Milacron – Madison Heights, MI, 248-398-6000	**Back Cover**	**1**	**2**	**3**		
Ewikon Molding Technologies, Inc. – Rockford, IL, 815-874-7270		1	2	3		
Extrude Hone – Irwin, PA, 724-863-5900			2			
Gammaflux – Sterling, VA, 703-471-5050						
Gunther Hot Runner Systems Inc. – Hoffman Estates, IL, 630-293-4650		1	2	3	4	
Hasco America Inc. – Fletcher, NC, 828-650-2600	**45**	**1**	**2**	**3**		
Hotset America Corp. – Swainsboro, GA, 912-289-1844			2			
HRS Flow – Byron Center, MI, 616-228-6900	**33**	**1**	**2**	**3**		
Husky Injection Molding Systems – Milton, VT, 802-859-8000		1	2	3	4	
IMS Company: Industrial Molding Supplies – Chagrin Falls, OH, 440-543-1615					4	
Incoe Corporation – Troy, MI, 248-616-0220	**35**	**1**	**2**	**3**		
Intex Tooling Technologies – Aurora, ON, Canada, 289-840-1095						
J-Tech Hotrunner Inc. – Caledon, ON, 519-927-1067		1	2	3	4	
Manner USA, Inc. – Lawrenceville, GA, 770-449-1820		1	2	3	4	5
Mastip, Inc. – Slinger, WI, 262-644-9400		1	2	3		
Melt Design Inc. – St. Charles, IL, 630-443-4000		1	2			
MHS - Mold Hotrunner Solutions – Georgetown, ON, 905-873-1954		1	2	3	4	
Mold-Masters/Milacron – Georgetown, ON, 905-877-0185	**31**	**1**	**2**	**3**	**4**	
Molders Choice Inc. – Parma, OH, 216-458-1220						
Orycon Hot Runner Systems – Ocean, NJ, 732-922-2400		1	2	3	4	
OSCO Inc. Runnerless Molding Systems – Rochester Hills, MI, 248-852-7310		1	2	3	4	
PCS Company – Fraser, MI, 586-294-7780	**47**	**1**	**2**			
Plastic Engineering & Technical Services – Auburn Hills, MI, 248-373-0800		1	2	3	4	
Plastic Process Equipment, Inc. – Macedonia, OH, 216-367-7000						
Polymer Cleaning Technology Inc. – Hillsborough, NJ, 908-281-0055						5
Polyshot Corporation – West Henrietta, NY, 585-292-5010		1	2	3	4	
Priamus System Technologies, LLC – Brunswick, OH, 877-774-2687						
Runipsys North America – Oldcastle, ON, 519-737-0874		1	2	3	4	
SISE Plastics Control Systems, Inc. – Atlanta, GA, 404-495-5968						
StackTeck Systems Limited – Brampton, ON, 416-749-1698		1	2			5
Synventive Molding Solutions – Peabody, MA, 978-750-8065		1	2	3		5
Technoject Machinery Corporation – Bolton, ON, 905-951-7144		1	2	3	4	
Thermal-Tech Systems, Inc. – West Chicago, IL, 630-639-5115		1	2	3	4	5
Thermoplay S.P.A. – Pont Saint Martin (AO), Italy, 39 125 800311		1	2	3		
Watlow – St. Louis, MO, 314-878-4600						
YUDO, Inc. – Livonia, MI, 734-744-8120			2	3		

For more supplier listings, go to moldmakingtechnology.com/suppliers.

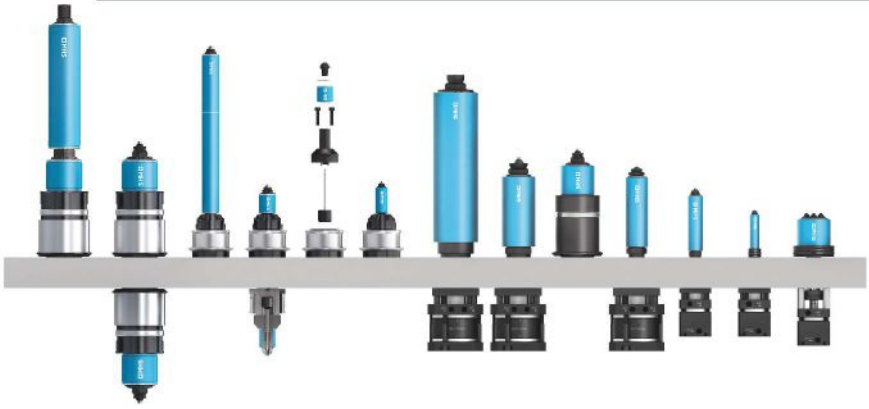
Mold Maintenance and Repair Services	Pneumatic Valve Gate Nozzles	Servo Valve Gate Nozzles	Temperature Controls, Monitors, Sensors	Thermal Edge Gate Nozzles	Thermal Hot Tip Nozzles	Thermal Multi-Gate Nozzles	Valve Gate Controllers	Valve Gate Sequencers	WEBSITE
6	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**WEBSITE**
6									**alliancelasersales.com**
	7				11				ampcometal.com
			9						hotrunnercontrol.com
			9						daltonelectric.com
6	**7**		**9**		**11**		**13**	**14**	**dme.net**
	7		9	10	11	12			ewikonusa.com
									extrudehone.com
			9				13		gammaflux.com
	7		9	10	11	12	13		gunther-usa.com
	7		**9**	**10**	**11**	**12**	**13**	**14**	**hasco.com/gb**
			9				13		hotset-worldwide.com
	7	**8**	**9**		**11**		**13**	**14**	**hrsflow.com**
	7		9	10	11	12	13	14	husky.ca
	7		9		11				imscompany.com
	7		**9**	**10**	**11**	**12**	**13**	**14**	**incoe.com**
6									intextooling.ca
6	7		9	10	11	12	13	14	jtechhotrunner.com
	7		9				13	14	m-form.com
	7		9	10	11	12			mastip.com
	7		9	10	11	12			meltdesign.com
	7		9	10	11	12	13	14	mhs-hotrunners.com
	7		**9**	**10**	**11**	**12**		**14**	**moldmasters.com**
			9						molderschoice.com
	7		9	10	11	12	13	14	orycon.com
	7		9		11	12	13	14	oscosystems.com
			9				**13**		**pcs-company.com**
	7		9	10	11	12	13	14	petsinc.net
			9						ppe.com
									polymercleaning.com
	7		9	10	11	12	13		polyshot.com
			9						priamus.com
					11	12		14	runipsys.com
			9						sise-plastics.com
6	7				11	12			stackteck.com
	7		9		11	12	13	14	synventive.com
	7		9	10	11	12	13	14	technoject.com
6	7	8	9	10	11	12			thermal-tech.com
	7		9				13	14	thermoplay.com
			9		11				watlow.com
	7		9	10	11	12	13	14	yudo.com

Image courtesy of Mold Hotrunner Solutions Inc.

Multizone Hot Runner Controller Technology

Atlanta-based **SISE Plastics Control Systems Inc.** presents its generation of multizone controller technology (MV3), which will soon be able to control up to 336 zones. Available in five sizes (XS, S, M, L and XL) with three available power cards (2.5A, 15A and 30A), it adapts to various key markets, namely packaging, automotive, cosmetics, medical and technical parts. The company uses a 10- or 15-inch touchscreen display, running on Linux-based SISE software. With accessible power and thermocouple cards on removable pivoting shelves, this generation will have useful, advanced functions like four soft starts, zone grouping, PTI function for thermocouple anomalies, Moldscan for real-time hot runner diagnostics and material leak detection. The system is multilingual (up to 11 languages available) and offers unlimited mold file memory. Lastly, the MV3 communicates with IMM's and can save and monitor production temperatures, perfect for Industry 4.0 installations.

SISE Plastics Control Systems, Inc. / 404-495-5968 / sise-plastics.com



Valve Gate Actuators Built Without O-Rings to Withstand Wear

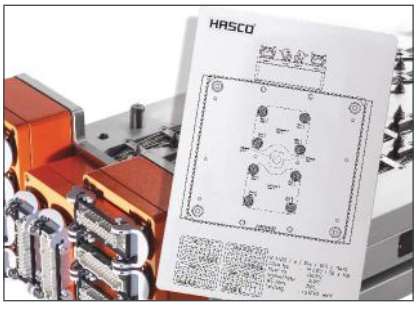
Mold Hotrunner Solutions Inc. (MHS) expanded its line of cooling-free valve gate actuators to cover a full range of injection molding applications. MHS has expanded both product lines for the new internally actuated Rheo-Pro iVG nozzles and the manifold mounted black box cylinders. MHS says that both product lines for the new internally actuated Rheo-Pro iVG nozzles and the manifold mounted Black Box cylinders have been expanded to bring their performance to plastic part applications of every size and for every industry. The products are built without o-rings entirely so that the products can withstand being worn out by force or heat, even at temperatures of 850°F. MHS says that because the pistons have no soft seals or lubrication, they require virtually no maintenance over the life of a mold.

MHS - Mold Hotrunner Solutions / 905-873-1954 / mhs-hotrunners.com

Hot Runner System Comes Fully Equipped

Hasco's Hot Half H4400 system comes fully equipped with all the hot runner components and nozzles, as well as the clamping, bolster and nozzle retainer plates, plus the standard components and connectors, and is ready for immediate use.

In addition to checking the mold-specific dimensions, all the drive and connection components are tested to ensure proper functioning. All the test results, documented in corresponding test reports, are included in the delivery. The Hot Halves are equipped with a USB 2.0 data storage device which contains all the available information, such as drawings, parts lists and measurement protocols. Regardless of where the mold is used, the data can be called up directly from the system. As an information storage device to accompany the mold, the screw memory A5805 can be used to archive all the mold and/or article-specific data directly in the mold. It can then be read out at any time without any need for a data cable.



Labels for connector assignment are permanently affixed with slotted pins, and a system-specific nameplate based on the A6500 is supplied with each Hot Half. The white-coated aluminum nameplate is individually printed with the system and customer-relevant data and covered with magnetic film. The two available sizes can be positioned either directly on the Hot Half or at a clearly visible point on the injection molding machine.

The Hot Half enables moldmakers and injection molders to considerably shorten design and production times for hot runner molds. Through its finely tuned assembly of the nozzles and its precise alignment of all the parts, the company ensures a leak-free system with functioning components.

The Hot Half is delivered within three to six weeks, depending on complexity. HASCO hot runner advisers and application technicians are available to assist customers worldwide and to configure an individual Hot Half in the optimum manner for the required application.

HASCO America, Inc. / 877-427-2662 / hasco.com

Nozzles on Hot Runner System Enable Wide Molding Window

Mastip Inc. offers Nexus pre-assembled and pre-wired systems that incorporate FlowLoc nozzle technology. Mastip supplies Nexus Systems pre-assembled and pre-wired so that they are ready to be installed into a mold without the need of pre-heating. Nexus is suitable for automotive, appliance and electrical applications. Mastip says that FlowLoc nozzles on its Nexus pre-assembled system facilitate a thermal profile that enables a wide molding window without the risk of polymer leakage while offering protection from accidental cold-condition starting. Nexus Systems are able to process a wide range of commodity and aggressive, engineering-grade polymers, are suitable for high-pressure applications and are fully customizable to suit any specific requirements.

Mastip's Nexus systems are compatible with FlowLoc 16, 19 and 27 series thermal-gate nozzles, which attach securely to the manifold with a threaded connection to provide a leak-proof solution. Mastip says that Nexus includes a customized wiring trunk to match specific mold layouts and offers quick removal of the complete unit from the mold for ease of service.

Mastip Inc. / 262-644-9400 / mastip.com

Hot Runner Control System is Easy to Use, Maintain and is Network Compatible

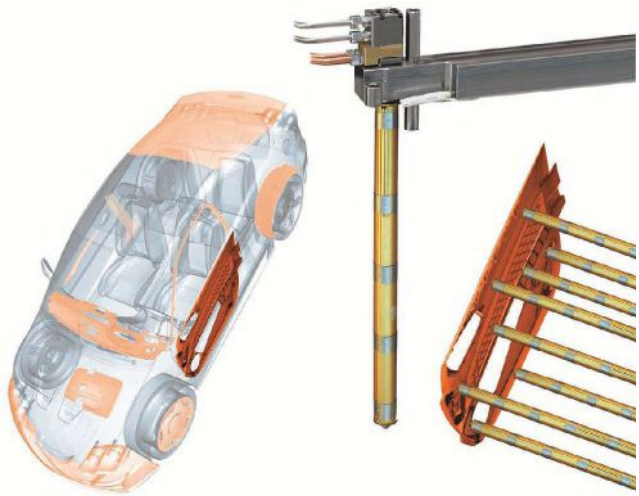
Thermal-Tech Systems presents the ProfiTemp+ hot runner control system. Hot runner control systems are a trending piece of technology that integrates the machine and hot runner and produces reliability with efficiency for a successful molding operation. The ProfiTemp+ hot runner control system is easy to use and maintain and is network compatible. Additionally, it can be expanded, providing users with both flexibility and cost savings. Hot runner systems can be kept in balance with touch screen controls and data to alert users about areas that require attention. With today's market, many companies are investing in technology and the end result is better quality parts and better performing hot runners, the company says.

Thermal-Tech Systems, Inc. / 800-745-9350 / thermal-tech.com

Plastic Leak Detection System Protects Against Leak Damage

Plastixs LLC's Airtect plastic leak detection system protects against plastic leak damage, either within a hot runner mold or at the machine injection nozzle. According to the company, it acts as an early warning device to prevent catastrophic damage in molding operations. This product enables users to identify solutions before a problem arises that is expensive to fix and causes significant downtime.

Plastixs, LLC / 508-842-1606 / plastixs.com



Nozzle and Heater System Produce Optimum Processing Conditions

Incoe Corp. presents the Direct-Flo 12 nozzle with MultiPower MP24 heater, with reduced outer dimensions and simplified mold cut out. With a homogeneous temperature profile, it produces optimum processing conditions. The MultiPower MP24 heater with two separate heating zones and a length as high as 600 mm has only a single cable outlet at the nozzle head, saving heating zones and lowering costs. Exchangeable thermocouples for both heating zones sit in matching grooves. An additional groove for each heating zone can incorporate a spare thermocouple. The heater creates a compact valve gate solution that can be used in tight spaces with deep gating points, such as the back injection of natural fiber mats for lightweight components manufactured in the automotive industry.

Incoe Corp. / 248-616-0220 / incoe.com

How to Quickly Generate 3D Runner Mesh

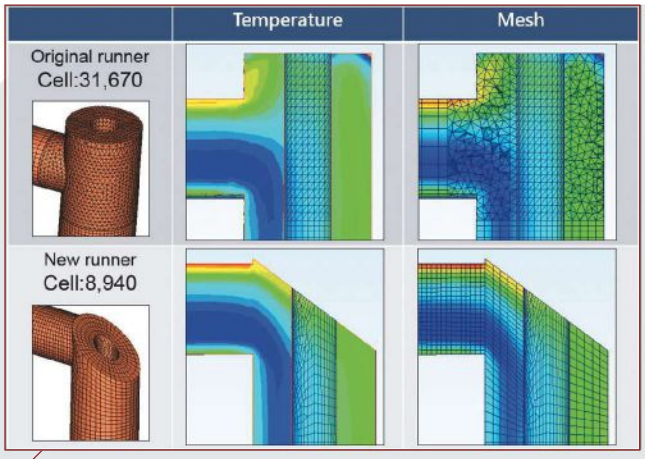


Image courtesy of Moldex3D.

New hexa-based runner mesh requires fewer mesh elements and better mesh quality for more accurate analysis results.

By Cloud Tsai

Three-dimensional runner mesh technology simulates filling behavior and temperature variation inside the runner, which helps analyze uneven temperature distribution that shear heating and multi-cavity mold-flow imbalance induces. The mesh quality is essential for generating an accurate simulation.

Designers using simulation software used to prepare the 1D pass curve with a 2D cross-section mesh and then create 3D runner mesh through sweep or other tools for solid mesh generation. For simpler runner designs, the software advancements of today enable designers to semi-automatically generate 3D runner mesh with wire frames and runner parameters like the diameter. These tools are essential in mold-filling simulation and will significantly affect the analysis results.

However, more complicated runner designs require significant time and effort to build models for numerous and sophisticated 3D runner mesh. New mesh technology for high-quality runner models with hexa-based solid mesh, node types and node preview features can help designers quickly create runner models with 3D mesh.

Hexa-based runner mesh enables designers to attain required mesh layers with fewer elements. It is built with high-resolution and high-quality mesh and can also help reduce operation and analysis time.

At the connection of the runner curves, node types automatically are provided based on the curve amount, angles and runner types. This new runner mesh technology provides a real-time node preview, so designers do not have to wait until the end of mesh generation. The runner mesh result will match the node setting perfectly without deformation. The software also generates a hexa-based mesh for common runner layouts and boundary-layer mesh for more complicated runner layouts. Users can choose common gate node types for mesh generation.

High-speed, high-quality mesh technology automatically generates the high-resolution hexa-based mesh in which the mesh model perfectly matches the original runner design with high accuracy. MMT

CONTRIBUTOR

Cloud Tsai is the manager of the product R&D division at Moldex3D.

FOR MORE INFORMATION

Moldex3D, EPS FloTek / 888-Moldex3D / epsflotek.com

Image courtesy of Alba Enterprises.

MILACRON®

DME

DME Co.
29111 Stephenson Hwy, Madison Heights, MI 48071, USA
Phone: 800-626-6653

dme.net

PRODUCTS/SERVICES

Mold Bases & Plates

Offering the largest selection of pre-engineered steel plates, assemblies, custom and standard mold bases and components DME is able to meet all of your project requirements. Superior cavity tool steel ensures faster cutting times and extended tool life to help you maximize your profitability. Short lead times and reliable delivery using in-stock interchangeable plates ensures that we provide you with maximum time to complete your job. Let us help you with your next project.

Mold Components

DME Mold Components are the mold designer's preferred solution Manufactured to the highest standards, DME components offer reliable quality and long tool life performance. With millions of products available to ship next day and easy access on-line DME has all your needs covered from ejector and core pins, slide action, tapered interlocks round and rectangle, mold-cooling, date inserts and many engineered molding solutions. If you require a custom product, contact us.

Industrial Supplies (MRO)

DME Industrial Supplies includes products to boost your plant's productivity and enhances part quality in all stages of the mold making, molding and repair processes. Auxiliary equipment such as conveyors and mold service tables, after-market tooling and machine supplies, safety products, serialized and ISO certified lift rings and eye bolts, purging compounds, mold cleaners and the Industry's first pioneering bench-marking coolant flow and cleaning machine service. DME is your full product and service provider. How can we help you today?

WEBSITE

Open 24/7 - 365 - Order from anywhere, anytime. Registered users receive premium benefits including promotional discounts, order traceability, quick order and much more! **store.milacron.com**

PRODUCT CATEGORIES

- **Mold Bases & Plates**
- **Mold Components**
- **Industrial Equipment & Supplies (MRO)**
- **MUD Systems & Quick-Change Prototyping Adapter**
- **Moldmaking & Polishing Equipment**
- **Hot Runner & Control Systems**
- **Hot Runner Repair, Service & Aftermarket Parts**
- **Conformal Cooling Products, Design & Service**
- **Mold Flow Analysis**

PROGRESSIVE COMPONENTS

Progressive Components International Corporation
235 Industrial Drive
Wauconda, IL 60084

Toll-Free: 800-269-6653
Phone: 847-487-1000
Fax: 800-462-6653

procomps.com

PRODUCTS/SERVICES

Mold Monitoring

Progressive continues to advance their mold monitoring products:

- CVe Monitor, OnDemand and CVe Live, together provide unprecedented access to your tool's activity and performance, and now offers a press management module and enhanced reporting options and alerts.
- New System Cooling High Temp Manifolds which support temperatures up to 250°F / 120°C.
- System Cooling Test Rig offers a time-saving way for mold builders to qualify circuitry and analyze and test cooling circuits during maintenance.

Maintenance Solutions

Progressive's Maintenance products, brought to you by sister company ToolingDocs, includes:

- Toolroom Bench, designed to industry best standards, enables more efficient mold assembly and disassembly.
- Color-coded Status Tags for easy mold status identification.
- Synthetic Mold Grease.
- Magnetically mounted Mold Light Bars that increase visibility for in-press repairs.
- Cable Checker and Mold Checker for testing hot runner cables and manifolds.

Tooling Standards

Progressive leads with innovation to help customers increase productivity and reduce costs. Many Progressive products have become industry standards such as:

- Through Hardened Ejector Pins with increased core hardness of 48-50 HRC.
- Z-Series Alignment Locks, engineered to outperform others.
- ModuLifters, modular lifter assembly that simplifies undercut release.
- Tapered Daters made from 420 SS preventing flash with LSR, Nylon, etc.
- Off-the-shelf Support Pillars in a variety of styles and size options.

WEBSITE

Progressive Components is the only American mold component supplier with direct, seamlessly integrated distribution wherever your tools are built and run. To learn more, give us a call at 800-269-6653, or visit us online:
procomps.com/contact

PRODUCT CATEGORIES

- **Off-the-shelf Standards and Mold-Ready Components**
- **Alignment Locks and Plate Sequence Control Items**
- **Standard Lifters, CamActions and Collapsible Cores**
- **Expanded Mold Monitoring Capabilities**
- **Toolroom Supplies and Software**

HASCO
Enabling with System.

Precision in Moldmaking since 1924.

HASCO America, Inc.
270 Rutledge Rd. Unit B
Fletcher, NC 28732

Phone: 877-427-2662
Fax: 828-684-7960

hasco.com

PRODUCTS/SERVICES

New HASCO Multi-Zone Control Unit Sets Standards

HASCO is extending its hot runner product portfolio with an innovative generation of control units in the H1280/... series. This controller is noted for its high functionality and comprehensive diagnostics and sets new standards in ease of operation. Three housing sizes with 6 to 36 zones are available as table-top units. With its new intuitive touch user interface, the controller is easy to operate. Unique and innovative operating functions support the user right from the start by entering data at all the different navigation levels.

HASCO Z1545/... Gear Housing and Z1547 Gear Rack Units

The HASCO stack mold components Z1545/... and Z1547/... now are in two sizes 2.5 and 5 modules. The standardized HASCO components allow the simple, reproducible and inexpensive construction of stack molds of this type. The low height of the components permit small distances between the tie bars on the machine while suppling high opening forces through the use of high-quality materials. DLC-coated slideways minimize wear and extend maintenance intervals.

HASCO Z2302/... Positive Locking Cylinder

For high-temperature applications in compression and injection molding tools up to 180°C, HASCO has as its latest innovation, introduced the positive locking cylinder Z2302/... with mechanical final position sensing. Safe locking at up to 180°C (356°F). The solid design of the new positive locking cylinder and the precise final position sensing via mechanical switches permits safe locking of the piston rod and is suitable for use with core pullers and mold slides.

WEBSITE & APP

For more than 95 years, HASCO has been supporting its customers' success with agility, simplicity and performance. The company and products will be presented in a new, clear appearance. HASCO is the world's leading supplier of modular standard mold units, accessories and hot runner technology. The company's hallmark is based on state-of-the-art standardized mold products. With over 700 employees worldwide, HASCO supplies the highest quality products and services. Visit our website for more information. **hasco.com**

PRODUCT CATEGORIES

- **Mold Components**
- **Mold Bases**
- **Mold Plates**
- **DLC Standard Components**
- **Collapsible Cores**
- **Unscrewing System**
- **Hot Runner Components**
- **Hot Runner Manifolds**
- **Temperature Controls, Monitors, Sensors**
- **Tool Steel/Mold Steels**

HASCO®

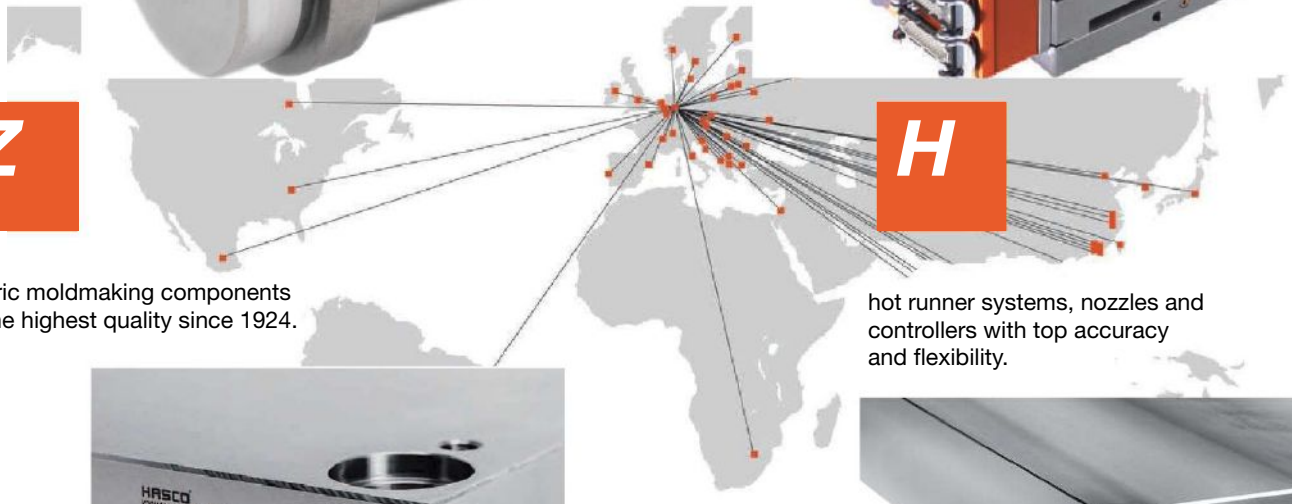
Enabling with System.

Where technology meets application

HASCO enables moldmaking

Enabling is our main area of expertise.
We define international standards and revolutionized moldmaking with the invention of our standard mold base.

Today, we rely on our innovative strength to set tomorrow's standards for our customers.



Z

metric moldmaking components
to the highest quality since 1924.

H

hot runner systems, nozzles and
controllers with top accuracy
and flexibility.

K

machined plates with the HASCO standard
guiding holes for bushings and pins
ready for assembly.

P

machined plates in many thicknesses,
sizes and materials ready for your
design and next process step.

HASCO AMERICA Inc.
270 Rutledge Road, Unit B, Fletcher, NC 28732
T +1 828 650-2600, F +1 828 684-7960

quotes.america@hasco.com

www.hasco.com

PCS COMPANY

Turn To The Industry Experts

PCS Company
34500 Doreka Drive
Fraser, MI 48026

Phone: 1-800-521-0546
Email: sales@pcs-company.com

pcs-company.com

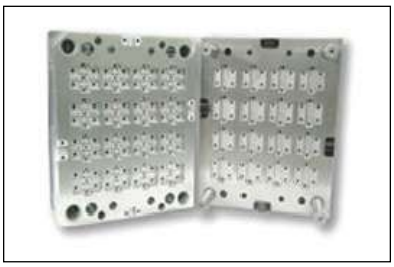
PRODUCTS/SERVICES

PROLIFTER™

Standard undercut release component exclusive to PCS. This self-aligning slide system eliminates excessive wear and binding common with other lifter systems. Innovative enhancements compensate for any misalignment from cumulative manufacturing tolerances and compound angles. Product assembly consists of a three-piece assembly with an optional forth piece which include; the bar or rod, adapter ball assembly, and guide shoe. Optional piece is the keeper key used with a rod. Various assembly sizes are available.

ANGLE PIN INSERT

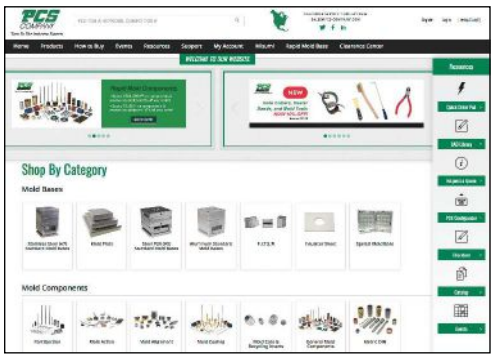
For use with angle pins in molds containing slide action or other applications requiring angle pins. Inserts allow mold maker to complete angle pin/angle pin insert machining while doing flat or surface work. No secondary set up required, which saves labor and money. Standard component easily replaced if required during routine maintenance; reducing potential down time. Various sizes with different angles available. Head of insert machined with a flat to prevent rotation.



MOLD BASE PRODUCT EXPANSION

Excited to announce our partnership with LKM and the expansion of our custom mold base capabilities in North America. Extending our relationship, which began over 25 years ago, we are combining our experiences and machining technology to create an unparalleled level of services and capabilities to the mold industry. Expanded size range includes length and width to 157.000", and thickness to 28.000." Offered materials include; 1045, P-20, 420 Stainless, H13, NAK55.

WEBSITE & APP



pcs-company.com

PRODUCT CATEGORIES

- **Mold Bases (Standard & Custom)**
- **Mold Components (Standard & Custom)**
- **Molding Supplies**
- **Hot Runner Systems**
- **Cutting Tools**

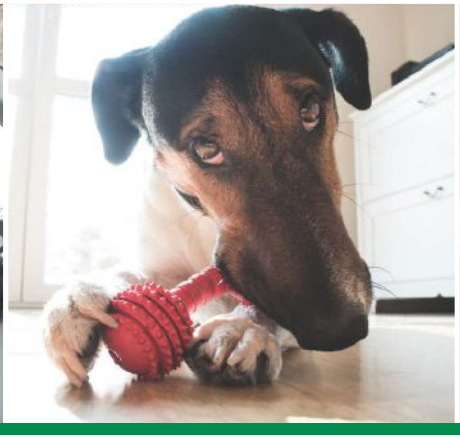
PCS COMPANY

Turn To The Industry Experts

Let us be your molding solutions expert, for each end market you serve.








Aerospace • Agriculture • Appliances • Automotive • Beverage • Building/Construction • Computers & Business Machines • Consumer Products • Containers/ Closures • Electrical/Electronics • Food Services • Government/Defense • Industrial • Lawn & Garden • Medical/Pharmaceutical • Office Products • Other Transportation • Outdoor & Other Furniture • Packaging • Pallets • Plumbing • Recreation/Sporting Goods • Telecommunications • Waste Management

MOLD BASES • MOLD COMPONENTS • MOLDING SUPPLIES
HOT RUNNERS • CUTTING TOOLS • ADDITIVE MANUFACTURING

Providing molding solutions for the plastics industry for over 50 years.

1-800-521-0546 | www.pcs-company.com

PFA Inc.
N118 W8251 Bunsen Drive
Germantown, WI 53022 US

Phone: 262-250-4410

pfa-inc.com

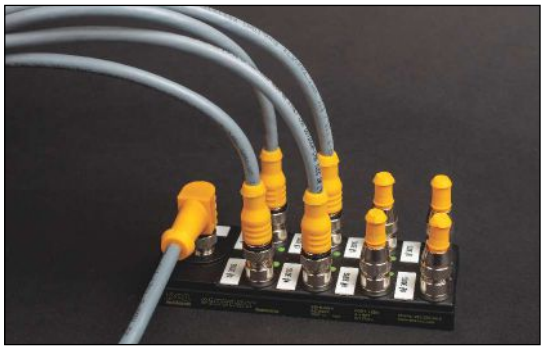
PRODUCTS/SERVICES

KOR-LOK® Hydraulic Locking Cylinders

PFA's KOR-LOK Side-Action Systems—Preloading and Locking Core Pull Cylinders—were specifically designed to ensure superior Injection Molded Parts. Zero Flash Molded Parts on the first shot and every shot is the goal! Only when cores are preloaded above injection pressure can designers be confident that complex part details will be produced as intended. 100% preload at ZERO pressure also means side cores will not move when press hydraulics drop out during injection. With free application reviews and fast delivery on ANY STROKE size, PFA and KOR-LOK provide the products and support essential for producing high-quality parts faster, easier, and with greater precision than ever before.

SWITCHMAX® Connectivity Cables

More than cables, PFA's NEW off the shelf SWITCHMAX® connectivity solution, originally designed to connect multiple side-action mold cylinder sensors in series for easy "plug and play" connections to machine inputs, now provides cross-connected sensor verification for SPDT Form C style mechanical switches. Systems also combine 3-wire solid-state proximity sensor inputs for a single press input. Connect typical PNP sensors with mechanical sensors as desired, with one simple standardized solution. Relay power adaptors to permanently convert press AC and zero volt systems to 24 V dc inputs, relay adaptor boxes for full voltage inputs, and custom solutions to meet unique input requirements are also available.



WEBSITE

PFA is a leader in preloading and locking cylinders for core pull/side-actions on injection molds and operator side LED sensor indication via Plug and Play cabling. Other products include quick mold change systems (QMC), quick die change (QDC) for stamping, robotic EOAT, and more.
pfa-inc.com

PRODUCT CATEGORIES

- **Locking Core Pull Cylinders**
- **Mold Wiring**
- **Quick Mold Change Systems**
- **Switches**

KOR-LOK®

SIDE-ACTION SYSTEMS

Be proactive – Reduce mold size and complexity, while eliminating tryout issues, mold tweaks, and expensive maintenance.

- Preload cores for perfect parts.
- Save $$$$ with a smaller cylinder.
- Simplify mold operation and design.
- Smaller mold base = low cost parts.
- Fully Preloads at only 1,500 psi.
- Stays locked without hydraulics.
- 400° F systems available.
- Rush 0-2 day shipping available.

KOR-LOK® SIDE-ACTION SYSTEMS	VS.	TRADITIONAL SIDE-ACTION SYSTEMS
YES!	Mold OPEN Core Out	YES!
YES!	Mold CLOSED Core OUT	CAN'T DO IT!
YES!	Mold CLOSED Core IN	YES!
YES!	Core PRE-LOADED Against FULL Injection Pressure	CAN'T DO IT!

Designed & Made in USA

3D Parametric CAD files now available online

VISIT OUR WEBSITE FOR PFA'S ENTIRE FAMILY OF PRODUCTS

PFA INCORPORATED

N118 W18251 Bunsen Drive
Germantown, WI 53022
(262) 250-4410
Fax (262) 250-4409

pfa-inc.com

Mold Components

COMPANY Advertisers are listed in bold type.	See Ad	1 Blades	2 Bushings	3 Cooling Systems	4 Core Pins	5 Counters	6 Date Inserts	7 Ejector or "Knock-out Pins"	8 Fixtures	9 Gaskets	10 Gate Inserts	11 Gears	12 Guides	13 Heating Equipment	14 Interlocks or
Agathon Machine Tools, Inc. – Bethel, CT, 203-730-8741			2										12		
Alba Enterprises Inc. – Torrence, CA, 909-941-0600	**55**			**3**					**8**						
Better Molding Solutions – Ellington, CT, 860-454-8656															
BMS Burns – Medina, OH, 800-345-7693		1	2	3	4		6	7	8	9			12	13	14
Choice Mold Components Inc. – Clinton Twp., MI, 586-783-5600		1	2	3	4		6	7	8				12		14
Craftsman Tool & Mold Co. – Aurora, IL, 630-851-8700															
Cross Tool & Manufacturing, Inc. – Flagstaff, AZ, 928-779-4218			2												
CUMSA USA – Troy, MI, 248-850-8385	**53**						**6**	**7**							
Dalton Electric Heating Co., Inc. – Ipswich, MA, 978-356-9844														13	
DME/Milacron – Madison Heights, MI, 248-398-6000	**Back Cover**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**			**12**	**13**	**14**
DMS – Oldcastle, ON, 519-737-6743		1	2		4		6				10		12	13	14
Edro Engineering and Specialty Steels, Inc. – Walnut, CA, 909-594-5751	**21**														
eMoldino – Seoul, KR, 82 70 7678 6388						5									
Ezell Precision Tool Co. – Clearwater, FL, 727-573-3575		1	2		4										14
Hasco America Inc. – Fletcher, NC, 828-650-2600	**45**	**1**	**2**	**3**	**4**	**5**	**6**	**7**			**10**	**11**			**14**
Hawk Mold & Die Supply Inc. – Pipersville, PA, 800-488-7757		1	2		4		6	7					12		14
Hotset America Corp. – Swainsboro, GA, 912-289-1844			2					7		9		11	12	13	14
i-mold GmbH & Co. KG – Erbach, Germany, +49 6062 8093 30											10				
IMS Company: Industrial Molding Supplies – Chagrin Falls, OH, 440-543-1615		1	2	3	4	5	6	7						13	
Ipsco International – Attleboro, MA, 508-226-1776			2		4										
Mac-Mold Base, Inc. – Romeo, MI, 586-752-1956															
Meusburger US, Inc. Standard Molds – Charlotte, NC, 704-526-0330	**54**														
Misumi USA, Inc. – Schaumburg, IL, 847-843-9105			2	3	4		6	7							
Mold Base Industries Inc. – Harrisburg, PA, 717-564-7960			2			5		7							14
Molders Choice Inc. – Solon, OH, 800-809-4623														13	
MouldPro – Rancho Cucamonga, CA, 909-941-0600		1			4			7	8				12		
National Tool & Manufacturing – Wheeling, IL, 847-806-9800															
Nonnenmann Inc. – Sterling Heights, MI, 586-977-8190		1	2	3	4			7							14
OMNI Mold Systems – Lisbon, CT, 888-666-4755															
PCS Company – Fraser, MI, 586-294-7780	**47**	**1**	**2**	**3**	**4**		**6**				**10**				**14**
PFA Inc. – Germantown, WI, 262-250-4410															
Precision Ground Inc. – Lakemoor, IL, 815-578-2613		1	2		4			7							
Precision Punch Corporation – Berlin, CT, 860-229-9902					4			7							
PRIAMUS System Technologies, LLC – Sterling, VA, 877-774-2687															
Progressive Components – Wauconda, IL, 847-487-1000	**Inside Cover**	**1**	**2**	**3**	**4**		**6**	**7**					**12**		**14**
Roehr Tool Corporation – Hudson, MA, 978-562-4488					4										
SelfLube – Coopersville, MI, 616-837-9721			2		4			7					12		
Smith Enterprises – Wood Dale, IL, 630-595-0202		1	2		4			7							
Superior Die Set Corporation – Oak Creek, WI, 414-764-4900			2		4						10				
Unitherm Insulation Systems – Lewisville, TX, 972-436-1401															

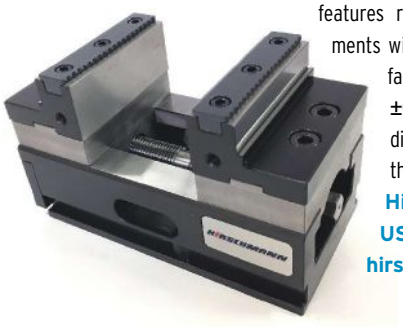
For more supplier listings, go to moldmakingtechnology.com/suppliers.

Taperlocks	Internal Mold Cooling Products	Jigs	Leader Pins	Lifters	Locating Rings	Mold Bases and Frames	Mold Insulation	Mold Monitoring Devices	Mold Wiring	O-rings	Pressure Controls, Sensors, Monitors	Quick Mold-Change Systems	Side Actions or Cam Actions	Slides	Socket Head Cap	Sprue Bushings	Stop Pins	Straight Locks	Support Pillars	Switches or Indicators	Thermal Pin/Heat Pipes	Wear Plates	WEBSITE
15	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**		**WEBSITE**
		17			20										30			33					agathon.com
15					**20**	**21**					**26**								**34**				**albaent.com**
													28										bettermolding.com
15		17	18	19	20	21		23		25			28	29	30	31	32	33	34	35	36		bmsburns.com
15	16	17	18	19									28	29	30	31	32	33		35	36		choicemold.com
					20																		craftsmanmold.com
		17		19							26				30			33					crosstool.com
			18										**28**										**cumsa.com**
																							daltonelectric.com
15		**17**	**18**	**19**	**20**	**21**		**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**		**dme.net**
15		17		19	20		22						28		30	31	32	33		35	36		dmscomponents.com
					20																		**edro.com**
							22			25													eshotlink.org
15	16	17	18	19	20								28		30	31	32	33			36		ezellprecision.com
15		**17**	**18**	**19**	**20**	**21**		**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**		**35**	**36**		**hasco.com/gb**
		17	18	19	20								28		30	31							hawkmold.com
15		17	18									27	28	29	30	31	32	33	34		36		hotset-worldwide.com
																							i-mold.com
		17		19		21	22			25				29	30						36		imscompany.com
		17		19										29	30			33			36		ipscointernational.com
					20						26												macmold.com
											26												**meusburger.com**
15		17	18	19																			us.misumi-ec.com/vona2/mold
		17		19	20									29	30	31	32	33			36		moldbase.com
15						21					26												molderschoice.com
15		17	18							25			28	29									albaent.com
					20																		ntm.com
15		17		19											30	31		33					nonnenmann-inc.com
			18		20								28				32						omnimold.com
15		**17**	**18**	**19**	**20**	**21**							**28**		**30**	**31**	**32**	**33**	**34**	**35**	**36**		**pcs-company.com**
								23			26	27							34				pfa-inc.com
		17													30	31							precisionground.net
		17														31							ppunch.com
							22			25													priamus.com
15		**17**	**18**	**19**	**20**		**22**			**25**	**26**	**27**	**28**		**30**	**31**	**32**	**33**	**34**		**36**		**procomps.com**
			18									27											roehrtool.com
		17	18										28		30		32				36		selflube.com
																31							smithpins.com
		17		19	20									29	30	31		33					superiordieset.com
						21																	unitherm.com

Image courtesy of Next Chapter Manufacturing.

Self-Centering Vise Features Reversible Jaws

Hirschmann Engineering offers the Kohn ZSS 80 AUT self-centering vise. Designed for use with all zero-point clamping systems, it is available in two bed lengths and clamping ranges. Built for medium-size and large workpieces, the vise is said to be lightweight enough for mid-range robotic systems. The vise features reversible, two-stepped jaw attachments with grip bars for non-machined surfaces and has a centering accuracy of ±0.02 mm. The vise can be mounted directly to the machine or used with the company's 9000 pallet system.



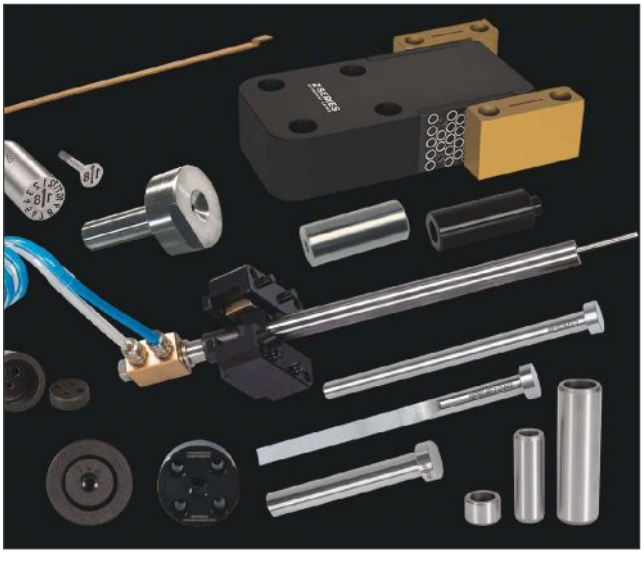
Hirschmann Engineering USA Inc. / 866-769-8717 / hirschmannusa.com

Components Catalog Reveals Extended Components Line

Progressive Components' V12 catalog highlights product advantages including a variety of standard mold base components to complement its existing line, cooling products that are readily machined and reach throughout cores previously not feasible, expanded through-hardened pins for large automotive and appliance tools, advancements in mold maintenance and monitoring technology and new alignment lock configurations.

The catalog provides standardized options for plate sequencing and more economically feasible routing cooling. It also provides options for eliminating custom per-mold machining with new ejection and alignment standards. The company is also advancing its mold maintenance and monitoring technology. With the debut of the V12 catalog, Progressive Components has its most comprehensive product line offering in the company's history.

Progressive Components / 847-487-1000 / procomps.com



Latch Function on Stamp Prevents Movement on Arrow Inserts

To prevent unintended movement of the arrow insert, **Meusburger** now offers stamps with a latching function, which the company says ensures higher process reliability during the injection molding process and prevents parts from being marked incorrectly.

The latching of the arrow insert into defined positions guarantees that the arrow remains in a fixed position. The main body of the stamp also remains at the same height as the arrow insert and therefore is named "with fixed height." The company says that users can easily remove the stamp at the split line face because of a withdrawal thread in the main body. Made of stainless steel 1.4112 with a hardness of 52 HRC, the stamp can be used at temperatures up to 340°C. Meusburger says that because of the low installation height, the stamp also is well-suited for installation in very thin molding plates. The new stamp is available in different variations: month (E 2420 R), year (E 2424 R), 0-9 (E 2422 R) and a blank main body for individual configuration (E 2429 R). The diameters range from 4 to 12 mm. The CAD data is available in the Meusburger web shop.

Meusburger US Inc. Standard Molds / 704-526-0330 / meusburger.com

Undercut Release Component's 3D Ball Adapter Prevents Binding

PCS Company launched the ProLifter, a standard undercut release component. The company says that the ProLifter is unique in that it is self-aligning and compensates for any misalignment from cumulative manufacturing tolerances and compound angles. The ProLifter consists of a three-piece assembly with an optional fourth piece. Product pieces include the bar or rod, the adapter ball assembly and a guide shoe. The company's optional piece for the ProLifter is a keeper key, which is designed for use with a rod. Five assembly sizes are available, including ¼, ⅜, ½, ¾ and 1-inch. The 3D ball construction on the ProLifter eliminates excessive wear and binding.

PCS Company / 800-521-0546 / pcs-company.com

Lifters Simplify Release of Small Undercuts in Molds

Cumsa USA offers new lifters from the Smart Worm family for the release of small undercuts. The company says that this new component is ideal for releasing small undercuts and that it comes in two versions.

Cumsa USA offers a simple version called the Smart Worm Pin (WP). It is capable of fitting small clips with short ejection strokes (ranging to 30 or 60 mm). Cumsa also offers the Smart Worm Lifter (WL), which is a long version to help simplify the release of small undercuts for large molds that require more ejection strokes (ranging to 125 mm). The Worm Lifter is compatible with Cumsa DR lifters.

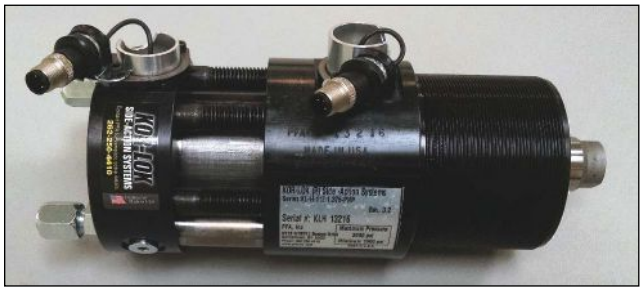
Cumsa USA offers both Smart Worms in different sizes. The Worm Pin comes in Ø6 and Ø8 mm and the Worm Lifter in Ø8 and Ø12 mm. Cumsa USA says that the advantage of the Smart Worms is that they do not need any mechanism in the ejector plates. Smart Worms have bendable cores that range to six degrees. The core makes it possible to release the undercuts simply by pushing up from the ejector plates.

Cumsa USA / 248-850-8385 / cumsa.com

Angle Pin Inserts Reduce Setup Times

PCS Company launches angle pin inserts made from 420 SS and available in 30 sizes at 10-, 15-, and 20-degree angles. The pin inserts reduce setup time by allowing the moldmaker to machine while doing other flat work, require no secondary setups and prevent rotation with the keyed head.

PCS Company / 800-521-0546 / pcs-company.com



Hydraulic Locking Cylinder Provides Plug and Play Integration

PFA Inc.'s Hydraulic Locking Cylinders are now available with low profile PNP style sensors designed to integrate with Switchmax mold connectivity solution. Connects can be orientated in any direction and moved to multiple sensor locations on the product. Combining integration and low profile sensors enables preload adjustments and more effective core positioning for perfect parts. Small PNP sensors provide tighter mold mounting, closer integration of core water lines and integration with other sensors for a single set and pull output for connection to the press via an integrated junction box. Side sensors on mold cylinders can be adapted with a field wireable connector for connection to the junction box that also provides LED indication for sensors, the company says.

PFA Inc. / 262-250-4410 / pfa-inc.com

Cutting Sprue Bushing Removes Need for Secondary Operation

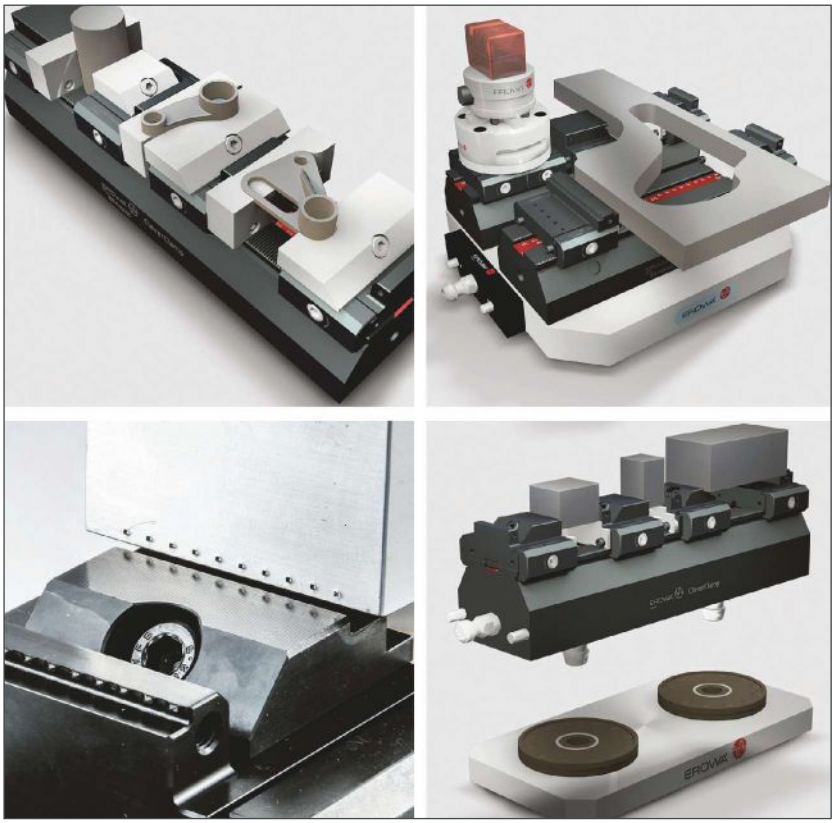
DMS adds Almo's cutting sprue bushing to its range of edge gate cutting components. The cutting sprue bushing enables feeding plastic components near the mold's center, virtually eliminating cold runners into a runnerless cold feed and trimming the gate as the mold opens, removing the need for secondary operation. It also provides a large edge gate area to reduce injection pressure and improve the packing and quality of the final plastic product.

DMS / 800-265-4885 / dmscomponents.com

Centering Sleeve Saves Space for Flexible Mold Design

HASCO offers the centering sleeve Z21, which can be deployed flexibly to precisely align the plates on injection molds as they are joined together. With its space-saving positioning above the screw connection, facilitated by a 15-degree lead-in chamfer, the centering sleeve allows plates to be centered in relation to one another and offers flexibility in mold design. The centering sleeve is equipped with an integrated pull-out thread for dismantling, is versatile in use and suitable for maximum service temperatures of up to 200°C.

HASCO America, Inc. / 877-427-2662 / hasco.com



Clamp Elements Are Versatile for Small-Batch Parts Production

The clamping elements of **Erowa**'s CleverClamp system are specifically tailored to the manufacturing of one-off and small-batch parts. The company says that they are simple to handle and serve a wide variety of applications while decreasing set-up times, increasing machining times and improving productivity.

The basic rails of the CleverClamp system are calibrated to fit the Erowa UPC and Erowa MTS production tooling systems. The wide range of clamping elements can be quickly positioned on the serrated base rails and can be used either horizontally or vertically. The base rails provide the flexibility to attach workpieces of varying shapes and sizes in a limited amount of space. An added feature of the CleverClamp system is that it can be universally automated. This increases customer's machine use by making use of marginal and night hours when the CleverClamp system is combined with an Erowa automation solution.

Erowa Technology Inc. / 800-536-4894 / erowa.com

Supplier Can Accommodate Special Configurations for Customers

Bernal Bearings, LLC specializes in oil-less sleeve/flanged bushings, thrust washers, PTFE bushings, guide components, wear plates/strips for the mold and die industry and general machinery industries worldwide. The company can generally accommodate any size or special configuration customers might need. They also accept other metal mechanical parts and customized orders.

Jiashan Bernal Bearings Co. / 913-401-7947 / bernalbearings.com

Maintaining Mold Components

Delicate tooling components, such as these hot runner nozzles, should be placed in a tray that keeps them separated so they do not bang into each and cause damage. The eyebolts at the corners of the tray allow it to be placed directly into an ultrasonic tank for cleaning. Then the components are dried using compressed air, which saves steps and time, and reduces handling risks.

By Steve Johnson

Proper mold-component maintenance depends on a toolroom's ability to recognize when and how a specific component needs attention. Every mold ever built, or that ever will be built, has a weakness. The design, build or production process can cause this weakness, which results in mold function or part quality issues if the toolroom leaves a mold unattended for a specific amount of run cycles. It is the tool shop's responsibility to have procedures in place to recognize the cycle count at which a certain component requires specific attention. If a toolroom understands a mold's performance characteristics and the conditions that wear out certain mold components, it can prevent these problems and greatly reduce breakdowns and quality issues.

Design, Build, Run

Let's review some mold characteristics that cause premature component wear or breakage.

A molded part's physical features, resin type and required volume dictate mold design and build quality. Molds are graded. SPI 101-classified molds are at the top of the class. Any molds classified less than 101 avoid certain design and build features to reduce mold cost, which can greatly influence component life when the shop runs the mold beyond the specified cycle count.

Regardless of mold grade, the molding process will subject many dynamic or static mold components to excessive wear and breakage depending on tolerance levels (too tight or too loose), steel quality, and hardness. Steel hardness between dynamic tooling that varies by more than two points can cause premature wear or galling. Cheaply-made mold components of substandard, soft steels and poorly-designed mold components with excessive pre-load will wear prematurely even with regular maintenance.

Other molding conditions such as how the shop sets up and runs the mold can be the root cause of many mold component issues. Molds bolted in improperly, platens out of square, hard mold closings, over-stroking mold openings, leaving heaters on during a shut-down and a lack of proper grease during long runs are a few issues that shorten component life.

Handling

The way a repair technician handles a mold can be harder on component life than the actual running of the mold. Disassembling and cleaning a mold using too much force with the wrong tools or too coarse or abrasive cleaning methods will mix up, ding or scuff mold components.

Repair technicians must pay attention to the type of tool and the amount of force they apply when removing or installing components. Techs must correctly size punches on sleeves and pins with appropriate clearance to avoid jamming, dinging or rounding critical edges. They must also clean up the faces of a punch and remove the mushroomed head that forms after months of use.

Once a tech removes the mold components, they should not haphazardly toss them into cleaning baskets and swish or agitate them in solvent tanks, as this causes small dings and burrs. They should also not clean components with coarse scouring pads, sandpaper or stones, or use a sandblaster with glass beads, walnut shells or aluminum oxide. We recommend soft, plastic media, along with ultrasonics and dry ice. Techs should place delicate cavity tooling on a plastic rack to prevent them from banging into each other.

There are many available sources with opinions on how to build molds, many of which are steeped in personal experience. Others are not, and it shows up in the quality and performance of the mold that shop builds. Providing accurate feedback to these sources so the information can be used to help design and build better tools is an important part of a toolroom maintenance program. Technology for designing and building molds continuously advances, but it will never replace accurately documented mold performance hindsight. MMT

CONTRIBUTOR

Steve Johnson is president of MoldTrax, which provides specialized course work, hands-on bench training, maintenance software, maintenance products, toolroom design and maintenance efficiency auditing.

FOR MORE INFORMATION

MoldTrax / 419-281-0790 / steve@moldtrax.com / moldtrax.com

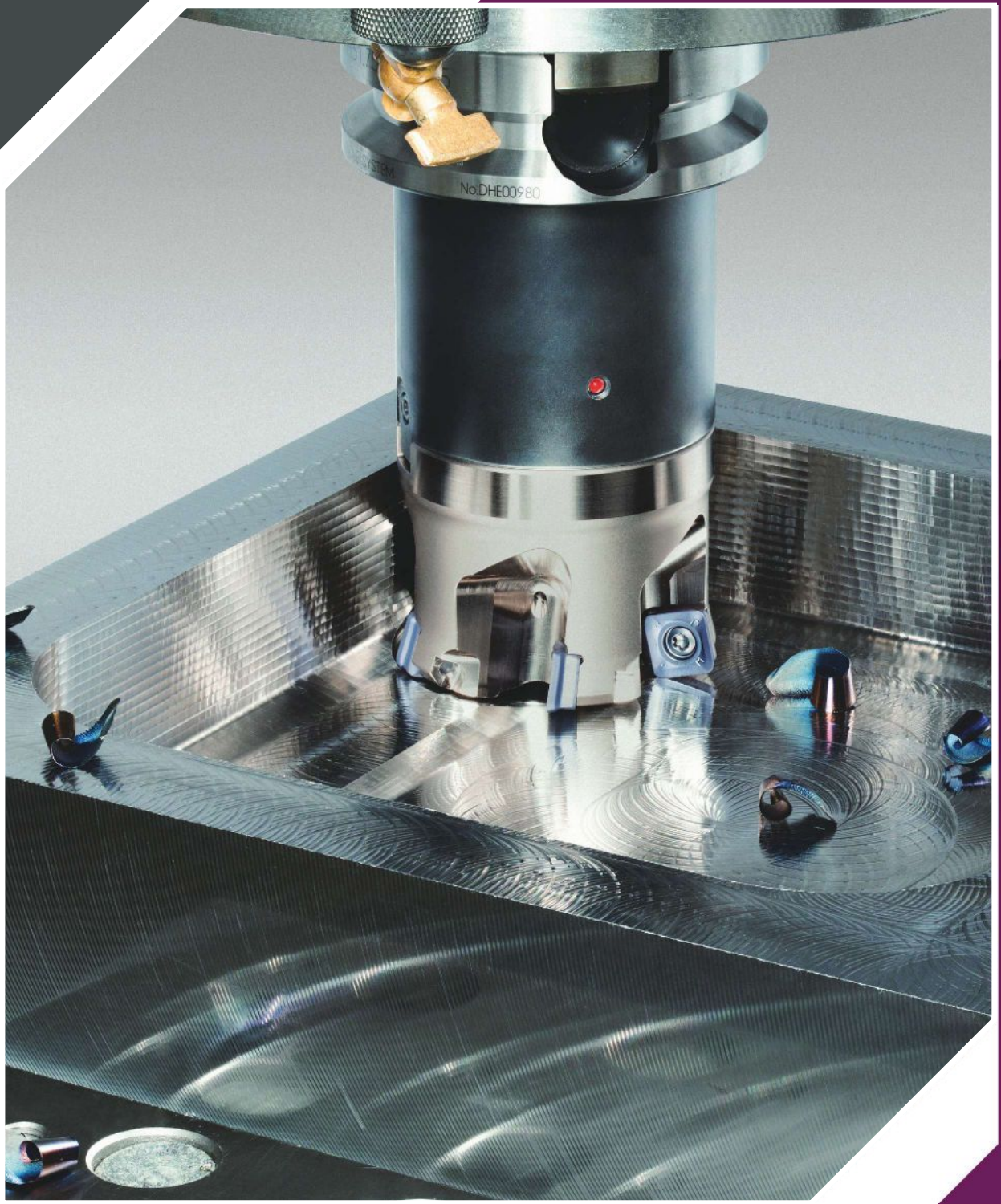


Image courtesy of Tungaloy America Inc.

Member IMC Group

Iscar Metals, Inc.
300 Westway Place
Arlington, TX 76018-1021

Phone: 817-258-3200
Toll-Free: 877-294-7227
Fax: 817-258-3221
Email: info@iscarmetals.com

iscarmetals.com

PRODUCTS/SERVICES

Machining Intelligently

ISCAR is about productivity. We help you reduce the cycle time to produce your part which increases your current machine tool capacity, improving your profitability.

Upon close collaboration with industry, we have developed industry-specific solutions to optimize productivity. We understand the unique requirements of many industries, continually improving and introducing new ideas directly related to what we learn from industry. Whether you're an automotive, aerospace, medical, die and mold, oil and gas equipment manufacturer or a general machining subcontractor, we have a solution to help you increase your throughput and resolve your machining challenges. We listen, and then we invest, to bring something better to market.

ISCAR has a comprehensive portfolio of machining solutions along with expert system software and tool management accessories to provide an unparalleled machining experience. Many variables come into play when applying tooling and ISCAR ensures that a high level of support is present to guarantee the best possible machining experience.

Become a Master – ISCAR LOGIQ Chess Lines

ISCAR has recently released the new LOGIQ line of cutting tools. This portfolio of new tooling solutions addresses some very specific machining environments. Typically, (multi-flute) indexable milling technology has been limited to above 0.500".

ISCAR has developed new, ***NANO***, technologies for both 90 degree and high feed milling systems with diameters as small as 0.315". These small inserts have 3 cutting edges providing a very economical approach to milling with impressive depth of cut and feed rate. Today's lathes, in many cases, have live tooling stations where expensive solid carbide end mills are used. These new nano tools could be a cost-effective substitute.

ISCAR has broken through the technical barriers to now offer a high-performance small diameter indexable drill. The new LOGIQ campaign expands the SUMOCHAM line down to 4mm diameter. Typically, the only choice in this diameter range was a solid carbide or HSS drill. The quick-change head replacement feature of this drill makes it an intelligent choice for the high production environment and is especially well-suited for use in Swiss machines.

Small tools can potentially produce big savings. These are just 2 examples of the many new LOGIQ solutions. Visit our website: www.iscar.com to see the entire offering.

WEBSITE

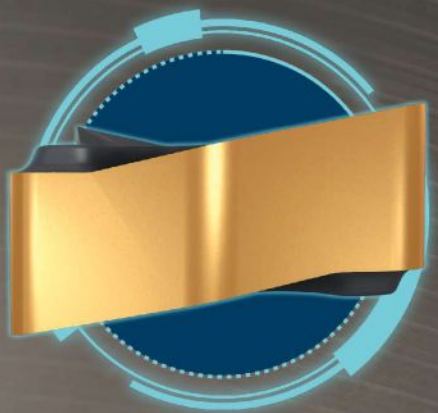
Iscar is a dynamic full-line supplier of carbide metal cutting tools which cover a broad range of applications and industries. Browse Iscar's site to find the newest innovations in metal removal. Contact Iscar for more information.
iscarmetals.com

PRODUCT CATEGORIES

- **Cutting Tools**
- **End Mills**
- **Inserts**
- **Lathe Tooling and Accessories**
- **Reamers**
- **Toolholders**
- **Tool Selection Software (ITA)**

LOGIQMILL
ISCAR CHESS LINES

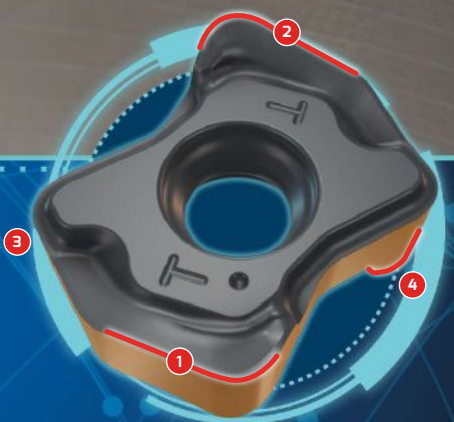
High Feed Milling
Twist Master



Twisted Shape

LOGIQ4FEED
HIGH FEED MILLING

Twisted Shape Insert for High Feed Milling Guarantees Higher Productivity



Unique Insert Shape

High Positive Rake Angle

Large Body Core Ensures Stability and Rigidity

Double Sided Insert

High Feed Milling

MACHINING INDUSTRY 4.0 INTELLIGENTLY

Member IMC Group
ISCAR
www.iscarmetals.com

Excellence in Technology

Horn USA Inc.
320 Premier Court
Suite 205
Franklin, TN 37067

Phone: 888-818-4676
Fax: 615-771-4101
Email: sales@hornusa.com

hornusa.com

PRODUCTS/SERVICES

HORN is the worldwide technology leader of indexable cutting tools with experience with more than 150,000 custom application solutions and engineering expertise, applied to more than 20,000 standardized tools for turning and milling. Our highly skilled application engineers provide a foundation of communication and reliable support in the field. Every application engineer is backed by a centrally located manufacturing facility with in-house technical specialists, customer service representatives and logistical support. Horn USA Inc. is committed to providing a prominent level of focused service in North America, with rapid and detailed response to your requirements.

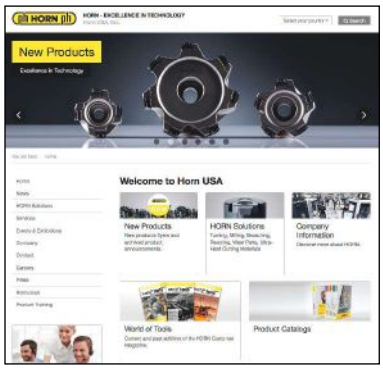
ISO 00P

- Round milling system for the Die & mold industry
- Retention clamp for secure milling
- Advanced substrates matched to the application
- Optimized insert position for excellent contour precision
- Shellmill, cylindrical, & modular fixation 10-160 mm Ø
- Insert Sizes 5,7 10,12, & 16

Broaching Geometries and Coolant

- Supermini® and S117 series inserts
- Geometries designed for broaching units and conventional broaching
- Superior coolant delivery for longer tool life
- Geometries for Difficult to Machine materials
- Wide range of broaching units supported
- Advanced AN25 Grade
- Supermini® 105 & 110 Geometry A & B
- S117 Geometry A & B
- Geometry A for broaching units
- Geometry B for conventional broaching
- SHM117 and SH117 with 3 outlet coolant

WEBSITE



hornusa.com

PRODUCT CATEGORIES

- **Milling Tools**
- **Turning Tools**
- **Broaching Tools**
- **Drilling Tools**
- **Reaming Tools**
- **Whirling Tools**
- **PCD, CBN, MCD, CVD-D Tipped Tools**
- **Tools for Machining Sintered Carbide**

THE TOOL

HORN is outstanding cutting-edge technology, performance, and reliability. Accomplish more: our precision tools make the difference.

www.hornusa.com

Crystallume

A DIVISION OF ROBBJACK CORPORATION

Crystallume
3397 De La Cruz Blvd.
Santa Clara, CA 95054

Phone: 408-653-1700
Toll Free: 800-789-4322

crystallume.com

PRODUCTS/SERVICES

Founded in 1984, Crystallume pioneered the development and application of Chemical Vapor Deposition (CVD) diamond technology. Since then, Crystallume's coating experts have become specialists at solving customer problems with diamond technology.

The DCC® (Diamond Coated Carbide) technology developed by Crystallume in 1992, produces continuous diamond coating with all the extreme chemical and physical properties of natural and high-pressure high temperature (HPHT) synthetic diamond. It is essentially pure diamond that is grown from methane gas. Diamond Coated Carbide is superior to other alternative coatings like DLC, PCD, and Plated Diamond.

Contact one of Crystallume's engineers for recommendations of how to implement diamond into your manufacturing process and improve your product performance today!

Stealth Line

Tolerences:
Cutting Diameter = +0.001/ -0.001"
Shank Tolerance h6
Flute Length = ±0.060"
Overall Length = ±0.060"

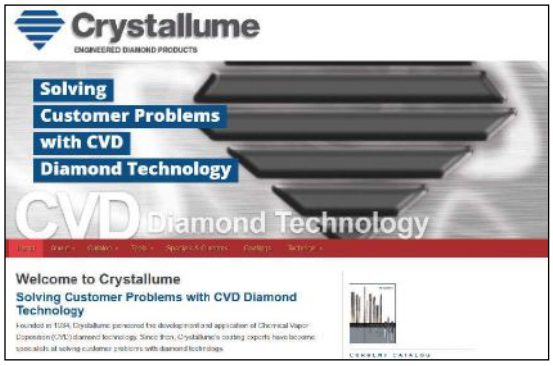
The sharpest cutting edge available in a diamond coated tool. The performance of real diamond, along with the edge sharpness of a thin coating, gives unheard of performance in the finishing of graphite. It is also the perfect tool for rib machining on graphite electrodes.

Lightning Line

Tolerences:
Cutting Diameter = +0.001/ 0.001"
Shank Tolerance = 0.0001/ 0.0003"
Flute Length = ±0.060"
Overall Length = ±0.060"

Real Crystalline Diamond Coating—Between Thunderbolt and Standard Premium in Thickness. The Lightning Series of tools are a cost-effective solution for the machining of graphite electrodes. By reducing the coating thickness, the edge sharpness is increased, and the cost reduced. These tools are a great solution for medium-lot size jobs.

WEBSITE

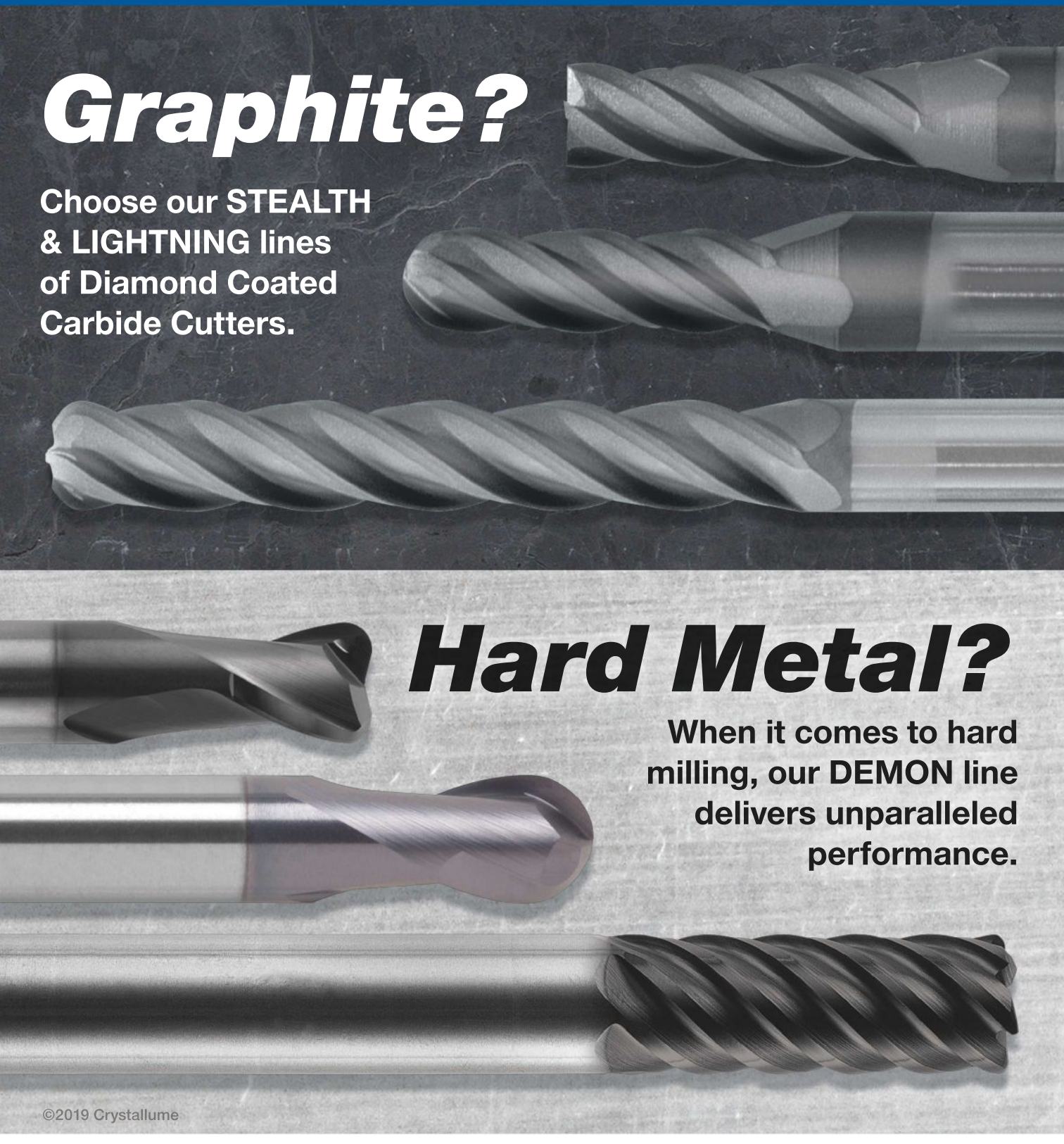


crystallume.com

PRODUCT CATEGORIES

- **Cutting Tools**
- **End Mills**
- **Hard Milling**
- **Coatings, Plating Services**
- **Part & Tooling Production Services – Additive Manufacturing**

DIAMOND DONE RIGHT — Made in the U.S.A.



Crystallume
A DIVISION OF ROBBJACK CORPORATION
Made in the U.S.A.

To learn more, call
1-800-789-4322
or visit www.crystallume.com

Walter USA, LLC
N22W23977 RidgeView Pkwy. W
Waukesha, WI 53188 US

Phone: 800-945-5554

walter-tools.com

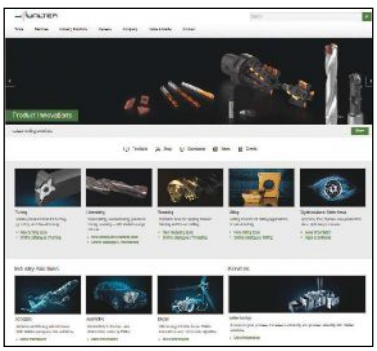
PRODUCTS/SERVICES

M4000 with Tiger·tec® Gold

M4000 is the universal system for all users who want to have as many options as possible when milling. That's because the M4000 range can master all machining tasks with one type of indexable insert. Whether used in shoulder milling cutters, high-feed milling cutters, face milling cutters, chamfer milling cutters, T-slot milling cutters, helical milling cutters or routing cutters, the square system inserts can be used across the entire M4000 range. For routing cutters and helical milling cutters, the range also has an additional rhombic indexable insert.

The low storage and procurement costs clearly show that this system places particular emphasis on cost efficiency. Efficiency is also maximized thanks to extremely easy handling and impressive performance data across the M4000 tool family. And with the new Tiger·tec® Gold indexable inserts, our high-performance milling tools are achieving an unprecedented level of productivity.

WEBSITE



walter-tools.com

PRODUCT CATEGORIES

- Coolants
- Cutting Tools
- End Mills
- Finishing Services
- Inserts
- Lathe Tooling and Accessories
- Machining Services
- Profilers
- Reamers
- Toolholders

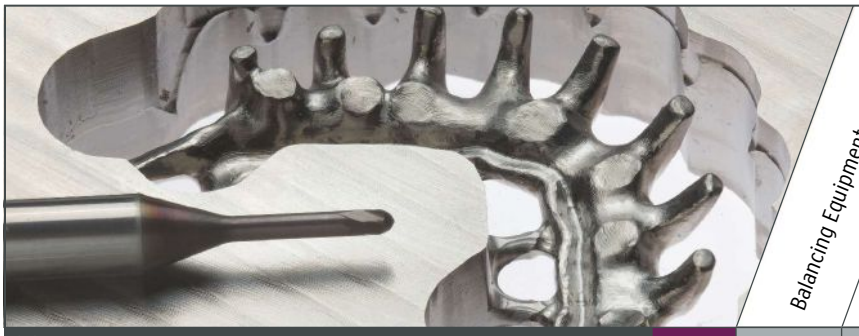
Tiger·tec® Gold
Go for better, go for Gold.

100 YEARS WALTER

For those who won't settle for anything but the best: Tiger·tec® Gold
If you had to make a choice right now – between maximum tool life, uncompromising process reliability and optimum productivity – which one would you pick? Why not choose the freedom to never have to choose again. Stay true to your own high standards in every way.
Choose Tiger·tec® Gold.

walter-tools.com/us

WALTER
Engineering Kompetenz



COMPANY Advertisers are listed in bold type.	See Ad	1 Balancing Equipment	2 Coolants	3 Cutting Fluids	4 Cutting Tools	5 End Mills	6 Grinding Wheels
BIG Kaiser Precision Tooling Inc. – Hoffman Estates, IL, 224-770-2999					4	5	
Cobra Carbide – Riverside, CA, 951-280-4700					4	5	
Cole Carbide Industries, Inc. – Orion Township, MI, 586-757-8700					4	5	
Crystallume – Santa Clara, CA, 408-653-1700	**63**				**4**	**5**	
CVD Diamond Corporation – London, ON, 519-457-9903					4	5	
Dapra Corporation – Bloomfield, CT, 860-242-8539					4	5	
Data Flute – Pittsfield, MA, 413-499-3895					4	5	
Drill Masters - Eldorado Tool – Milford, CT, 203-878-1711					4		
EDM Network Inc. – Sugar Grove, IL, 630-466-5588							
Emuge Corp. – West Boylston, MA, 508-595-3600				3	4	5	
Greenleaf Corporation – Saegertown, PA, 814-763-2915					4	5	
Haimer USA – Villa Park, IL, 630-833-1500	**69**	**1**			**4**	**5**	
Horn USA Inc. – Franklin, TN, 615-771-4100	**61**				**4**	**5**	
Ingersoll Cutting Tools – Rockford, IL, 815-387-6600					4	5	
Iscar Metals, Inc. – Arlington, TX, 817-258-3200	**59**				**4**	**5**	
JM Performance Products, Inc. – Fairport Harbor, OH, 440-357-1234							
Kennametal Inc. – Latrobe, PA, 800-446-7738				3		5	
LMT USA, Inc. – Waukegan, IL, 847-693-3270					4	5	
Micro 100 Tool Corp. – Meridian, ID, 208-888-7310					4	5	
Millstar – Orion Twp., MI, 586-573-9450					4	5	
Monster Tool Company – San Marcos, CA, 888-227-2433					4	5	
Nachi America Inc. – Greenwood, IN, 317-530-1001					4	5	
Niagara Cutter – Troy, MI, 248-528-5220					4	5	
NSK America Corp. – Hoffman Estates, IL, 847-843-7664							
OSG USA, Inc. – Glendale Heights, IL, 630-790-1400					4	5	
REGO-FIX Tool Corp. – Whitestown, IN, 317-870-5959		1					
RobbJack Corporation – Lincoln, CA, 916-645-6045					4	5	
RoundTool Laboratories – Huntington Beach, CA, 800-854-2431					4	5	
Sandvik Coromant Co. – Fair Lawn, NJ, 201-794-5000					4	5	
SCHUNK, Inc. – Morrisville, NC, 919-572-2705	**81**			**3**			
Scientific Cutting Tools – Simi Valley, CA, 805-584-9495					4		
Seco Tools, LLC – Troy, MI, 248-528-5200					4	5	
Single Source Technologies – Mason, OH, 800-336-7283		1	2	3	4	5	
Sumitomo Electric Carbide, Inc. – Mt. Prospect, IL, 847-635-0044					4	5	6
Tool Alliance – Huntington Beach, CA, 714-898-9224					4	5	
Tool-Flo Manufacturing Inc. – Houston, TX, 713-941-1080					4	5	
Transor Filter USA – Elk Grove Village, IL, 847-640-0273				3			
Tungaloy America – Arlington Heights, IL, 888-554-8394				3	4		
Walter USA, LLC – Waukesha, WI, 262-347-2400	**65**		**2**		**4**	**5**	
YG-1 Tool Co. – Vernon Hills, IL, 800-765-8665					4	5	

For more supplier listings, go to moldmakingtechnology.com/suppliers.

Hard Milling	High-Feed Milling	High-Speed Electric Spindles	Inserts	Lathe Tooling and Accessories	Profilers	Reamers	Tool Management Systems	Toolchangers	Toolholders	WEBSITE
7	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**WEBSITE**
			10	11			14		16	bigkaiser.com
			10			13			16	cobracarbide.com
7	8		10						16	colecarbide.com
			10							**crystallume.com**
										cvddiamond.com
7	8		10							dapra.com
7	8									dataflute.com
						13				dmetool.com
7	8									edmnetwork.com
7	8		10	11		13			16	emuge.com
7	8		10	11					16	greenleafcorporation.com
7	**8**						**14**		**16**	**haimer-usa.com**
7	**8**		**10**	**11**	**12**	**13**			**16**	**hornusa.com**
7	8		10	11		13	14		16	ingersoll-imc.com
7	**8**		**10**	**11**		**13**	**14**		**16**	**iscarmetals.com**
									16	jmperformanceproducts.com
			10	11	12	13			16	kennametal.com
			10	11						lmtusa.com
			10	11	12				16	micro100.com
			10						16	millstar.com
7	8					13				monstertool.com
										nachiamerica.com
7	8									niagaracutter.com
	8	9								nskamericacorp.com
7	8		10			13			16	osgtool.com
7				11					16	rego-fix.com
			10							robbjack.com
7	8									roundtool.com
			10	11					16	sandvik.coromant.com
				11					**16**	**us.schunk.com**
			10	11	12	13			16	sct-usa.com
7	8		10	11		13	14		16	secotools.com/us
		9	10					15	16	singlesourcetech.com
7	8		10	11		13			16	sumicarbide.com
7			10			13				toolalliance.com
			10		12				16	toolflo.com
										transorfilter.com
7	8		10	11		13			16	tungaloy.com/us
			10	**11**	**12**	**13**			**16**	**walter-tools.com/us**
7	8		10	11					16	yg1usa.com

Image courtesy of Seco Tools.

End Mills Achieve Greater Depth of Cut in Aluminum

RobbJack's FMHV two- and three-flute end mills are designed for high-horsepower, high-velocity aluminum aerospace machining. The company says its Mirror edge geometry progressively reduces vibration at greater Z-depths of cut. Anti-pullout shank technology prevents tools from pulling out of the holder. Well-suited for high-speed machining of deep pockets and thin walls, the tools are available with through-coolant holes and a DLC coating that extends tool life in roughing applications. Overall length and reach length are designed to maximize gripping force in tight-tolerance toolholders. The company reports that a 1" diameter, three-flute FMHV with through-coolant holes and DLC coating can achieve a peak metal-removal rate of 713 ipm³ (72 lbs of 7075 aluminum per min.).

RobbJack Corp. / 844-342-0238 / robbjack.com

Circle Segment End Mills Increase Material Removal

Emuge Corp. has introduced circle segment cutters, a class of end mills designed to enable more material removal with fewer passes in five-axis machining. They are said to reduce cycle times by over 80 percent and to produce smoother surface finishes. The end mills are ideal for machining turbine blades, impellers and blisks, as well as in moldmaking applications. They feature unique forms with large radii in the cutting area of the mills, enabling a larger axial depth of cut during pre-finishing and finishing operations.

The solid carbide end mills are offered in four geometries: barrel-shaped, oval form, taper form and lens-shaped. Oval and taper form mills are ideal for curved shapes such as blades or straight-walled pockets, freely engaging more of the cutting edge. Barrel mills provide effective flank milling to the sides of spiral grooves and similar applications, while lens-shaped mills are designed for narrow channels or in lands on molds. CAM software, such as the more recent versions of HyperMill or Mastercam, is required to support and compute the geometries of the end mills for maximum performance.

Emuge Corp. / 800-323-3013 / emuge.com

New Indexable Insert Drill Provides Trouble-Free Drilling in Virtually All Conditions

Walter has introduced the D3120, an indexable insert drill it says is built to provide trouble-free drilling in virtually all conditions. The D3120 features square positive indexable inserts with four cutting edges, enabling it to reduce cost per cutting edge.

Available in five diameter sizes ranging from 0.63-1.654-in (16-42 mm) and with 2, 3, 4 x Dc, the new drill delivers maximum process reliability with simple and efficient chip removal, two coolant channels and polished flutes. Superior protection against friction is provided by the D3120 hardened and polished surfaces. This combination of surface hardness and improved coolant flow results in reduced wear on the drill surface.

The new drill is easy to use since it has one indexable insert shape for both outer and inner seat, and a measuring collar for easy diameter identification. The drill is suitable for ISO material groups P (steels), M (stainless steels), K (cast irons), N (nonferrous) and S (super alloys). Torx Plus screws give it secure indexable insert clamping and high stability in all working conditions.

The D3120 features long tool life because of Walter Tiger·tec Silvergrade, which features increased wear resistance due to its unique aluminum oxide layer with optimized microstructure, as well as low wear due to the extremely smooth rake face it creates.

Walter USA, LLC / 800-945-5554 / walter-tools.com/us

Insert Drill's Redesign Improves Chip Control

Seco Tools LLC spotlights its redesigned Perfomax indexable insert drill. Designed for more aggressive drilling parameters as well as improved chip control and evacuation, the drill's flutes have updated helix angles and smoother chip flute exits. An engineered wave pattern reduces contact between chips and flute surfaces. The fronts of the Perfomax's flutes have been hardened with a laser to prolong tool life. A hardness of HRC 60 enables the drill to withstand chip erosion for longer periods of time.

Perfomax drill bodies are available in diameters ranging from 0.594 to 2.375 inches (15 to 59 mm); in length-to-diameter ratios of 2×D, 3×D, 4×D and 5×D; and in most spindle interfaces.

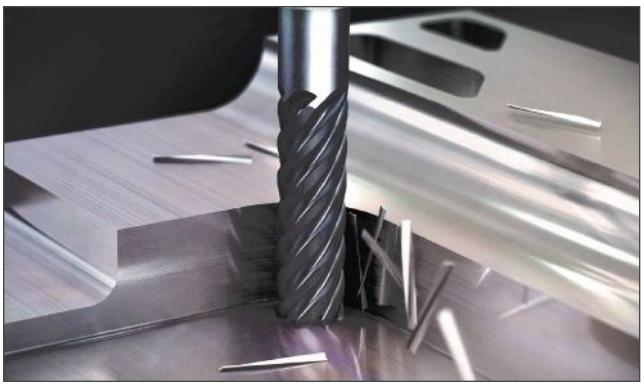
Seco Tools LLC / 800-832-8326 / secotools.com

End Mills Enable Trochoidal Milling, Fine Finishing

YG-1 Tool Co. features the V7PlusA series of end mills, which features four- and six-flute models, and the Titanox series, which offers four- and five-flute models that provide better performance in heavy cutting, trochoidal milling and fine finishing, according to the company.

The six-flute models from the V7PlusA series offer improved cutting geometry, making them more applicable to trochoidal and peel milling. For heavier cuts, the four-flute models provide variable-helix and unequal pitch design, which helps to eliminate vibration.

YG-1 Tool Co. / 800-765-8665 / yg1usa.com



Milling Tools Resist Chatter, Pullout

New geometries for **Haimer**'s Power Mill line of solid carbide end mills and and Duo-Lock line of modular milling heads include designs for aluminum and mold steels. Unequal flute and helix designs provide chatter-free machining. The company's tools are made from K20-K40-grade fine-grain carbide.

The latest tools include two- and three-flute end mills for aluminum, which are available in solid carbide or as a modular interface (Duo-Lock), four- to 10-flute end mills for working in steel, and various specialized cutting tools. Special tools include a multifunction chamfer spotting tool, four- and five-flute roughing mills for steel, a quadrant end mill, and ball nose end mills for steel and aluminum. All are available as solid carbide end mills or Duo-Lock interfaces. The company also offers the Basic Mill line of solid carbide end mills and Duo-Lock milling heads for roughing, finishing and drilling. All tools are available with the optional Safe-Lock anti-pullout system.

Haimer USA / 866-837-3265 / haimer-usa.com

Diamond-Tipped Tools Cut Sintered Carbide

Horn USA's CVD-D-tipped tools are designed for drilling, turning and milling carbide in the sintered state, ranging to a hardness of 2,200 Vickers. The geometrically defined cutting edges range from extremely sharp and rounded to positive and negative chamfers. With application-specific cutting edge optimization, CVD-D diamond can be useful for roughing work or fine finishing. According to the company, the tools enable accurate profile machining in the micron range. In terms of roughness, polishability and corrosion behavior, the surface structure is reportedly comparable to grinding and eroding processes.

Horn USA Inc. / 888-818-4676 / hornusa.com

How to Hard-Mill **Effectively**

Image courtesy of Seco Tools.

Hard milling is a highly effective strategy for machining complex features on 2D and 3D parts, such as mold cavities, gates, heat-sinks and even die pockets in tool steel above 48 HRC. However, the devil is in the details.

By Jay Ball

Hard milling requires the utmost attention to detail to achieve maximum performance and tool life and tight tolerances down to 0.0001 inch. These tips help machinists get the most from hard milling.

Maintain a constant chip load and feed rate. Machine tools rapidly fluctuate feed rates when machining complex surfaces and cutter paths, which drastically reduces tool life. Machinists must understand that when machining complex surfaces, machine tools do not reduce rpm in conjunction with feed-rate reductions. So, if the machine cannot maintain programmed feed rates 80 percent of the time, operators should record the average feed rates and then reduce the feed rates and rpm accordingly. For example, if an operator programs a 30,000 rpm and a 150-ipm feed rate, but the machine can only maintain an average feed rate of 75 ipm, the operator should reduce the rpm to 15,000. The subsequent reduction in rpm will increase tool life by 50 percent and impact cycle time negligibly.

Do not leave extra stock for finishing. When machinists are machining tool steels above 48 HRC, extra finish stock will reduce output and wreak havoc on surface finish and tool life. A general rule for finish-stock allowance is 1 to 2 percent of the finish-cutter diameter. Most cutting-tool manufacturers base their finishing cutting data on 1 to 2 percent of the tooling diameter engagement, so leaving more than that decreases productivity. For example, when using a tool with a 0.5-inch diameter, leave no more than 0.005 to 0.010 inch of finish stock.

Leave consistent stock on all surfaces. After a machinist roughs a complex surface, he or she should run a rest-rough and semi-finish tool path to ensure consistent finish stock on all surfaces. For example, when a machinist roughs out a complex 3D surface using a 12-millimeter ball-nose end mill, and the intended finishing cutter diameter is 8 millimeters, a safe practice for ensuring 0.003 to 0.006 inch of stock on all surfaces is to rest-rough with a 10-millimeter ball-nose end mill and then semi-finish with an 8-millimeter ball-nose end mill. Then the machinist should finish mill with a new 8-millimeter ball-nose end mill to ensure all surfaces have a consistent surface finish. This practice also extends finishing cutter life and enables the machinist to use the finishing ball-nose end mill as a semi-finishing tool when the life of the finishing tool ends.

Use strong, precise toolholders. High-precision holders are crucial when hard milling to achieve maximum tool life. Run-out must be limited to less than 0.0004-inch to maximize tool life. Machinists can achieve this level of precision with most shrink-fit holders, milling chucks, high-precision collet chucks and select end-mill holders. A precise holder ensures process accuracy, whereas a less secure holder can cause unpredictable tool life and produce out-of-tolerance surfaces.

Follow recommended cutting parameters. Cutting data is optimized according to the tool's design and for specific material groups, as some common hardened tool steels present unique challenges, so machinists should use recommendations as a starting point. The machinist can make modifications depending on the application. MMT

CONTRIBUTOR

Jay Ball is the product manager for solid end mills for Seco Tools.

FOR MORE INFORMATION

Seco Tools / 800-832-8326
jl.ball@secotools.com / secotools.com

Image courtesy of Makino.

REGISTER NOW!

Modern Machine Shop **TOP SHOPS**

2019 CONFERENCE

SEPTEMBER 9-11, 2019 | CINCINNATI, OH

BUILD YOUR MACHINING BUSINESS

Modern Machine Shop Top Shops Workshop is the place to build your business. The event connects the leaders in machining and metalworking – the top shops, the top suppliers, the top innovators.

Gardner Business Media Metalworking Group

Modern Machine Shop | PM Production Machining | MoldMaking Technology | Additive Manufacturing | AD&P | TechSpex

TopShopsEvent.com

IN PARTNERSHIP WITH: NTMA | AMT The Association for Manufacturing Technology

HURCO®
mind over metal®

Hurco Companies, Inc.
One Technology Way
P.O. Box 68180
Indianapolis, IN 46268

Toll-Free: 800-634-2416
Email: info@hurco.com

hurco.com

PRODUCTS/SERVICES

Hurco Expands BXi Line

Hurco has added a new model to the BXi CNC machine series: the BX50i (XYZ Travels 37.4" x 53.2" x 23.6"). The rigidity and thermal stability of the double-column design and the overall weight of the machine provide exceptional accuracy and outstanding surface finish capabilities. Designed with the mold and aerospace industries in mind, the BXi machine meets the needs of any high speed machining application that requires tighter tolerances.

The ladder design of the BX50i bridge provides maximum support to the head casting; and the spindle center line is closer to the supporting structure, allowing increased rigidity. Additionally, the bridge structure is isolated from part weight and operates in a stable and predictable manner.

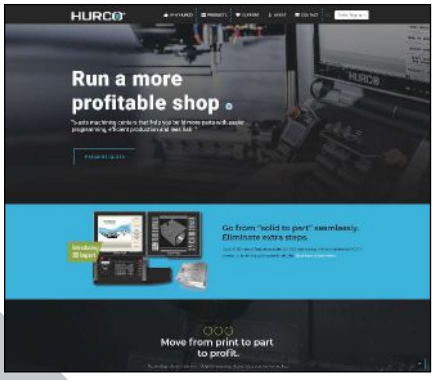
The BX50i differs from other bridge-type CNC machines due to the integrated Hurco control powered by WinMax® control software and the patented motion system called UltiMotion® (Hurco.com/UltiMotion). The control helps machinists and job shops be more productive and profitable by supporting multiple programming methods: conversational programming; NC programming; and a Hurco-specific feature called NC/Conversational Merge that optimizes efficiency even further.

The Hurco control is equipped with the most robust technical specifications of any control on the market. For example, the Hurco MAX5 control comes with 4GB RAM Memory, a 2.7 GHz

Dual Core Processor, a 128GB Solid State Hard Drive, up to 4,000 bps processing speed, and up to 10,000 block lookahead.

With the addition of 3D Import to the Hurco control, you can go from "solid to part" seamlessly—eliminating the need for extra steps. Hurco engineers have invented 3D Import, which includes 3D DXF technology that displays all geometry that the CAD system outputs, including splines. Learn more at Hurco.com/3DImport.

WEBSITE



hurco.com

PRODUCT CATEGORIES

- **Horizontal Machining Centers**
- **Lathes**
- **Machine Control Software**
- **Machine Controls**
- **Milling Machines**
- **Vertical Machining Centers**

JINGDIAO

Jingdiao North America
1400 E. Business Center Drive
Ste. 103
Mount Prospect, IL 60056

Phone: 847-906-8888
Email: usa@jingdiao.com

us.jingdiao.com

PRODUCTS/SERVICES

Jingdiao CNC equipment has a significant advantage in precision mold and die machining, and provides guarantee for the machining effect. Strict control of machine assembly accuracy index, and using advanced vibration-resistance technology of machine, spindle and screw fine control technology, increase the grating ruler to constitute the full closed loop system and other means ensures that Jingdiao's high speed machining center achieve the high accuracy and high stability requirement, which makes the machining process more stable and efficient, greatly improving the machining accuracy.

The quality of die molds influences the product's quality directly. As the demands for better product quality continues to increase, it results in higher requirements on the surface effect and precision of mold. On one hand, good surface quality makes it easy to demold, improves product quality and extends service life. On the other hand, high precision and interchangeability can reduce manual participant in molding process, improve efficiency so that you can respond to your customers faster. These make it really necessary for you to transplant Jingdiao die mold solution to your sites. Not because we can help you to machine one pair of precision die mold, but because it's possible to realize standardized mold making without secondary operation by using our solution.

As we can accurately control the fitting tolerance within 5μm and stably machine optical mold with 10nm surface roughness.

The idea of our solution is controlling the tolerance of each process within 5μm, because if each process is controlled precisely the mold will fit perfectly. By using Jingdiao's precision control technology, it won't be a difficult task since the temperature fluctuation inside machine can be controlled less than 2μ, tool wear is smaller than 2μm and machining at the speed with lowest vibration. Moreover, Jingdiao OMIM technology can inspect machining tolerance of each process, based on the data shown on control system, and the operator can decide whether to carry out the next process or not, so that every decision is well-founded.

WEBSITE

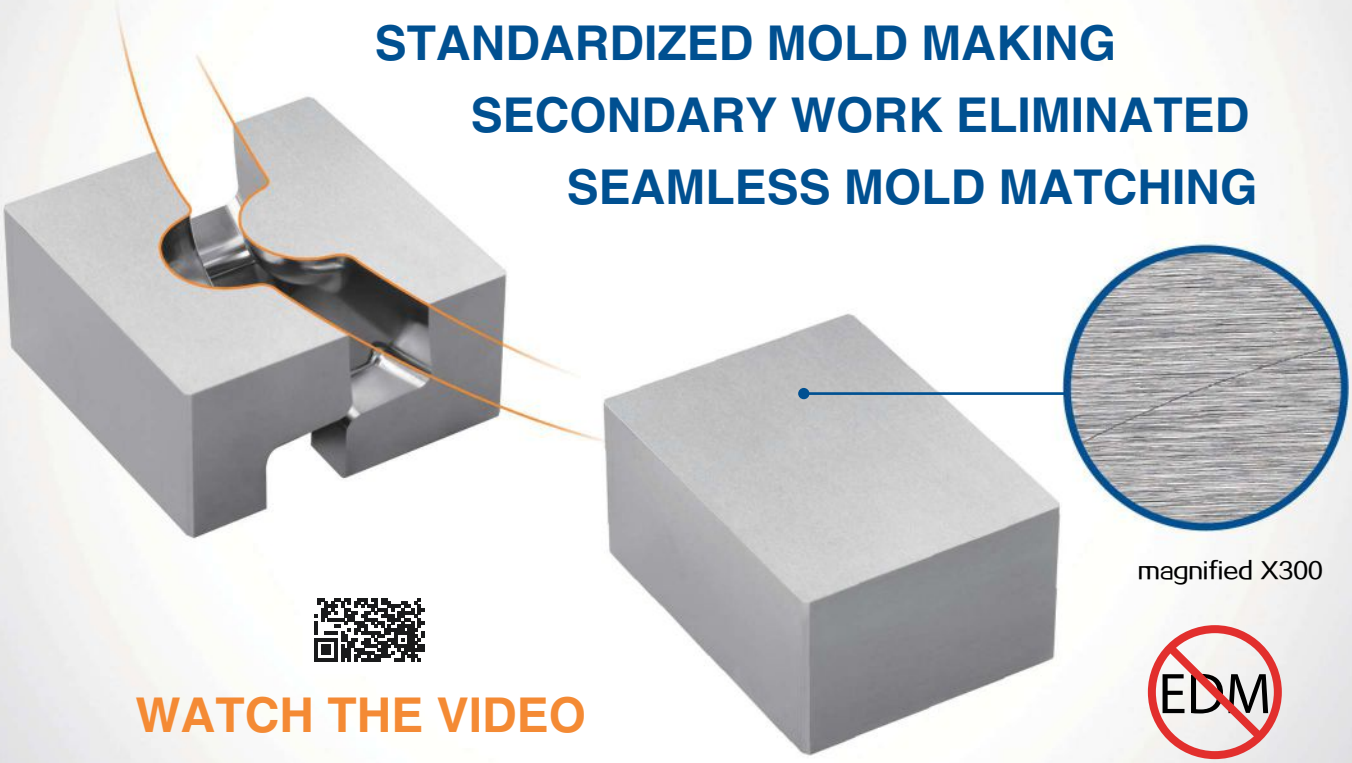
us.jingdiao.com

PRODUCT CATEGORIES

- **Machining Centers**
- **Mold and Dies**
- **Inspection and Measurement**
- **Cutting Tools**
- **Toolholders**
- **Software**

JINGDIAO - THE PERFECT FIT

ON MACHINE MEASUREMENT
STANDARDIZED MOLD MAKING
SECONDARY WORK ELIMINATED
SEAMLESS MOLD MATCHING



magnified X300

WATCH THE VIDEO

EDM

Jingdiao, the one to call for ingenious and time proven solutions for those difficult applications that everyone else stays clear of.

JINGDIAO HIGH-SPEED MACHINING CENTER

- Capable of “0.1μm feed and 1μm machining”
- Mirror finish, surface roughness Sa < 10nm
- 3 axis machining accuracy within 8μm
- 5 axis machining accuracy within 10μm
- 10:1 ratio micro-hole drilling
- 14:1 ratio deep slotting

JINGDIAO NORTH AMERICA, INC.
1400 E. Business Center Drive, Ste.103
Mount Prospect, IL 60056
Phone: (847) 906-8888
Email: usa@jingdiao.com
Web: www.jingdiao.com/en

Precision
Innovation
Collaboration

HEIDENHAIN

HEIDENHAIN Corporation
333 East State Parkway
Schaumburg, IL 60173-5337

Phone: 1-847-490-1191
Fax: 1-847-490-3931

heidenhain.us

PRODUCTS/SERVICES

TS 460 Workpiece Probe and TT 460 Tool Probe

The TS 460 workpiece probe and the TT 460 tool probes are the only devices in the market that have combined radio/infrared signal transmission. Together with the receiver, the SE 660 or (SE 661 for Endat) the system provides optimized signal quality for usage on both smaller, larger machines and transfer lines. Further, the TS 460 offers a patented collision adapter and an integrated workpiece cleaner.

5-Axis Mill-Turn Control

HEIDENHAIN 5-axis simultaneous Mill-turn control is now offered with ground-breaking touch technology that supplements its many field-proven cycles. The operator navigates quickly and intuitively through long lists, programs, and tables by what is known as kinetic scrolling. The kinetic scroll converts the impulse of hand contact into a particular scrolling speed. TNC 640 now features Global Programming Settings with virtual tool axis, Batch Process Manager for order sequencing and Tool-oriented machining.

StateMonitor (SM)

HEIDENHAIN StateMonitor (SM) captures, visualizes and evaluates machine data and can export error messages and machine status modes to operator's tablets or smartphones. Thereby SM helps reduce downtime. Override settings such as spindle speed, rapid traverse and feed rate are visible and the utilization rate and availability are calculated. SM is easy to setup, connects to older HEIDENHAIN controls and MTconnect (Fall 2018) and its configurations can be customized.

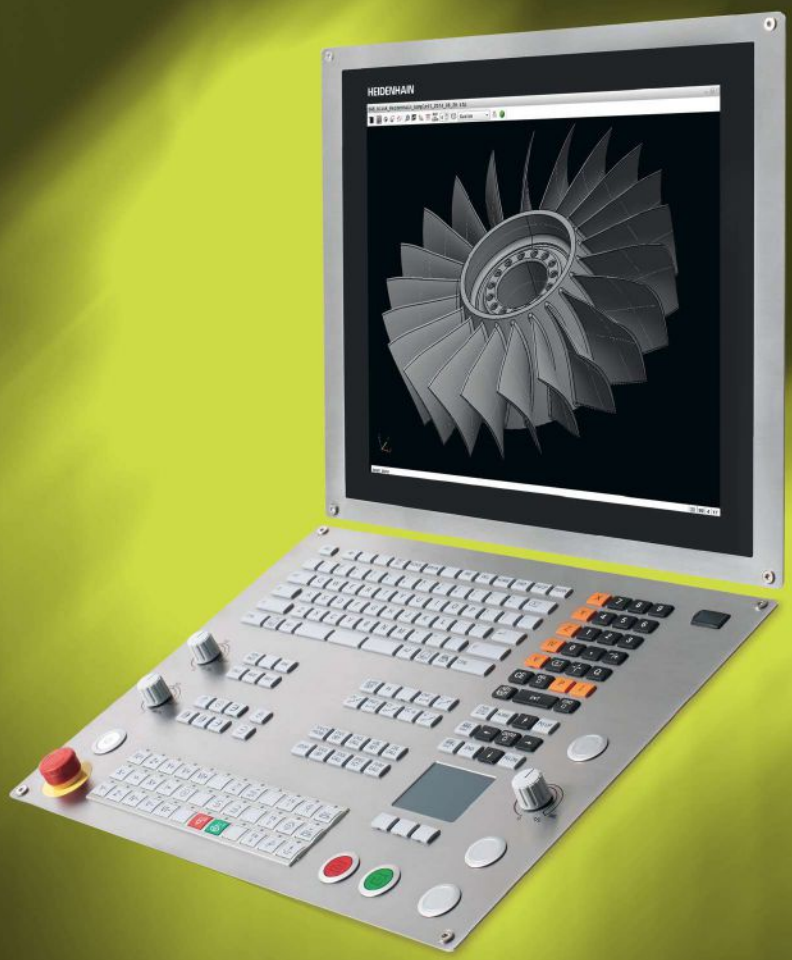
WEBSITE

HEIDENHAIN manufactures linear and angle encoders, rotary encoders, digital readouts and numerical controls for demanding positioning tasks. HEIDENHAIN products are used primarily in high-precision machine tools.
heidenhain.us

PRODUCT CATEGORIES

- **Linear Encoders**
- **Angle Encoders**
- **Rotary Encoders**
- **Grid Encoders**
- **Length Gauges**
- **CNC Controls**
- **Subsequent Electronics**
- **Touch Probes**
- **Measuring and Test Equipment**

HEIDENHAIN



TNC 640 – High-End Control for Milling and Turning Operations

The TNC 640 from HEIDENHAIN: for the first time, milling and turning are combined in one TNC. Now users can switch as desired between milling and turning—within the same NC program. Switchover is independent of the machine kinematics. It automatically takes the respective operating mode into account and without any additional action. This new simplicity is complemented by dialog-guided plain language programming, the optimized user interface, powerful programming aids as well as comprehensive cycle packets taken from amply field-proven HEIDENHAIN controls into the TNC 640.

HEIDENHAIN CORPORATION, 333 East State Parkway, Schaumburg, IL 60173 847-490-1191 www.heidenhain.us

Angle Encoders + Linear Encoders + Contouring Controls + Position Displays + Length Gauges + Rotary Encoders

UNISIG
DEEP HOLE DRILLING SYSTEMS

Unisig
N58 W14630 Shawn Cir.
Waukesha County
Menomonee Falls, WI 53051

Phone: 262-252-3802
Email: sales@unisig.com

UNISIG.com

PRODUCTS/SERVICES

USC-1.5M, USC-2M and USC-3M

Featuring universal milling and indexable gundrilling spindles, UNISIG's USC-1.5M, 2M and 3M machines are designed to allow moldmakers to overcome their toughest manufacturing challenges. With robust milling capabilities, advanced Heidenhain interface and drive systems, generous work envelopes, and effective table capacities, these models offer expansive manufacturing versatility for highly productive roughing and finishing applications as well as gundrilling. The machines' smaller footprints and above-floor installation save space without sacrificing UNISIG quality and capabilities.

USC-M38 and USC-M50

This all-in-one deep hole drilling and machining center reduces production time and gives manufacturers confidence to produce world-class molds. The 7-axis configuration features a 4,000 rpm milling spindle and 5,000 rpm deep hole drilling spindle—backed by Heidenhain controls, scales, motors and drives—for exceptional accuracy and speed. Mold manufacturers no longer need dedicated drilling machines or boring mills—they can now have it all inside one package, reducing lead times and improving ROI.

WEBSITE

UNISIG has nearly 40-years of experience delivering precise and intuitive gundrilling, BTA, trepanning, skiving and multi-process CNC machines. Our solutions are engineered and manufactured in the U.S.A.

UNISIG.com

PRODUCT CATEGORIES

- **Deep-Hole Drilling Machines**
- **Gun Drilling Machines**
- **Drilling Machines**
- **Five-Axis Machining Centers**

UNISIG.COM

UNISIG

UNISIG TAKES **MOLDMAKERS FURTHER**

Gundrilling and milling on the same machine will change how you think about making molds.

UNISIG has the right deep hole drilling machine for any shop, from high-performing entry-level machines to fully automated solutions.

Check our expanded machine lineup for 2019 at UNISIG.COM.

UNISIG
DEEP HOLE DRILLING SYSTEMS

UNISIG machines are engineered and manufactured in the USA

SCHUNK
211 Kitty Hawk Drive
Morrisville, NC 27560
ISO9001:2008
Certified

Toll-Free: 800-772-4865
Phone: 919-572-2705
Email: info@us.schunk.com

schunk.com

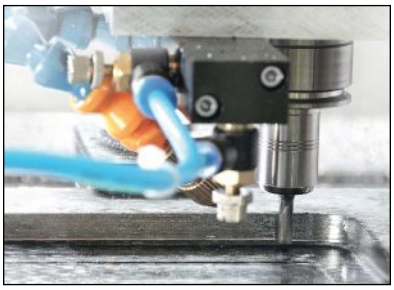
PRODUCTS/SERVICES

MAGNOS

The workpiece is placed flat onto the MAGNOS magnetic chuck, allowing for all five sides of the workpiece to be machined in one setup. With MAGNOS, the workpiece can be clamped within seconds, increasing productivity dramatically. It is not necessary to spend time on fine adjustment of clamping elements or changing the setup of the workpiece, reducing machine downtime to a minimum.

VERO S

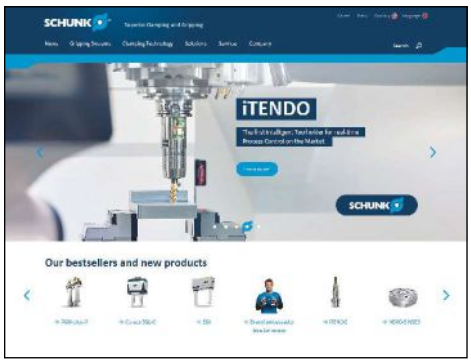
VERO-S is the modular quick-change pallet system for exceptionally fast and extremely precise resetting of workpieces, clamping devices, and many other components on modern 3, 4 and 5-axis machining centers. VERO-S reduces set-up times by up to 90% and therefore increases machine running times for optimal utilization machine capacity. VERO-S clamps workpieces, pallets, modules for stationary use, and tombstones using one or more clamping pins all with an accuracy of 5 microns or less.



TENDO Series

The TENDO Series achieves excellent vibration damping and improved surface quality. TENDO products increase the tool's service life, prevent chipping at the tool's cutting edge, and are completely maintenance-free. Enjoy consistent set up with a simple t-handle and no changes in runout, even with multiple tool changes for roughing, drilling, reaming, and finishing. With increased demands and high quality requirements, these precision toolholders exceed expectations and cut costs.

WEBSITE



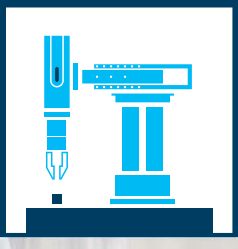
schunk.com

PRODUCT CATEGORIES

- **Quick Change Pallets**
- **Lathe Chucks**
- **Precision Toolholders**
- **Gripping Systems**

Equipped by

SCHUNK



It takes just **2** steps for commissioning

Electric ELP linear module

Up to **300** N gripping force

Electric EGP gripper for small components

Only **0,18** s/180° swivel time

Electric EGS gripper/swivel unit

Superior Clamping and Gripping

SCHUNK®

Everything for your Assembly Automation

More than 10,000 components.
Now NEW: The 24 V mechatronic program.

schunk.com/equipped-by

CHETO

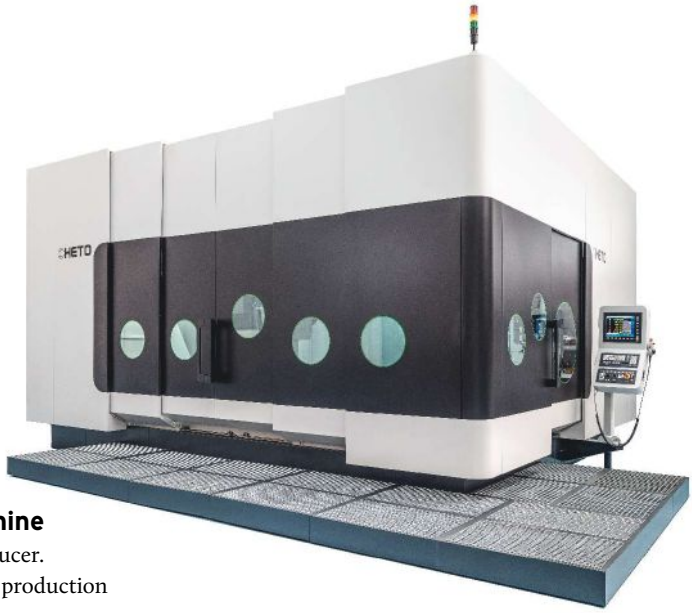
CNC DEEP HOLE DRILLING WITH MILLING

CHETO Corporation, SA
Área de Acolhimento Empresarial de UL-Loureiro
Oliveira de Azeméis
Portugal, 3720-070

Phone: 351-256-247-970

cheto.eu

PRODUCTS/SERVICES



CHETO CNC Deep Hole Drilling with Milling Machine

CHETO is a CNC deep hole drilling with milling machine producer.

We develop our product line with a focus to add value to the production process, mainly for the mold and die industry.

The Mold production is a complex and accurate process. Using CHETO machines you will get a reduction on cost and a much better time production.

The drilling process is slow, in comparable terms. Increasing the feed rates and saving time on overall process is our goal.

This is because the process is the most important factor to get the lower effective cost production and the best delivery time. CHETO is your partner.

WEBSITE

cheto.eu

PRODUCT CATEGORIES

- **Deep-Hole Drilling Machines**
- **Drilling Machines**
- **Five-Axis Machining Centers**
- **Gun Drilling Machines**

CHETO

CNC DEEP HOLE DRILLING WITH MILLING

Management System ISO 9001:2015
TÜVRheinland CERTIFIED
www.tuv.com ID 9105076158

www.cheto.eu

REVOLUTIONARY CONCEPT to OPTIMIZE DEEP HOLE DRILLING with MILLING

visit us at booth #1463
amerimold The Event for Mold Manufacturing 2019

visit us at booth #15C20
EMO Hannover 16-21·9·2019 The world of metalworking

WISE DECISIONS · DEEP REWARDS

IXN Series
our best seller
machine with
gun drill tool changer

SiC Model
the first **5-axes milling**
center with gun drill arm
in the world!

NORTE 2020 PROGRAMA OPERACIONAL REGIONAL DO NORTE
PORTUGAL 2020
UNIÃO EUROPEIA
Fundos Europeus Estruturais e de Investimento
©CHETO
CE

Okamoto
Emerging Abrasives Technology

Okamoto Corporation
370 Corporate Woods Pkwy
Vernon Hill, IL 60061 USA

Phone: 847-235-3500
Fax: 847-235-3274
Email: sales@okamotocorp.com

okamotocorp.com

PRODUCTS/SERVICES

Okamoto . . . Superior Products, Support and Service Worldwide

Okamoto Corporation's USA Corporate Headquarters are located just outside of Chicago, IL. This facility features a newly built state-of-the art showroom with precise temperature/humidity control ideal for customer test grinds. Additional US sales/support facilities centers are located in California, Kentucky and Connecticut.

Okamoto maintains manufacturing plants in Japan, Thailand and Singapore. In addition, Okamoto has 9 sales/service offices throughout Japan, 2 in Germany, 1 in the UK and 4 in China.

ACC-818NC CNC Form Grinder

The ACC-818NC 2-axis simultaneous CNC Form Grinder is ideal for surface, slot, step, form and contour grinding. It is available with ballscrew table drive enabling precise positioning making it ideal for use with a wide variety of third party indexing and centerless grinding devices.

Grind cylindrical components including pins, punches and mold components such as core pins with extreme accuracy and efficiency.

Table working area (W x L) is 8" x 18" with a 265 lb load capacity.

UGM-1224NC Universal Grinder

The UGM-1224NC 3-Spindle Universal Grinder is designed for single component high-precision multi-function grinding.

This compact grinder houses a dynamic high-performance 3-spindle turret style head with temperature controlled high-precision spindles that provide standard OD, Angular OD/Face and ID grinding in a single chucking, dramatically boosting productivity while assuring exceptional workpiece geometries and unparalleled accuracies. DD motor drive spindle indexing assures precise positioning. It's the ideal choice for complex parts that typically require multiple grinders.

WEBSITE

Visit our website to learn more about our wide range of high-performance grinding machines. See specifications, watch product videos, find your local dealer and more.
okamotocorp.com

PRODUCT CATEGORIES

- **Saddle Type Surface Grinders**
- **Single and Double Column Type Surface Grinders**
- **Rotary Type Surface Grinders**
- **Form Grinders**
- **Internal Grinders**
- **Cylindrical Grinders**
- **Vertical and Horizontal Universal Grinders**
- **Specialty Grinders**
- **Aerolap Polishing Machine**

Okamoto

Emerging Abrasives Technology

ACC-CHiQ Series
High Capacity Double Column Surface Grinders

GRIND-BIX High Productivity Coolant System available

Machine shown with options

Grinders

that streamline critical component production.

The best molds and dies make the best parts. ACC-CHiQ Series Double Column Grinders deliver a new degree of accuracy and efficiency for demanding mold and die-base production grinding, and other rigorous large component grinding applications.

- **40" x 80" Grinding Stroke** allows simultaneous grinding of two 40" x 40" mold sections
- Ultra-rigid, heavy-duty double column design and construction with Double-V Slideways
- Easy-to-use Okamoto iQ Touch Screen Control
- 30hp spindle motor (Ø20" x 4" x 5" wheel)
- Shift-Plunge Cycle for fast efficient stock removal
- Multi-level grinding capability

With nearly a century of grinding experience and a dedicated staff of grinding professionals we're ready to assist you.

370 Corporate Woods Parkway Vernon Hills, IL 60060 USA Tel: (847) 235-3500 Fax: (847) 235-3274

Okamoto Corporation www.okamotocorp.com

EROWA®
system solutions

EROWA Technology Inc.
2535 S Clearbrook Dr.
Arlington Heights, IL 60005

Phone: 847-290-0295

erowa.com/en/

PRODUCTS/SERVICES

EROWA Robot Compact 80

Like its predecessor, the EROWA Robot Compact 80 has a small footprint (less than 22 sq/ft) and able to load two machines, but the most noticeable improvement is that it now has a maximum transfer weight of 80kg (176lbs). Another enhancement is its ability to accommodate our UPC pallets (320 x 320 mm). Depending on configuration, the robot can hold over 300 palletized workpieces and up to 11 different pallet sizes. The optional integrated loading station can be used for large and heavy workpieces without interrupting the automatic program sequence of the robot.

EROWA CleverClamp

The clamping elements of EROWA's CleverClamp system are specifically tailored to the manufacture of one-off and small batch parts while the basic rails are calibrated to fit the EROWA UPC and EROWA MTS production tooling systems. The wide range of clamping elements can be quickly positioned on the serrated base rails and be used horizontally or vertically. An added feature of the system is that it can be universally automated. This increases customer's machine utilization by making use of off-hours when combined with an EROWA automation solution.

EROWA PowerChuck P

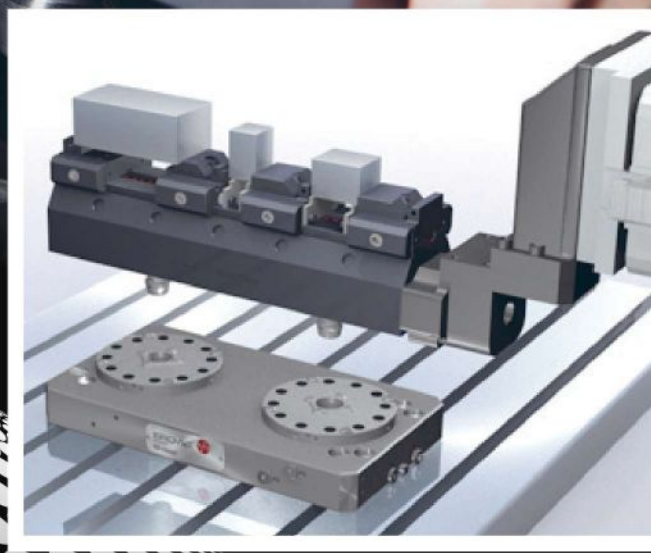
The latest model of our PowerChuck now includes two integrated compressed air ducts, which, when combined with a new version of the workpiece carrier pallet P (148 mm diameter), makes it possible to operate palletized fixtures pneumatically through the pallet and the chuck. This allows the fixture to be loaded with the workpieces during an automated manufacturing process. In addition to this, a robot can load and unload the machine with other palletized fixtures that are required depending on the order.

WEBSITE

EROWA Technology, Inc.is a full service supplier of palletization and automation systems for the North American manufacturing market. Visit the official EROWA website for the latest news and product information.
erowa.com/en/

PRODUCT CATEGORIES

- **Coordinate Measuring Machine (CMM) Software**
- **Coordinate Measuring Machines (CMMs)**
- **Data Management Software**
- **Electrode Holders**
- **Fixtures**
- **Fixtures, EDM**
- **Lathe Tooling and Accessories**
- **Loading/Unloading Systems**
- **Manufacturing Automation Software**
- **Pallet Changers**
- **Robots**
- **Toolchangers**
- **Workholding Equipment**



CleverClamp System

The seamless, modular workpiece clamping system. The wide range of available clamping jaws and surfaces hold any workpiece securely and accurately making the **CleverClamp System** ideal for one-off and small batch parts manufacturing. Increase productivity by integrating the CleverClamp base rails into your automation system.

www.erowa.com

EROWA®
system solutions

COMPANY Advertisers are listed in bold type.	See Ad	1 Boring Machines	2 CNC Software	3 Deep-Hole Drilling Machines	4 Drilling Machines	5 Five-Axis Machining Centers	6 Graphite Electrode Machines	7 Grinding Machines	8 Gun Drilling Machines	9 High-Speed Machining Centers	10 Horiz. Mach. Ctrs.
Absolute Machine Tools Inc. – Lorain, OH, 440-960-6911		1		3	4	5	6	7	8	9	10
Agathon Machine Tools, Inc. – Bethel, CT, 203-730-8741								7			
CHETO Corporation – Oliveira de Azeméis, Portugal, +351 256 820 384				3	4						
Chevalier Machinery Inc. – Sante Fe Springs, CA, 562-903-1929	**90**	**1**			**4**	**5**		**7**			**10**
DMG MORI – Hoffman Estates, IL, 847-593-5400			2	3	4	5		7		9	10
Doosan Machine Tools America – Pine Brook, NJ, 973-618-2500		1			4	5					10
EDM Network Inc. – Sugar Grove, IL, 630-466-5588							6			9	
Erowa Technology Inc. – Arlington Heights, IL, 847-290-0295	**87**										
FANUC America – Rochester Hills, MI, 248-377-7000			2								
FCS North America – Windsor, ON, Canada, 519-737-0372											
Fives Machining Systems – Hebron, KY, 859-534-4924					4					9	10
GF Machining Solutions – Lincolnshire, IL, 847-913-5300	**91**					**5**				**9**	**10**
Grob Systems Inc. – Bluffton, OH, 419-358-9015											
Haas Automation, Inc. – Oxnard, CA, 805-278-1800					4	5	6			9	10
Hardinge Inc. – Berwyn, PA, 800-843-8801						5		7			
Hurco Companies Inc. – Indianapolis, IN, 317-293-5309	**1**		**2**								**10**
Hwacheon Machinery America – Lincolnshire, IL, 847-573-0100						5	6			9	10
Hyundai WIA Machine America Corp. – Itasca, IL, 630-625-5600		1			4	5				9	10
Jingdiao North America – Mt. Prospect, IL, 847-906-8888	**75**		**2**		**4**	**5**	**6**	**7**		**9**	
Kitagawa NorthTech, Inc. – Schaumburg, IL, 847-310-8787			2								
Kitamura Machinery Of USA Inc. – Wheeling, IL, 847-520-7755					4	5				9	10
Makino – Mason, OH, 513-573-7200		1			4	5	6	7		9	10
Matsuura Machinery USA, Inc. – St. Paul, MN, 651-289-9700						5					10
Mazak Corporation – Florence, KY, 859-342-1700		1	2		4	5	6			9	10
MC Machinery Systems, Inc. – Elk Grove, IL, 630-616-5920	**95**					**5**	**6**			**9**	
Methods Machine Tools Inc. – Sudbury, MA, 978-443-5388		1	2		4	5	6			9	10
Milltronics USA, Inc. – Waconia, MN, 952-442-1410		1					6				10
Mitsui Seiki (USA) Inc. – Franklin Lakes, NJ, 201-337-1300		1				5		7		9	10
Okamoto Corporation – Vernon Hills, IL, 847-235-3500	**85**							**7**			
Okuma America Corporation – Charlotte, NC, 704-588-7000			2					7			10
Single Source Technologies – Mason, OH, 800-336-7283		1			4	5	6		8	9	10
Sodick, Inc. – Schaumburg, IL, 847-310-9000	**97**					**5**				**9**	
Takumi USA – Indianapolis, IN, 317-614-1515										9	
Tarus Products Inc. – Sterling Heights, MI, 586-977-1400				3		5			8	9	
Toyoda Americas Corporation – Arlington Heights, IL, 847-253-0340						5		7		9	10
TRAK Machine Tools – Rancho Dominguez, CA, 310-608-4422											
UNISIG – Menomonee Falls, WI, 414-252-3802	**79**				**4**	**5**			**8**		
United Grinding – Miamisburg, OH, 937-859-1975								7			
Yama Seiki USA, Inc. – Chino, CA, 909-628-5568					4	5				9	
YCM Technology (USA) – Carson, CA, 310-735-8610						5				9	10

For more supplier listings, go to moldmakingtechnology.com/suppliers.

Jig Boring Machines	Laser Cutting Machines	Lathes	Loading/Unloading Systems	Machine Controls	Machining Cells/Work Cells	Machining Services	Milling Machines	Mill-Turn Machines	Multi-Tasking Machines	Pallet Changers	Robots	Toolchangers	Turning Machines	Vertical Machining Centers	Waterjet Machines	Workholding Equipment	WEBSITE
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**WEBSITE**
		13	14		16	17	18	19	20	21	22		24	25	26	27	absolutemachine.com
																	agathon.com
																	cheto.eu
		13					**18**		**20**				**24**	**25**			**chevalierusa.com**
	12	13	14	15	16	17	18	19	20	21	22	23	24	25			dmgmori.com
		13					18				22		24	25			doosanmachinetoolsUSA.com
																	edmnetwork.com
			14							**21**	**22**	**23**				**27**	**erowa.com**
	12			15							22						fanucamerica.com
																27	fcssystem.com
			14						20	21				25	26		fivesmsi.com
							18			**21**	**22**	**23**		**25**			**gfms.com/us**
					16												grobgroup.com/en
		13					18							25			haascnc.com
		13					18						24	25		27	hardinge.com
		13		**15**			**18**							**25**			**hurco.com**
		13					18		20	21			24	25			hwacheonusa.com
		13			16		18		20				24	25			machine.hyundai-wia.com/usa
11			**14**	**15**	**16**		**18**				**22**			**25**			**jingdiaousa.com**
			14			17										27	kitagawa.us
					16		18							25			kitamura-machinery.com
							18							25			makino.com
																	matsuurausa.com
		13	14	15	16		18		20	21		23	24	25			mazakusa.com
	12	**13**	**14**		**16**		**18**			**21**	**22**	**23**	**24**	**25**			**mcmachinery.com**
		13	14	15	16		18		20	21	22	23		25			methodsmachine.com
		13		15			18							25			milltronics.com
11			14		16		18	19		21	22	23		25			mitsuiseiki.com
																	okamotocorp.com
		13		15			18		20	21			24	25			okuma.com/americas
		13	14		16		18		20	21		23	24	25		27	singlesourcetech.com
																	sodick.com
							18							25			takumiusa.com
							18										tarus.com
			14		16					21			24	25			toyoda.com
		13		15			18							25			trakmachinetools.com
																	unisig.com
																	grinding.com
		13	14				18			21			24	25			yamaseiki.com
							18		20				24	25			ycmcnc.com

Image courtesy of Cheto Corp. S.A.

Vertical Machining Center Reduces Handwork

Makino's V90S is a next-generation vertical machining center (VMC) for five-axis continuous processing. This high-precision VMC has an updated spindle and tilting and rotating axis unit that supports tighter tolerances and decreased machining and polishing times. The VMC combines quick machine movements and accuracies with software for high-speed motion control, and it is designed for high-speed finishing of multifaceted, 3D contours. It also cuts cycle times and reduces handwork in complex dies and molds. To maximize work-zone volume and load capacity, the V90S can accommodate workpiece sizes up to 2200 by 1500 by 700 mm and weighing 5000 kg. The X, Y and Z axes provide swift movements, and the A axis tilts at ±30°, which is wide enough to machine holes for an angular pin, while the C axis rotates at ±60°, ensuring that the tool tip can be positioned to provide optimum contact with the workpiece. The company says it extends tool life, provides the required surface finish and minimizes post-machining hand processes.

Makino / 800-552-3288 / makino.com

Deep Hole Drilling and Machining for Moldmakers

Unisig offers a custom machine from its R&D lab. The machine demonstrates the extreme depth-to-diameter ratios possible with the latest control technologies. It possesses CNC motion control capabilities to produce accurate, off-center gundrilled holes. The company also introduces its expanded line of deep hole drilling and machining centers designed for moldmakers. These machines complement the company's existing USC-M series of four- to seven-axis deep hole drilling and machining centers. Four-sided machining capability enables manufacturers to process large and small parts alike in a single setup.

Unisig Deep Hole Drilling Systems / 262-252-3802 / unisig.com

Double-Column Machines Combine Speed, Stability

The latest additions to **Hurco's** BXi CNC machine series are the BX50i, with X-, Y- and Z-axis travels measuring 37.4" x 53.2" x 23.6", and the BX60i, with X-, Y- and Z-axis travels measuring 52.1" x 63" x 27.6". The rigidity and thermal stability of the double-column design, combined with the weight of the machines, provide accuracy and improved surface-finish capabilities. Designed for the moldmaking and aerospace industries, the machines are suitable for high-speed machining applications that require tight tolerances.

The double-column design is said to minimize machine distortion and thermal deformation. Also contributing to rigidity is a ladder-style bridge. This design supports the head casting, keeps the spindle centerline close to the supporting structure and isolates the bridge from part weight.

The machines feature integrated WinMax control software and the UltiMotion motion system. The control software supports multiple programming methods, including conversational programming, NC programming and a Hurco-specific feature called NC/Conversational Merge.

The UltiMotion system is designed to determine the tool's optimal trajectory, ensure consistent programmed feed rates and reduce cycle time. Compared to conventional systems, it is said to improve cornering velocity and reduce machine jerk. It includes up to 10,000 blocks of dynamic look ahead and adapts to toolpaths. It improves on CAM output through improved handling of machine mechanics and dynamics.

The BX50i has a table size of 59.1 by 37.8 inches and a table load capacity of 5,512 lbs. Its axes run as fast as 1,535 ipm. It features direct drive ballscrews. Its motorized, 47-horsepower spindle can rotate as fast as 18,000 rpm, and its spindle taper is HSK 63A. Spindle torque ranges to 88 ft-lbs at 2,800 rpm. It has 30 automatic tool changing stations and weighs 28,600 lbs.

Hurco Companies Inc. / 800-634-2416 / hurco.com

Machining Center Combines Five-Axis Milling with Laser AM

Okuma America Corp.'s MU-8000V Laser EX multitasking machine combines five-axis machining with a Trumpf laser, providing both additive and subtractive manufacturing capabilities. It enables complete part production on one machine.

The machine implements laser metal deposition (LMD) technology to provide users with the ability to cut parts of different sizes and shapes. LMD supplies powder from nozzles and performs laser melting and bonding to parent material. This enables the combination of various types of materials, as well as three-dimensional fabrication and cladding. Variable control of laser spot diameters (from 0.4 to 8.5 mm) increases efficiency and resolution, according to the company. This combination of features enables mid-process part inspection and material exchange, coolant use in the work envelope and greater process speed.

Okuma America Corp. / 704-588-7000 / okuma.com

HMCs Are Not Just for **Big Manufacturing**

By Bill Howard and John Einberger

Now more than ever, increasing productivity is crucial for shops that want to maintain their competitive position in the marketplace. Investing in a horizontal machining center (HMC) can help shop owners meet their needs today, as well as continue to meet their needs three to five years down the line.

HMC Functions and Features

The work envelope, workpiece access and gravity provide HMCs with their biggest advantages. For example, essential **chip management** for cutting-tool durability, comes naturally for an HMC. Its design and construction enable gravity to assist with pulling the chips away from the part and into the chip-management area, decreasing wear and tear on perishable cutting tools. Also, the workpiece on the vertical plane and the horizontal positioning of the spindle move the chips away from the cutting area, reducing the need for re-cutting and improving tool life and surface finish.

Basically, placing the core and cavity on a vertical fixture in an HMC provides better access for the spindle to reach both the core and the cavity. Also, gravity aids the natural flow of chips and coolant from the core and the cavity.

The key to **coolant longevity** is maintaining good coolant performance as long as possible without needing to clean or recharge the coolant system. Typically, HMCs have more coolant volume and higher sophistication in coolant filtration. This lengthens the coolant's serviceable life and minimizes the labor and expendable investment.

Another HMC advantage, permitted by its chip-management design, is the typical use of an **index table (or full contouring fourth axis) under the work or pallet**. This table facilitates indexing or rotating the workpiece relative to the spindle, which provides angular access to the workpieces for shorter, stiffer tools that can produce better surface finishes.

HMCs increase **spindle utilization** by reducing non-cutting time. Spindle utilization on an HMC is around 85%. The increased spindle-utilization capability enables HMCs to outproduce comparable VMCs. Having one HMC that yields the same amount of production as several VMCs decreases not only the labor portion of the cost equation but floor space, tooling and utility requirements as well. It also reduces fixture and maintenance costs and streamlines manufacturing.

HMCs also typically use a **pallet changer**, which maximizes productivity by preventing part loading and unloading and changeover times from impacting machine cut-time. The automatic pallet changer enables parts to be preloaded onto fixtures and can exchange a fresh pallet of parts for a completed pallet in seconds. The pallet changer separates loading and unloading from spindle cutting, which keeps the spindle busy, maximizes productivity and prevents part-handling times from impacting throughput. It also enhances the flexibility of the HMC to juggle various jobs.

Image courtesy of Makino.

When an HMC uses a tombstone-type fixture, it can provide twice as much work to the spindle as a VMC. This tombstone fixture has a pattern of bushing and threaded holes for use with zero-point, quick coupling components that are used to locate and clamp a large mold and die workpiece on an HMC, providing quick, productive part change-over.

An HMC with a pallet changer puts more workpieces in front of the spindle, so it facilitates unattended operation, which makes HMCs far less dependent on the person loading and unloading the machine. The pallet changer provides a buffer between part loading and cutting, which permits the machine to run through breaks, lunch and even unattended into the evening.

Some smaller shops are hesitant to make a move because the initial investment is significant. But, with today's demands for increased productivity, mold builders must consider *all* aspects of an HMC to make the best decision. MMT

CONTRIBUTOR

Bill Howard is the vertical product line manager at Makino. John Einberger is the horizontal machine tools product line manager at Makino.

FOR MORE INFORMATION

Makino / 800-552-3288
william.howard@makino.com / makino.com

Image courtesy of X-Cell Tool and Mold Inc.

MITSUBISHI EDM

MC Machinery Systems, Inc.
85 Northwest Point Blvd.
Elk Grove Village, IL 60007
United States

Phone: 630-616-5920
Fax: 630-616-4068

mcmachinery.com

PRODUCTS/SERVICES

A World of Experience

As part of the global Mitsubishi Corporation, MC Machinery Systems draws from an extensive global source of support and innovation. Mitsubishi Corporation employs more than 60,000 people around the world, across a wide spectrum of industries including machine tools and controls, automotive, aerospace, industrial machinery, elevator, energy, metals, chemical, food and textile. This diversity, strength and stability trickles down to MC Machinery Systems customers—who benefit from Mitsubishi's massive global R&D efforts and widespread knowledge base.

Metalworking Success

MC Machinery Systems customers get the best of both worlds: a single source for a diverse arsenal of manufacturing technologies, and our expansive and knowledgeable support network.

Our expertise spans virtually every aspect of metalworking—from simple fabrication to CNC-driven, automated manufacturing cells. But it isn't just the breadth of technology–laser, EDM, milling and press brake–that will bring your business to the next level; it's our ability to identify, implement and support the right combination of those technologies.

Sinker EDM
EA8S Advance

Wire EDM
MV 2400-S Advanced Type M800

WEBSITE

mcmachinery.com

PRODUCT CATEGORIES

- Copper Electrodes
- DI Equipment
- DI Resin
- Electrode Holders
- Electrodes
- Filtration
- Fixtures
- Fluids
- Graphite Electrodes
- Laser Cutting Machines
- Milling Machines
- Sinker EDM
- Vertical Machining Centers
- Wire EDM
- Wires

MITSUBISHI EDM

It’s not where you are, it’s where you’re going.

mcmachinery.com

Sodick
601 Commerce Dr.
Schaumburg, IL 60173

Phone: 847-310-9000

sodick.com

PRODUCTS/SERVICES

HIGH SPEED MILL

Sodick's UH Series High Speed Mills utilize the latest trends in machining by emphasizing both high speed and shallow cuts. This strategy, ideal for highly responsive linear motors, gives the operator more control over the machining process whilst facilitating extreme precision and surface quality. In this way, the UH series drastically shortens cycle time and the entire machining period as a whole. Other advantages include improved surface quality, and minimized chip sizes for easy disposal.

EDM Products

Sodick's Wire and Sinker EDM Products are designed for longevity. With patented Rigid Linear Motors, precision is proven to be more exact than conventional ball screw technologies, reaching accuracies as low as 2µm. Sodick's EDM machines function fully free from friction, wear, and backlash. Linear Motor Technology makes Sodick EDMs the equipment of choice for optimal performance and reliability.

OPM SERIES 3D Printer

Sodick's innovative OPMs are a series of hybrid printers. Prior to the launch of the Sodick OPM, parts were produced with multiple pieces of equipment, involving laborious set ups and changes, and requiring frequent human intervention. 3D Printing, an unmanned technology, is undergone during a process in which lasers sinter shapes into a bed of metal powder layer by layer. Eventually after many passes, a complex workpiece is the result. This innovation yields shorter cycle times and a reduction in total manufacturing expenses, while enabling users to create ever more complex designs with ease.

WEBSITE

Sodick specializes in manufacturing EDM equipment, 3D Metal Printers, High-Speed Mills, and Small-Hole Drills. Sodick also offers consumables for superior equipment maintenance.
sodick.com

PRODUCT CATEGORIES

- **EDM**
- **High Speed Mills**
- **Additive Manufacturing**
- **Small Hole Drills**
- **Consumables**

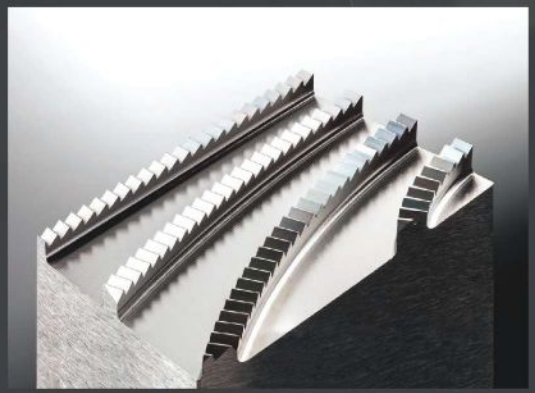
Sodick

ULTRA HIGH SPEED MILL SERIES

HIGH PERFORMANCE
POLISH FREE
MACHINING

The UH430L & UH650L

Creating molds that require micron tolerances and the most complex, three-dimensional contours.



Quality Optics

Produce high accuracy reflector and optical molds with ease

Create your Future

sodick.com

COMPANY Advertisers are listed in bold type.	See Ad	1 Copper Electrodes	2 DI Equipment	3 DI Resin	4 EDM Services	5 Electrode Holders	6 Electrodes
3D Industries – Bensenville, IL, 630-616-8700					4		6
Absolute Machine Tools Inc. – Lorain, OH, 440-960-6911			2	3	4	5	6
Accu-Prompt Inc. – Fridley, MN, 763-717-1511					4		
Alouette Tool Co. Ltd. – Fairport, NY, 585-388-1240							
BA Die Mold, Inc. – Aurora, IL, 630-978-4747					4		
Belmont Equipment & Technologies – Madison Heights, MI, 800-256-4811		1	2	3	4	5	6
Chemtool Inc. – Rockton, IL, 815-957-4140							
Chicago Mold Engineering Co., Inc. – St. Charles, IL, 630-584-1311					4		
Commercial Tool & Die – Comstock Park, MI, 616-785-5400					4		
Dynamic International – Pewaukee, WI, 262-521-1100							
EDM Network Inc. – Sugar Grove, IL, 630-466-5588							6
EDM Sales and Supplies, Inc. – Maple Grove, MN, 763-424-1189		1	2	3	4	5	6
Erowa Technology Inc. – Arlington Heights, IL, 847-290-0295	**87**					**5**	
Ezell Precision Tool Co. – Clearwater, FL, 727-573-3575					4		
GF Machining Solutions – Lincolnshire, IL, 847-913-5300	**91**		**2**		**4**		
Graphel Corp. – West Chester, OH, 513-779-6166		1			4	5	6
Hirschmann Engineering USA, Inc. – Schaumburg, IL, 847-468-9700		1				5	
Industrial Molds – Rockford, IL, 815-397-2971					4		
ITW Fluids North America – Carol Stream, IL, 800-452-5823							
Keller Products Inc. – Acton, MA, 978-264-1911							
Kern Precision Inc. – Addison, IL, 331-979-0954		1			4		6
Makino Inc. – Mason, OH, 513-573-7200							
Manner USA, Inc. – Lawrenceville, GA, 770-449-1820					4		
MC Machinery Systems, Inc. – Elk Grove, IL, 630-616-5920	**95**	**1**				**5**	**6**
McWilliams Sales & Service Inc. – Mooresville, NC, 704-598-6616		1	2	3		5	6
Mersen – Saint Marys, PA, 800-472-3483	**101**	**1**					**6**
Methods Machine Tools Inc. – Sudbury, MA, 978-443-5388							
Ohio Carbon Blank Inc. – Willoughby, OH, 440-953-9302		1					6
ONA EDM USA – Addison, IL, 630-268-1635		1	2	3	4	5	6
Performance Alloys & Services Inc. – Germantown, WI, 262-255-6662		1					
Poco Graphite, An Entegris Company – Decatur, TX, 940-627-2121							6
Single Source Technologies – Auburn Hills, MI, 248-232-6232							
Sodick, Inc. – Schaumburg, IL, 847-310-9000	**97**	**1**	**2**	**3**	**4**	**5**	**6**
System 3R USA LLC – Lincolnshire, IL, 847-439-4888						5	
thyssenkrupp Materials – Copper and Brass Sales – Southfield, MI, 800-926-2600							6
Transor Filter USA – Elk Grove Village, IL, 847-640-0273							
Tri-Gemini, LLC – Hillside, IL, 708-786-4300		1				5	6
Wisconsin Engraving / UNITEX – New Berlin, WI, 262-786-4521		1			4		6
Xact Wire EDM Corp. – Waukesha, WI, 262-549-9005					4		
YCM Technology (USA) – Carson, CA, 310-735-8610							

For more supplier listings, go to moldmakingtechnology.com/suppliers.

Filtration	Fixtures, EDM	Fluids	Graphite Electrodes	Sinker EDM	Small Hole EDM or "Hole Popper"	Wire EDM	Wires	WEBSITE
7	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**WEBSITE**
			10					3dpros.net
7	8	9	10	11	12	13	14	absolutemachine.com
								accuprompt.com
				11	12			alouettetool.com
								badiemold.com
7	8	9	10	11	12	13	14	belmont4edm.com
		9						chemtool.com
								chicagomold.com
								commercialtoolgroup.com
						13		dynamicintl.com
	8		10	11	12	13	14	edmnetwork.com
7	8	9	10	11	12	13	14	edmsalesinc.com
	8							**erowa.com**
								ezellprecision.com
				11	**12**	**13**	**14**	**gfms.com/us**
			10	11				graphelcorp.com
	8	9		11	12	13		hirschmannusa.com
								industrialmolds.com
		9						itwfluidsna.com
7								kellerproducts.net
			10					kernprecision.com
		9		11	12	13		makino.com
								m-form.com
7		**9**	**10**	**11**		**13**	**14**	**mcmachinery.com**
7		9	10	11	12	13	14	mcwilliamsedm.com
			10	**11**	**12**			**edm.mersen.com**
				11	12	13		methodsmachine.com
	8		10	11	12			ohiocarbonblank.com
7	8	9	10	11	12	13	14	onaedmusa.com
								moldstar.com
			10					poco.com
				11		13		singlesourcetech.com
7		**9**		**11**	**12**	**13**		**sodick.com**
	8			11		13		system3r.com
								tkmna.com
7		9						transorfilter.com
7	8	9	10	11	12			tri-gemini.com
			10	11				wi-engraving.com
								xactedm.com
						13		ycmcnc.com

Image courtesy of Sodick Inc.

Entry-Level EDM Features Break-Through Detection

Methods Machine Tools offers Ocean Technologies' compact, entry-level River 300 EDM drill. It features break-through detection and an HP1+ power supply for reduced wear and shorter burn times with low energy consumption.

The machine uses linear guideways and a 100L DI/Filter. The XYZ-axis travels measure 11.8 by 7.9 by 11.8 inches. Its W-axis travel measures 13.8 inches. Table dimensions are 13.8 by 9.9 inches. Maximum workpiece height is 11.8 inches with workpiece weight capacity at 330 lbs.

E-Learning software is featured on the machine, enabling new operators to easily run it while seasoned operators can review particular processes on the fly.

Methods Machine Tools Inc. / 877-668-4262 / methodsmachine.com

New Wire EDMs Feature Ergonomic Enhancements

The new GE-SAi and GE-SAiL AccuteX CNC wire EDM machines from **Absolute Machine Tools** feature a choice of either traditional ball screw or AccuteX linear motion axis drive systems. GE series machines are engineered for reliable, economical production of small parts and components. The space-saving design includes a drop door and three-sided table, as well as AccuteX-patented, fully annealing, automatic wire threading and the ability to perform submerged machining up to 8 inches deep.

Absolute Machine Tools Inc. / 800-852-7825 / absolutemachine.com

EDM Drill Provides High Production, Unattended Operation

Current EDM Inc.'s FT300 five-axis CNC EDM drilling machine features the Siemens 840DsI control. The fully enclosed machine is designed for production facilities in which machines are placed side-by-side in rows. It is operable and serviceable from both the front and rear machine panels. Moving-gantry design and a stationary worktable increase weight capacity and reduce operator reach for ergonomic part handling.

The machine suits high-tolerance work in the aerospace, medical, automotive and cutting-tool industries. Table travels are 12 inches on the X axis and 6 inches on the Y axis, with a part-weight capacity of 30 lbs at the tilt-rotary table. Precision slides and a 6 inches diameter, 10 inches high cylindrical work envelope enable accurate positioning and drilling of complex parts such as turbine engine components, nozzles, valves, injectors, medical/dental devices and cutting tools. Drilling aspect ratios greater than 300:1 can be achieved with DI water.

The machine features a 24-station electrode changer for high production and unmanned operation. EDM milling expands capabilities by enabling the machining of three-dimensional shapes such as gates and diffusers. A sensitive servo and finely tuned power supply enable the machine to drill with consistent speed, wear and depth control. It won't bend or collapse long, thin electrodes, and exit-hole break-through speed is optimized for rapid hole-to-hole cycle time.

Current EDM Inc. / 650-966-9676 / currentedm.com

Wire EDM Improves Positional Accuracy

Makino's UP6 Heat wire EDM is designed for precision stamping and fine blanking applications. It is also suitable for die tooling for electric motor stators. The machine features a stationary work table designed to improve positional accuracy, and it uses a programmable, rise-and-fall, three-sided work tank that improves ergonomic access to the work zone. This configuration also simplifies requirements for automation.

Several features are designed to improve long-term thermal stability, including integration of the dielectric fluid reservoir into the base casting of the machine. Chilled dielectric fluid is circulated through the machine's casting to facilitate active thermal cooling and maintain machine temperature. The machine uses a Hyper-i control with a 24-inch HD touchscreen, which comes with the HyperConnect Industrial Internet of Things (IIoT) network-connectivity function for remote machine monitoring.

A wire-drive system uses AC motor tensioning, which expands the range and stability of wire tension and reduces maintenance requirements. A wire-threading system provides both jet and jet-less threading modes. It can rethread the wire in the gap at a break point.

Makino Inc. / 800-552-3288 / makino.com

EDM Provides Friction-Free, Accurate Column Movement

MC Machinery's MV2400-ST EDM is designed for large-part production and is capable of performing submerged cutting as low as 16.5-inches deep. With an annealing length over 21 inches, the machine can thread the maximum workpiece height both at the start point and through the gap for broken-wire recovery. The machine's linear shaft-motor drive and glass-scale feedback contribute to accurate, friction-fee column movement through the X and Y axes. The machine also features the Mitsubishi M800 series control with a 19-inch touchscreen, providing a user-friendly interface. The control uses rotational and tilting functionality while showing job-monitoring data in a single view. The navigation interface provides smooth job operation, enabling the quick and accurate completion of production jobs, according to the company.

MC Machinery Systems Inc. / 630-616-5920 / mcmachinery.com

EDM-Compatible Oil Captures Fine Graphite Particles

EDM Network and Chmer EDM offer an exclusive series of dust-free graphite mills to eliminate graphite dust while milling graphite electrodes. These mills are available with ball-screw drives and three-axis linear motor drives with precision glass scales for optimum precision and speeds. Fourth and fifth axes are available with Siemens 840D CNC controls and drives.

EDM-compatible oil in the oil shroud surrounds the 30,000-rpm spindle, capturing all of the fine graphite particles in the oil curtain. The particles are then filtered through two 30-micron filters before the system returns the particles to the oil reservoir to be reused. The use of the oil while high-speed milling also can prolong cutter life, reduce graphite chipping and improve electrode surface quality. The graphite electrode does not experience any detrimental effect after being soaked in the oil. Larger models can high speed mill hardened metals up to Rc63.

EDM Network Inc. / 888-289-3367 / edmnetwork.com

Rethinking EDM for **Additive Applications**

By Evan Syverson and Tully Mijatovic

As manufacturers accept and implement 3D printing into their operations, downstream processes on wire EDM workholding, cutting conditions and machine-tool specifications need to be adjusted to accommodate.

Workholding

Before a technician prints a 3D part, consider how subsequent processes are affected by early workholding decisions. One factor that complicates these decisions is the variance in 3D printers. One trend is for traditional tooling suppliers to partner with original equipment manufacturers (OEMs) for machines to provide integrated solutions. With validated systems at the OEM level, it is possible for tooling manufacturers to make the secondary operations just a little less laborious. Alternatively, for machinery without an established tooling solution, it may be possible to produce tombstones or other custom fixtures to expedite the setup process, though these would be less transferable from one operation to the next. Operators should be aware that because 3D printing is not a perfectly accurate process, virtually all applications would benefit from including reference or datum surfaces for more accurate pickups.

Cutting Conditions

Special care is necessary to avoid wire breaks when wire-cutting into a 3D-printed part, and flushing is especially important for additive parts. Inside a typical kerf, flushing jets are confined, enabling fluid to laminate the EDM wire and to clear swarf efficiently and neatly. As the distance from the flushing nozzle increases, this stream becomes more turbulent and less effective. The flushing stream experiences a drop in pressure upon hitting hollow cavities, expanding the flushing path and creating even more turbulence. These poor flushing conditions create an increased concentration of conductive particles that linger within the spark gap. These particles continue to spark with each pulse, wearing the EDM wire more quickly.

To avoid wire breaks, operators can switch to 0.012-inch wire instead of relying on the standard 0.010-inch brass wire. The larger diameter provides additional strength to keep the wire core temperature low. Users may also switch to steel-core wire, which is much less likely to break, but it is not compatible with most wire-choppers on the market and is more difficult to recycle. Increasing the sensitivity of adaptive circuits enables operators to use a more conservative setting on most of the newer EDM models when the cutting environment is not ideal.

Image courtesy of Sodick Inc.

As the capacity of 3D printers grows, it is critical to select an EDM machine with a tall Z height to accommodate.

Machine-Tool Specifications

Shops that plan to take on more additive work may want to consider machinery that is suited more specifically for this application. Often, wire-EDM work on an additive part is limited to the removal of supports or of a baseplate, meaning that the goal is no longer fine finishing or extreme precision but capacity, cutting speed and reliability under unfavorable conditions. As additive applications continue to grow in size at a fairly rapid pace, the only machines capable of accommodating these large workpieces are often the premium, large-capacity models in the EDM lineup. These premium models tend to offer many capabilities that, while impressive, are not strictly necessary for the application at hand, and thus add unnecessary cost. Moving forward, expect EDM manufacturers to introduce models that target the additive marketplace more adequately, with fast cutting speeds and large capacity but without advanced technology for six-, seven- or eight-pass finishes.

The automatic wire threading (AWT) on these machines will also be important. Additive jobs require a highly capable threader because 3D parts frequently use exotic geometries and hollow cavities. Look for threaders that are annealing, which keeps the wire straight even through a tall, hollow workpiece, and verify that AWT performance is reliable even at the full Z height. MMT

CONTRIBUTOR

Evan Syverson is the additive and HSM business manager of Sodick Inc., and Tully Mijatovic is an applications engineer for Sodick Inc..

FOR MORE INFORMATION

Sodick Inc. / 888-639-2325 / sodick.com

Inspection/Measurement

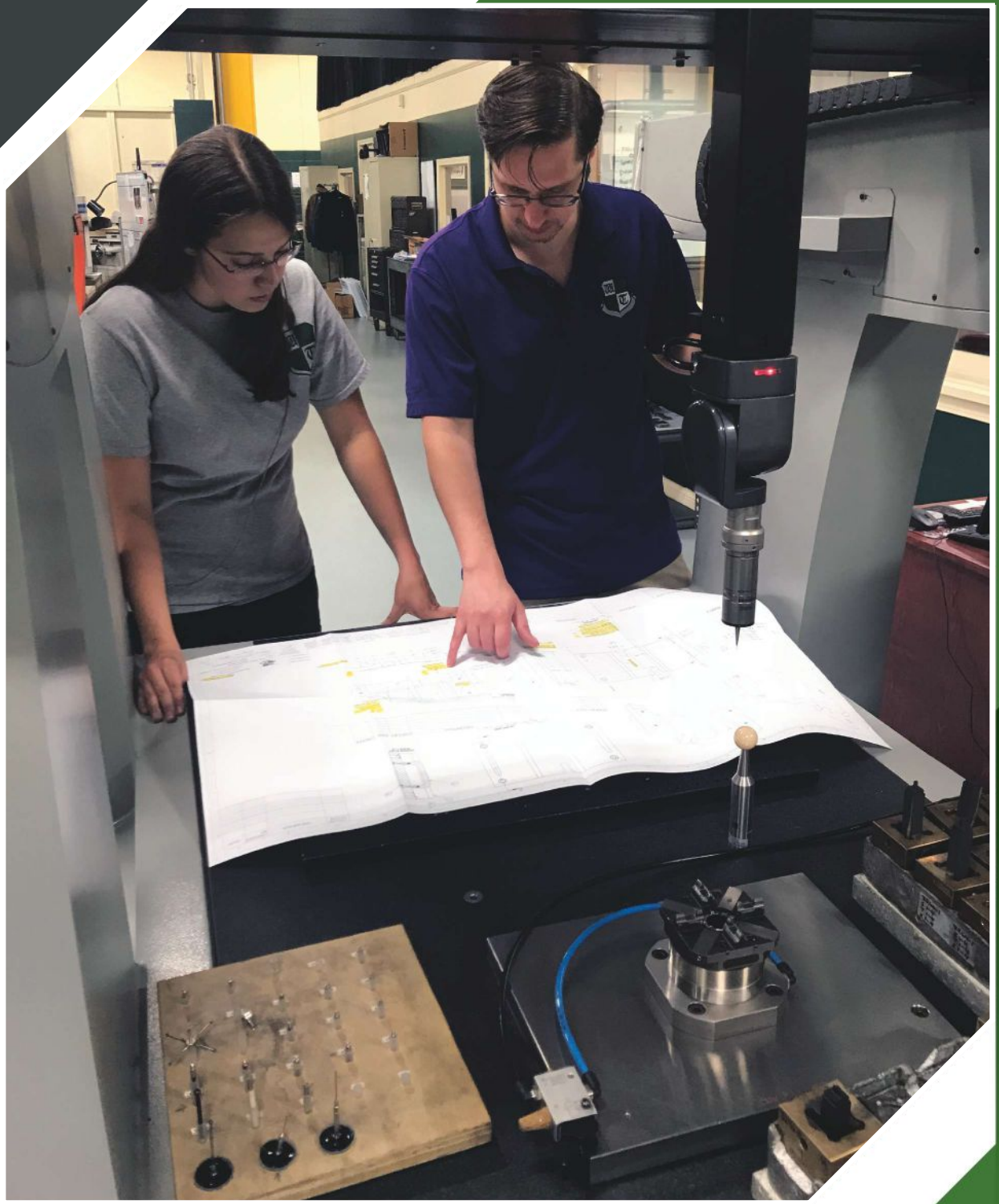


Image courtesy of Westminster Tool.

COMPANY Advertisers are listed in bold type.	See Ad	1 Balance Machines	2 Calibrators	3 Coordinate Measuring Machine (CMM) Software	4 Coordinate Measuring Machines (CMMs)	5 Digital Thermography/ Infrared Cameras
3D Systems Geomagic – Cary, NC, 919-474-0122		1	2	3	4	
Alba Enterprises Inc. – Torrence, CA, 909-941-0600	**55**					
Blum-Novotest, Inc. – Erlanger, KY, 859-344-6789						
Brown & Sharpe – North Kingstown, RI, 401-886-2000				3	4	
CAE Services Corporation – Batavia, IL, 630-761-9898						
Capture 3D – Santa Ana, CA, 714-546-7278				3	4	
CGI 3D Scanning – Eden Prairie, MN, 952-937-2005						
Die Sep – Lake Geneva, WI, 262-767-9751						
Direct Dimensions, Inc. – Owings Mills, MD, 410-998-0880		1	2	3	4	
Exact Metrology Inc. – Cincinnati, OH, 866-722-2600				3	4	
FANUC America – Rochester Hills, MI, 248-377-7000						
FARO Technologies, Inc. – Lake Mary, FL, 407-333-9911				3	4	
Haimer USA – Villa Park, IL, 630-833-1500	**69**					
Heidenhain Corp. – Schaumburg, IL, 847-490-1191	**77**		**2**			
Hexagon Manufacturing Intelligence – North Kingstown, RI, 401-886-2000				3	4	
IMS Company: Industrial Molding Supplies – Chagrin Falls, OH, 440-543-1615						5
Jesse Garant Metrology Center – Dearborn, MI, 313-996-5840						
Konica Minolta Sensing Americas, Inc. – Ramsey, NJ, 201-236-4300		1	2	3	4	
L.S. Starrett Company – Athol, MA, 978-249-3551						
Laser Design Inc. – Minneapolis, MN, 952-884-9648		1	2	3	4	
Mahr Federal Inc. – Providence, RI, 401-784-3100			2			
Marposs Corporation – Auburn Hills, MI, 248-370-0404						
Mitutoyo America Corporation – Aurora, IL, 630-820-9666		1	2	3	4	
MouldPro – Rancho Cucamonga, CA, 909-941-0600		1				
NextEngine – Santa Monica, CA, 310-883-1888						
Nikon Metrology, Inc. – Brighton, MI, 810-220-4360		1	2	3	4	
NT USA Corporation – Franklin, TN, 615-771-1899						
NyproMold Inc. – Clinton, MA, 978-365-4547						
Optical Gaging Products (OGP) – Rochester, NY, 585-544-0400					4	
Perceptron – Plymouth, MI, 734-414-6100		1		3	4	
REGO-FIX Tool Corp. – Whitestown, IN, 317-870-5959		1				
Renishaw Inc. – West Dundee, IL, 847-286-9953			2	3		
Resec Systems Inc. – Bergenfield, NJ, 800-394-6758					4	
Roland DGA Corp. – Irvine, CA, 949-727-2100						
Scansite – San Rafael, CA, 415-488-9500						
Verisurf Software, Inc. – Anaheim, CA, 714-970-1683				3	4	
Vision Engineering Inc. – New Milford, CT, 860-355-3776					4	
Volume Graphics Inc. – Charlotte, NC, 704-248-7736				3		
ZEISS Industrial Metrology – Maple Grove, MN, 800-327-9735				3	4	
ZOLLER Inc. – Ann Arbor, MI, 734-332-4851		1			4	

For more supplier listings, go to moldmakingtechnology.com/suppliers.

Gages	Inspection/Measurement Services	Laser Digitizing/ Scanning Equipment	Leak Testers	Noncontact Measurement Systems	Optical Measuring Systems	Probes	Testing/Analysis Services	Vision Systems	WEBSITE
6	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**WEBSITE**
6	7	8		10	11	12	13	14	geomagic.com
						12			**albaent.com**
6	7	8		10	11	12			blum-novotest.us
	7	8		10		12			hexagonmetrology.us
							13		caeservices.com
	7	8		10	11	12	13	14	capture3d.com
	7	8			11		13		CGI3DScanning.com
	7						13		diesep.com
6	7	8		10	11	12	13	14	dirdim.com
	7	8		10	11	12	13	14	exactmetrology.com
								14	fanucrobotics.com
		8		10	11	12		14	faro.com
				10	**11**	**12**			**haimer-usa.com**
		8				**12**			**heidenhain.us**
6	7	8		10	11				hexagonmetrology.us
6	7		9			12			imscompany.com
	7						13		jgarantmc.com
6	7	8		10	11	12	13	14	sensing.konicaminolta.us
6	7			10	11			14	starrett.com
6	7	8		10	11	12	13	14	laserdesign.com
6				10	11	12			mahr.com
6				10	11	12			marposs.com
6	7	8		10	11	12	13	14	mitutoyo.com
						12			albaent.com
		8		10					nextengine.com
6	7	8		10	11	12	13	14	nikonmetrology.com
				10	11				nttoolusa.com
	7						13		nypromold.com
		8		10	11			14	ogpnet.com
6	7	8		10	11	12	13	14	perceptron.com
									rego-fix.com
		8		10	11	12			renishaw.com
		8						14	resecsystems.com
		8							rolanddga.com
	7								scansite.com
	7	8		10		12			verisurf.com
	7			10	11			14	visioneng.us
									volumegraphics.com
	7	8		10	11	12		14	zeiss.com/metrology
	7			10	11			14	zoller-usa.com

Image courtesy of Mitutoyo.

Software Collects Measurement Data from Multiple Devices

Hexagon's HxGN Smart Quality is an online quality data and measurement resource management software platform. It collects data from multiple manufacturing phases and provides statistical analysis, visualization and workflow management and process optimization. It is said to structure data in a way that provides insight into production and improvements in process. The remotely accessible software enables users to manage quality requirements in real-time. It collects and stores data from any number of devices in one database.

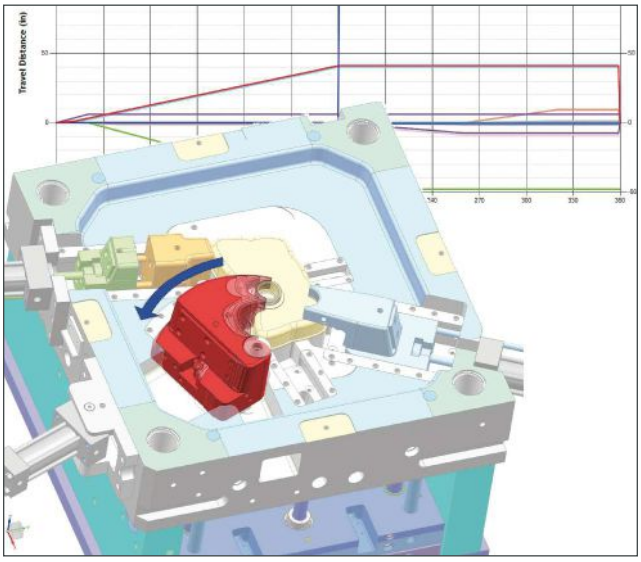
Hexagon Manufacturing Intelligence / 855-443-9638 / hexagonmi.com

Augmented Reality Enables Virtual Measurement Exercise

Marposs offers guided-sequence gauging using augmented reality (AR). Marposs provides customers AR glasses that guide them through a sequence of steps and measurements to check features on a cylinder-head component using the Marposs iWave2 handheld wireless gauge and a Go/NoGo gauge. As customers progress through the sequence, they will be able to see that the measurement information is adhering to the workpiece.

The company's measurement and inspection solutions can be applied to improve manufacturing processes before, during and after machining. The company features machine tools to demonstrate tool setting, probing, machine monitoring and robotic gauging. Additionally, they offer dynamic grinding, including a BLU single cable control system, bench gauging, automated machine inspection and leak testing.

Marposs / 888-627-7677 / marposs.com



Application Verifies Individual Mechanism Designs

Cavalier Tool & Manufacturing offers equipment and facility improvements, as well as network infrastructure and new software. The company's purchase of NX Dynamik Design, a state-of-the-art application for virtually simulating motion and interactions, enables them to verify the design of individual mechanisms throughout the entire mold build. The interface verifies the complex mechanisms for potential damage caused by collisions, simulating all actions simultaneously. The company also simulates the plastic injection process to review how plastics warp, then builds windage into the mold before cutting for dimensional accuracy.

Cavalier Tool & Manufacturing Ltd. / 519-944-2144 / cavaliertool.com

Measuring Equipment Detects 3D Printing Defects

Zeiss's optical 3D scanners, CT scanners, high-resolution X-ray microscopes and coordinate measuring machines (CMMs) detect 3D printing defects and downstream processing problems. The company's CT scanners enable users to check the interior structure of components and identify defects or dimensional errors. Optical and X-ray systems can be used to inspect outer and interior surfaces.

The company's measuring equipment and scanners enable users to compare measurement data across all manufacturing steps. The equipment is meant to help companies quickly determine if downstream processes, such as heat treatment and removal of components from the build plate, affect a part's final dimensional characteristics.

Zeiss IM & MIC / 800-327-9735 / zeiss.com

GARDNER INTELLIGENCE

GET READY FOR WHAT'S NEXT

World Machine Tool Survey

The foremost resource on who's buying machine tools, where and what that means for your business. The report contains data on production, imports, exports, and consumption collected from more than 20 countries.

Get the report at
gardnerintelligence.com

The report includes:

- Overview of the machine tool industry, its impact on the U.S., and suggestions on how to respond
- The top 20 machine tool importers for 2018
- The largest trade balances in 2018
- Analysis of 60 countries highlighting each country's:
  - Production, imports, exports, consumption rank and value
  - Money supply, industrial production, capital utilization
  - Real machine tool consumption over time
  - **NEW!** Totals and YOY% changes in imports/exports for specific machine types, at the 4 digit HS code level

Leverage the power of industry-leading intelligence in your operation.

GARDNER INTELLIGENCE

513-527-8800 | gardnerintelligence.com

Pages 103 to 108

Maximizing Intelligent **Manufacturing**

Image courtesy of Mitutoyo.

As manufacturers move to collect process data, they need to ensure that they do not overlook measurement data. The collection and analysis of measurement data can yield tangible improvements to any process.

By Jeremy P. Banks

Shops continue to adopt intelligent manufacturing principles that require connection and communication of data across all machine-tool, sensor and human resources. This data creates a virtual model that tests scenarios to improve uptime and throughput and to predict and better manage production capacity and estimated delivery times. The user also can plan and check continuous improvement activities against this model, which results in more efficient and profitable shops without costly trial and error. The more data that is collected, the more robust the virtual model.

Many moldmakers are already investing in intelligent manufacturing because the promise of improved product accuracy with less re-work and scrap is hard to ignore. As shops continue to invest in the infrastructure to support this initiative, they usually focus on process data, such as machine uptime, tool life, cycle time and machine utilization. Collecting and using measurement data is just as important as process data. Not only does this ensure that mold components meet the customer's needs, it makes it possible for companies to reduce scrap and rework.

Intelligent Moldmaking

Data collection and real-time statistical process control (SPC) software collect data from most gauges regardless of sophistication or brand. The software then communicates the data to the same infrastructure as the rest of a shop's connected devices. Moldmakers should use data collection and real-time SPC software to collect measurement data and then relay it back to the CAD/CAM software to refine part programs, which ultimately yields **more accurate parts**. Many moldmakers are using software to increase CNC programming accuracy and throughput, but many of these programmers are finding that the finished mold does not always match the model.

Some operators use in-machine probing to measure and compensate for this inaccuracy, but not all machine tools are fitted with this type of technology. Real-time SPC software can collect data from many sources, including coordinate measuring machines, non-contact and vision metrology and traditional hand tools like calipers and micrometers. This flexibility eliminates the need for new equipment investment as it enables users to begin this type of activity using existing gauges. All of this data can then be compared to the mold's specifications and sent back to the CAD/CAM software to compensate the program.

Measuring mold components before and after polishing can tell machinists how much material to leave for surface treatment. Since multiple operators typically perform this process by hand, each polisher may remove different amounts of material as they perform their work, despite having proper training and employing standardized techniques. This can result in molds producing subtly different parts and inconsistencies that do not meet a customer's requirements. The solution is measuring samples before and after each step of the polishing process to determine the amount of material that the polishing removed. Real-time SPC software collects and filters this data by the individual worker, which makes it possible for machinists to compensate for the exact amount of extra material that an individual polisher removes as they perform their work. This yields more consistent molds and less rework.

Having all this data in one platform also facilitates **simpler integration with ERP software**. Real-time SPC software is designed to perform this task, and with it, any device with output can collect measurement data. Operators can even use non-digital gauges with data entered via a keyboard. The ERP software can then harvest the entirety of this data from one source, the SPC software's structured query language database. This requires only a single integration, saving ERP costs and reducing the effort required to consolidate the data.

This next revolution in industrial technology requires tools like real-time SPC software to help moldmakers achieve intelligent manufacturing. MMT

CONTRIBUTOR

Jeremy P. Banks is a data management sales specialist for Mitutoyo.

FOR MORE INFORMATION

Mitutoyo / 888-648-8869 / mitutoyo.com

Pages 109 to 119

Mold Maintenance, Repair & Surface Treatment

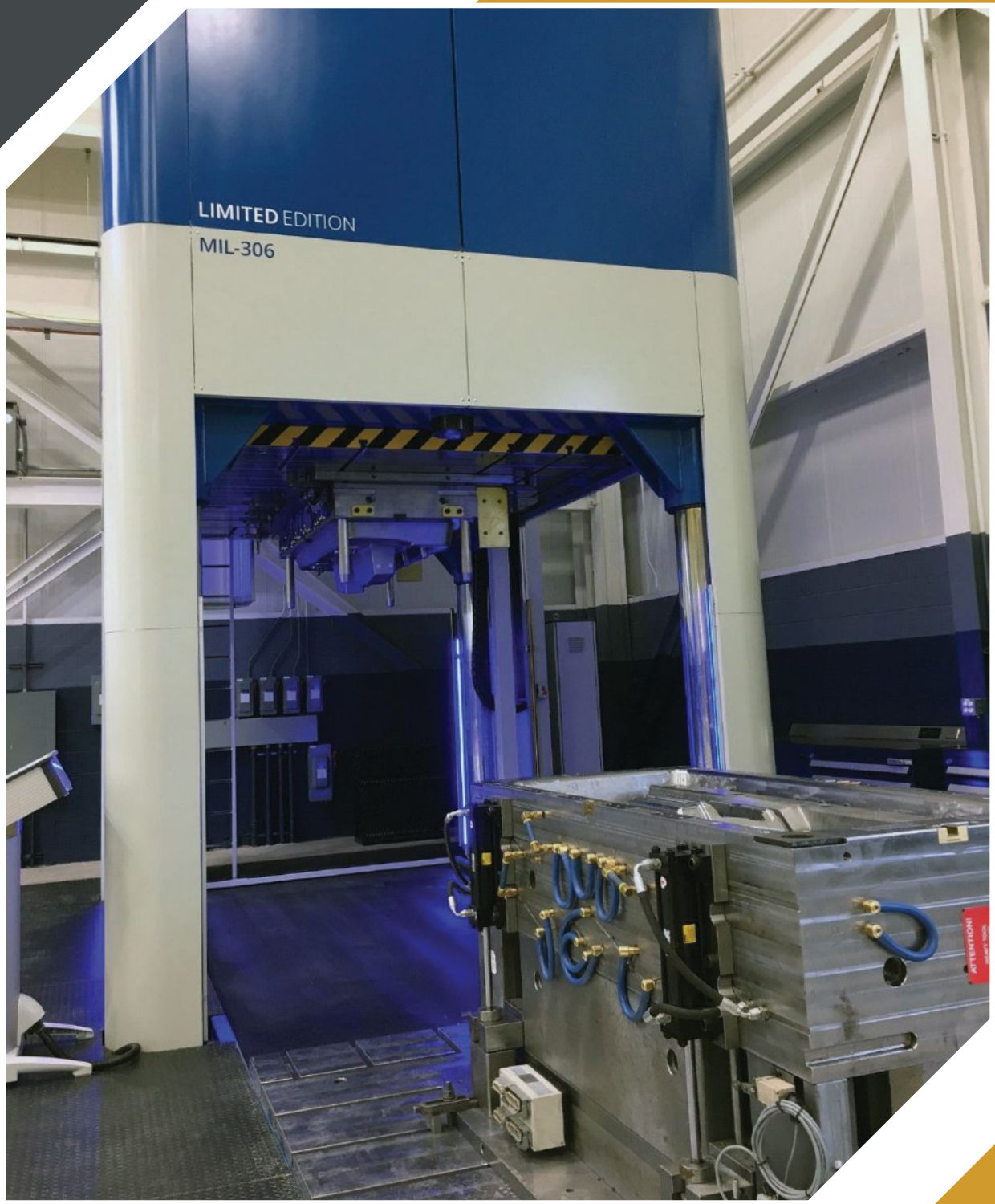


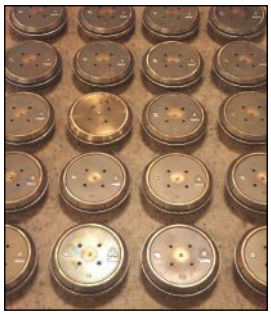
Image courtesy of Cavalier Tool and Manufacturing Ltd.

Alpha Laser
7799 McHenry St.
Meadville, PA 16335

Phone: 814-336-9000
Fax: 814-724-1590

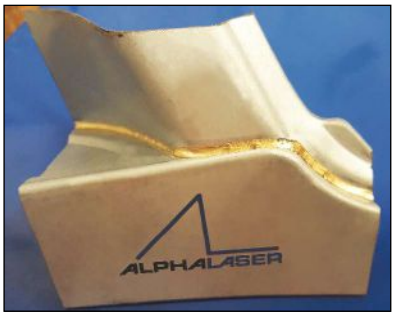
alphalaser-us.com

LASER WELDING APPLICATIONS



Shut Off Repair And Refurb

Alpha Laser is the leader in Tool & Die repairs and refurbishments. Alpha Laser's are designed as a toolmakers machine; extremely flexible, easy to use, powerful, and capable. Repairing shutoffs and damaged areas of a tool is one of the most common uses for a laser welder. The low heat input, high power density, and ease of use make it a no brainer for anyone who makes machining mistakes, or repairs damaged tooling, to make an Alpha Laser part of their service catalog.



Production Welding

Laser Welders are the best way to process sheet metal weldments and production welding. With the ability to penetrate sheet metal up to .200", Alpha Lasers can be used for a wide variety of production processes. The unique welding characteristics, coupled with Alpha's simple to use programming software, WinLaser, and the extreme flexibility of Alpha Laser Optics makes it the perfect choice for thin metal welding.

Engineering Changes

Laser welding is still used for fine details small edges, but Alpha Laser's have enough power to be used for larger buildups and coatings as well! The power that Alpha has in even a 300 Watt laser is enough to be used for large tooling repairs and engineering changes, things that would have previously been TIG(GTAW) welded. Alpha Laser's have high pulse and power rates, allowing companies to use a low heat process (laser welding) instead of a high heat process(TIG).

WEBSITE

alphalaser-us.com

PRODUCT CATEGORIES

- **Laser Welding**
- **Laser Cladding**
- **Laser Hardening**
- **Laser Joining**
- **Laser Cutting**
- **Freeform 3D Printing**
- **Homogeneous Welds**
- **Wire Welds**

HERMES AWARD
Nominated for 2018

ALPHALASER

LASER WELDING
AT THE PULSE OF INNOVATION

New Capabilities, fewer limitations

Our lasers are the most flexible, efficient, effective, reliable, and simply the best systems on the market.

We prove this through live demonstrations for our customers.

ALFlak | Mobile Systems

#1 LASER

FOR TOOL & DIE REPAIR,
LOW HEAT INPUT
PRODUCTION WELDING,
AND LASER POWDER CLADDING

7799 McHenry Street, Meadville, PA 16335
814-336-9000 | Sales@alphalaser-us.com

www.alphalaser-us.com

INDISPUTABLY THE BEST LASERS ON THE MARKET

ALLIANCE SPECIALTIES AND LASER SALES

Alliance Specialties and Laser Sales
265 Industrial Dr.
Wauconda, IL 60084

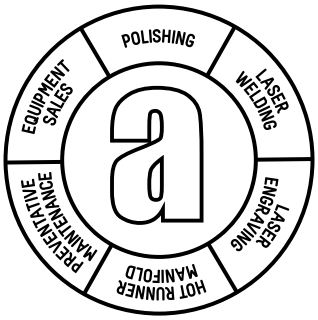
Phone: 847-487-1945
Fax: 847-487-2945
Email: info@alliancelasersales.com

alliancelasersales.com

PRODUCTS/SERVICES

ID-1 Fiber Laser Welder

The ID-1 Fiber Laser Welding System is made in America by mold builders for mold builders. It features fiber laser technology which means lower power consumption, zero maintenance calls or the need for costly replacement lamps, no downtime and consistent power for over 70,000 continuous laser hours. Engineered with our customers needs in mind, the ID-1 can weld all tooling steels including aluminum, copper and other difficult to use materials.



Complete Service Solution

The only complete service and maintenance company in the industry. Specializing in mold polishing, hot runner and manifold cleaning, preventative mold maintenance, laser welding and engraving. With Alliance you get the results you require when you need them, with professional insight in multiple areas of expertise. Because all services are done in one location, there is a lower chance of errors by eliminating multiple shipments and costly delays. #wedothattoo

NGRV2 Laser Engraver

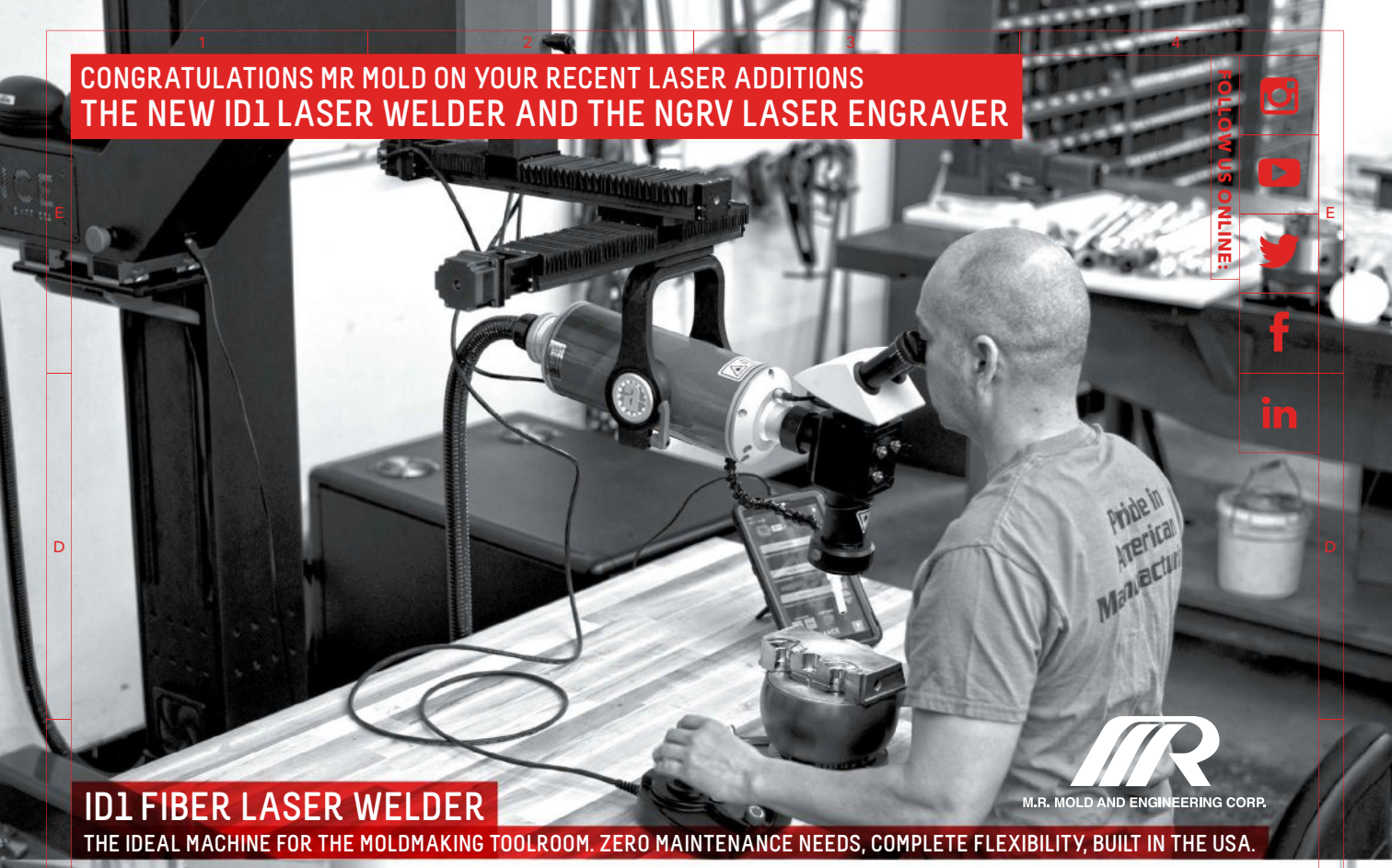
The NGRV2 laser engraving solution marries the technology of the past with that of the future, while maintaining affordability. It is engineered by retrofitting a Bridgeport-style machine with an IPG laser, U.S. sourced scan head, coupled with Alliance Laser software for design and implementation. It features a 36-square-inch field size, programmable x and y travel for a larger engraving surface area, automated rotary function, 750-pound weight capacity and easy-to-operate software.

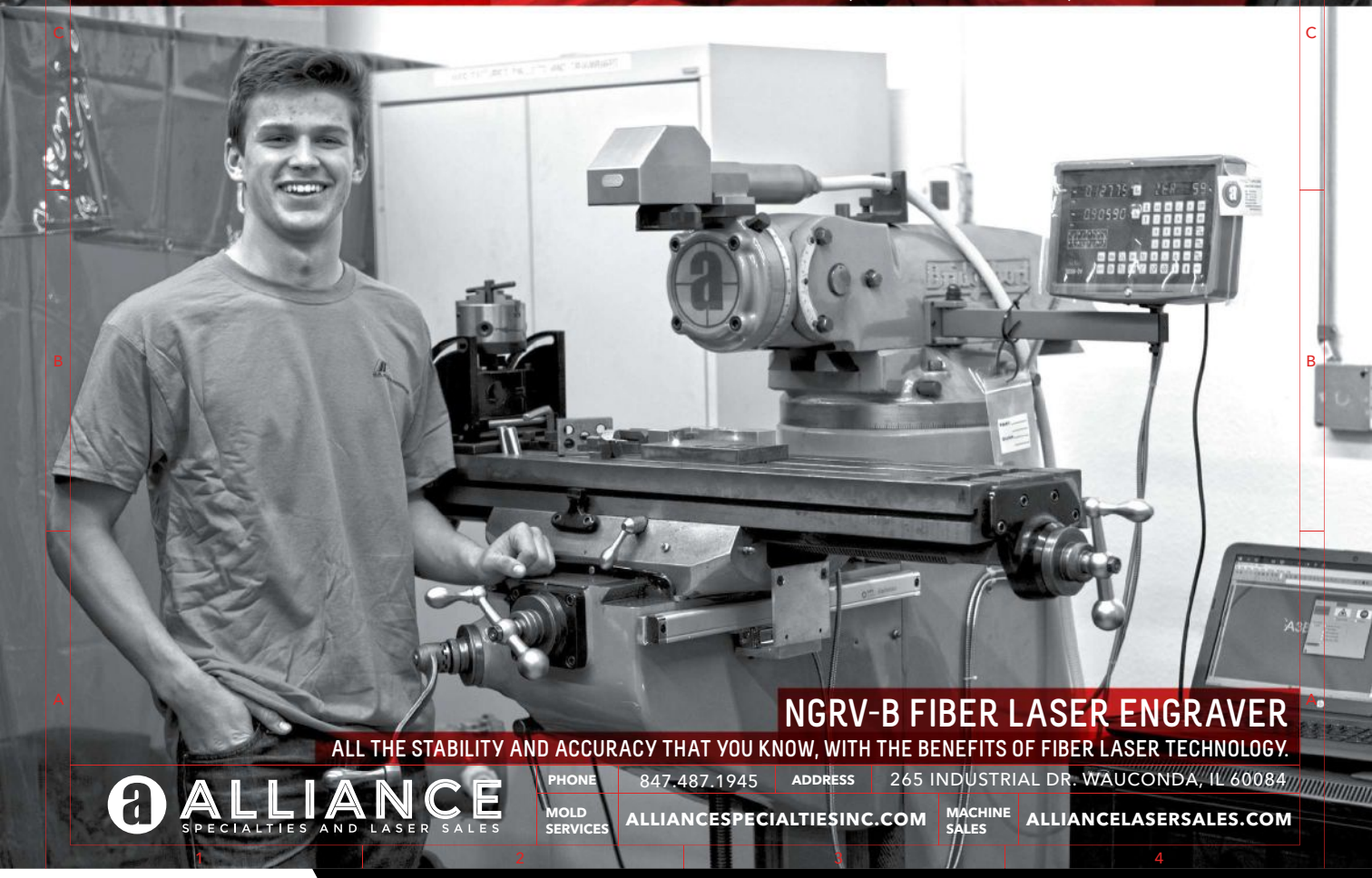
WEBSITE

We create long-lasting, successful relationships with our customers by listening and delivering solutions to their most difficult challenges. Simply put, we make a difference.
alliancelasersales.com

PRODUCT CATEGORIES

- **Engraving Services**
- **Finishing Services**
- **Mold Cleaning Services**
- **Mold Maintenance Repair**
- **Polishing Services**
- **Welding Services**
- **Laser Cutting Equipment**
- **Engraving Equipment**
- **Laser Welding Equipment**
- **Hot Runner Manifolds**





COMPANY Advertisers are listed in bold type.	See Ad	1 Cleaners	2 Coatings, Plating Services	3 Coatings, Platings	4 Dust Collectors	5 Electroplating Services	6 Engraving Equipment	7 Engraving Services	8 Finishers	9 Finishing Services	10 Heat Treating, Hardening Systems	11 Heat Treating Services	12 Laser Welding Equipment	13 Manual Cleaning Equipment	14 Mold Cleaning Svcs.
Accurapuls Canada Inc. – Edmonton, AB, Canada, 780-445-0920									8	9	10				
Alliance Specialties and Laser Sales Inc. – Wauconda, IL, 847-487-1945	**113**						**6**	**7**		**9**			**12**		**14**
Alpha Laser - US – Meadville, PA, 814-336-9000	**111**						**6**						**12**		
Bales Metal Surface Solutions – Downers Grove, IL, 630-852-4665			2	3						9					
Blue Wave Ultrasonics, Inc. – Davenport, IA, 563-322-0144		1													14
BORIDE Engineered Abrasives – Traverse City, MI, 231-929-2121		1													
Branson – Danbury, CT, 203-796-0400		1											12		14
Brush Research Manufacturing Co., Inc. – Los Angeles, CA, 323-261-2193									8						
Cold Jet, LLC – Loveland, OH, 513-831-3211		1							8					13	14
Die Sep – Lake Geneva, WI, 262-767-9751		1												13	14
DME/Milacron – Madison Heights, MI, 248-398-6000		1												13	14
Duro-Chrome Industries – Wauconda, IL, 847-487-2900			2				6	7		9	10		12		14
Dytron Corp. – Frazer, MI, 586-296-9600	**118**												**12**		
ENGIS Corporation – Wheeling, IL, 847-808-9400															
Fisa North America – Elk Grove Village, IL, 847-299-8400		1													14
Gesswein & Company – Bridgeport, CT, 203-366-5400	**116**	**1**			**4**		**6**						**12**		
Grieve Corporation, The – Round Lake, IL, 847-546-8225											10	11			
High Tech Laser and Polishing – Lee's Summit, MO, 815-525-9800								7							
LaserStar Technologies Corporation – Riverside, RI, 401-438-1500							6						12		
Manner USA Inc. – Lawrenceville, GA, 770-449-1820			2					7		9	10				14
Millutensil SRL – Milano, Italy, 39 02 294 043 90															
Mold-Tech – Carol Stream, IL, 630-588-0400			2					7		9					14
Mould Pro – Rancho Cucamonga, CA, 909-941-0600		1													
Nanoplas – Grandville, MI, 616-452-3907		1		3											
O.R. Lasertechnologies GmbH – Dieburg, Germany, +49 6071 209 890													12		
Oerlikon Balzers Coating USA Inc. – Schaumburg, IL, 847-844-1753				3											
Omegasonics – Simi Valley, CA, 805-583-0875		1													
Phoenix Laser Solutions – Meadville, PA, 814-724-3666															
Polymer Cleaning Technology, Inc. – Hillsborough, NJ, 908-281-0055		1													14
Precision Laser Technology – Rochester, NY, 585-458-6208								7							
Rocklin Manufacturing Co. – Sioux City, IA, 712-255-7957			2	3			6								
Rofin-Sinar, Inc. – Plymouth, MI, 734-455-5400							6				10		12		
RUD Ketten, Rieger & Dietz GmbH u. Co. KG – DE, 49 7361 504 1070	**117**														
Slide Products, Inc. – Wheeling, IL, 847-541-7220		1													
Smart Attend Inc. – Aurora, ON, Canada, 866-210-9630															
SURFACETEC – Franklin Park, IL, 630-521-0001			2			5			8	9					14
Thermal-Tech Systems, Inc. – West Chicago, IL, 630-639-5115		1													14
ToolingDocs – Wauconda, IL, 847-487-1000															
United Tool & Mold Inc. – Easley, SC, 864-859-8300													12		
Wisconsin Engraving / UNITEX – New Berlin, WI, 262-786-4521								7		9					

For more supplier listings, go to moldmakingtechnology.com/suppliers.

Mold Dehumidification Systems	Mold Finishing Systems	Mold Maintenance & Repair Services	Mold Maintenance Training	Mold Sprays, Grease, Lubricants & Releases	Mold Transporters	Mold Treatment Systems	Mold/Die Spotting Presses	Polishing Equipment	Polishing Services	Replacement Parts	Retrofitting Services	Rust Preventatives	Safety Equipment	Sampling/Mold Tryout Services	Scrap Recycling Equipment	Scrapers	Storage Equipment/Services	Texturing Equipment	Texturing Services	TIG Welding Equipment	Ultrasonic Cleaning Equipment	Welding Services	WEBSITE
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	
	16					21		23										33					accurapuls-canada.com
		17							**24**													**37**	**alliancelasersales.com**
		17																**33**				**37**	**alphalaser-us.com**
				19					24			27										37	balesusa.com
												27									36		bluewaveinc.com
				19				23	24			27											borideabrasives.com
																					36	37	emerson.com/branson
	16							23															brushresearch.com
																							coldjet.com
					20		22						28										diesep.com
15	16	17		19	20			23		25		27	28			31	32				36		dme.net
		17							24													37	duro-chrome.com
		17																		**35**			**dytroncorp.com**
								23												35			engis.com
												27									36		fisa.com
				19				**23**				**27**									**36**		**gesswein.com**
						21																	grievecorp.com
		17						23	24										34			37	htlaser.com
																							laserstar.net
		17							24		26			29					34			37	m-form.com
		17					22							29									millutensil.com
		17							24										34				mold-tech.com
				19												31							albaent.com
				19								27											nanomoldcoating.com
		17																				37	or-laser.com
																							oerlikon.com/balzers/us
																					36		omegasonics.com
		17																				37	phoenixlaser.com
																							polymercleaning.com
																			34			37	precisionlasertech.com
																		33				37	rocklinmanufacturingco.com
																							rofin.com
													28										**rudchain.com**
				19								27											slideproducts.com
													28										smartattend.com
		17							24		26												surfaceteccorp.com
		17		19					24		26	27								35		37	thermal-tech.com
		17	18																				toolingdocs.com
		17					22				26								34			37	utminc.com
		17							24										34				wi-engraving.com

Image courtesy of Vistatek.

Robotic Drag Finisher Automates Cutting Tool Honing, Polishing

Bel Air's AutoHone robotic reverse drag finisher improves cutting tool honing and polishing workflow with very little operator involvement. The automated system achieves short cycle times and consistent results. In the reverse drag finishing process, the machine quickly moves process media, producing a high-energy "wave" that streams across the workpiece. The machine's six-axis robotic arm enhances control and precision over the workpiece's angle of introduction into the media. This results in complete, even and repeatable finishing processes.

Bel Air Finishing Supply / 401-667-7902 / belairfinishing.com

Fiber Laser Welding System Uses Diode Pumps for More Power

The ID1 fiber laser welding system from **Alliance Specialties and Laser Sales** uses Fiber Solid State (FSS) laser technology, which generates laser power through a series of diode pumps instead of crystals and mirrors. This removes many of the intricate parts found in typical YAG lasers and results in virtually zero maintenance for the user, according to the company. The machine's design also offers high beam quality, air cooling for high ambient air temperatures, low power consumption, long diode life (ranging to 100,000 hours), fewer necessary optics, and easy integration and service.

The swivel design provides unlimited head position configurations for greater job flexibility, 4.5-ft. travel and full 360-degree rotation. The company says that every part of this system is easily adjustable, giving the operator versatility and flexibility to meet most laser repair demands. It is designed to be manually adjusted, which eliminates the possibility for mechanical failure and offers the ability to focus on specific areas, ultimately reducing wear.

Alliance Specialties and Laser Sales / 847-487-1945 / alliancelasersales.com

Equipment Provides Vibration Stress Relief

Bonal Technologies' model 2401 equipment is designed as a substitute for heat treatment in stress-relief applications. It features a touch-screen display, two onboard computers and graphic certification. The equipment applies the Meta-Lax vibration stress-relief process for effectiveness and consistency.

Bonal Technologies Inc. / 800-638-2529 / bonal.com

Radial Discs Ideal for High-luster Polishing

Boride Engineered Abrasives adds Dedeco Sunburst Radial Discs to its line of mold and die polishing supplies. This product is ideal for finishing, smoothing and high-luster polishing on nearly any material. The specially treated ceramic abrasive grain embedded throughout thin flexible bristles enables faster and longer work than rubber wheels, brushes, buffs and conventional sanders.

Boride Engineered Abrasives / 231-929-2121 / borideabrasives.com

Dry Ice Blasting Reduces Downtime, Improves Part Quality

Cold Jet's i3 MicroClean dry ice blasting technology is a non-abrasive, nonconductive cleaning method that does not use chemicals or solvents. Using compressed air, the technology accelerates dry ice pellets through high-velocity nozzles onto surfaces. The pellets sublimate upon contact and expand 800 times to flush away contaminants.

The technology enables items to be cleaned in place without disassembly and is used to remove production residues, release agents, contaminants, paints, oils and biofilms. According to the company, the dry ice blasting technology reduces downtime, improves cleaning and part quality, lowers scrap rates, improves tool utilization and increases asset life.

The technology makes use of recycled carbon dioxide and eliminates the need for chemicals and water in the cleaning process.

Cold Jet LLC / 513-831-3211 / coldjet.com

Welder System Produces Precision Mold and Die Repairs

Gesswein & Company's PUK U5 welder offers precision mold and die repairs. Utilizing micro TIG technology, the welder produces small, consistent spot welds to penetrate mold surfaces, and it does not require pre-welding heat treatment. Users can repair parting lines, mold seams and three-point corners and edges, as well as fill in pits and deep scratches. Using different electrodes can weld into slots, corners and ribs. Slides, ejectors and core pins can also be repaired. It can be used on common tool steels, stainless steels, aluminum and copper. All heat is concentrated at the weld spot, eliminating distortion and metal stress caused by overheating, enabling the mold to withstand pressures during the molding process. The system comes complete with microscope, LED light, electrode handpiece, set of 0.6 mm and 0.8 mm electrodes, electrode sharpener, ground cables, argon gas regulator, tack resistance welder and foot pedal, and a one-year manufacturer's warranty.

Gesswein / 203-366-5400 / gesswein.com

Mold Washer Combines Spray and Ultrasonic Actions for Flexibility

Blackstone-NEY Ultrasonics, a division of **Cleaning Technologies Group LLC**, introduces an innovation in an aqueous-parts cleaning system that combines spray and ultrasonic functions. The new patent-pending Rotosonic cleans heavily soiled parts in a single machine, which could prevent users from having to purchase a spray cabinet and an ultrasonic machine separately.

Blackstone-NEY Ultrasonics says that the washer gives the ultimate in flexibility, offering the use of a single process or both, depending on the needs of the user. The machine has a compact design and eliminates the need for manpower and the safety risks associated with moving parts from washer to washer.

Cleaning Technologies Group LLC / 877-614-4480 / ctgclean.com

Advancing Anode Assembly Fabrication

By Luis Gonzalez

Fabricating a conforming anode assembly is a necessary step when chrome plating injection and compression molds, but not all plating operations approach this step in the same way.

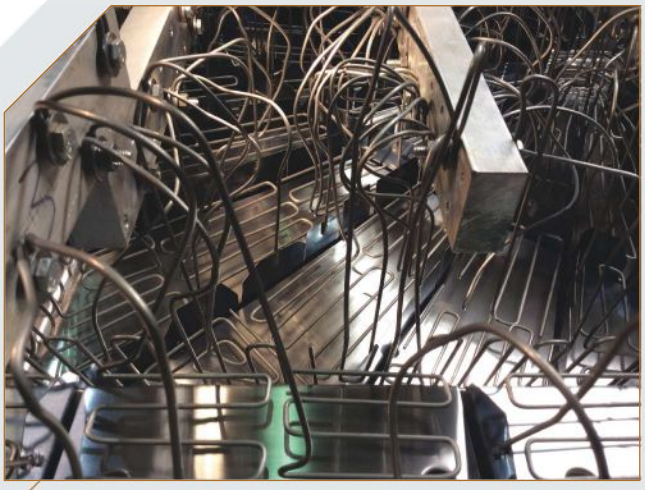
While a conforming anode is only one element in the electroplating process, the quality of the assembly strongly impacts certain critical parameters, such as plating film thickness, uniformity over geometrically complex molding surfaces and pitting control. Anode materials have evolved, but the current standard for functional plating of molding surfaces is still a system of individual, steel-wire anodes.

Platers used to fabricate anodes with malleable, perforated lead sheets. These sheets worked to a point, but some people believed they had a potentially unsafe impact on the working environment. An ISO14001-registered operation has incentives to seek alternative options, like custom-building the anode assemblies on a base frame of square, aluminum bars with mild, steel-bent wires that are individually attached to the frame and conformed to the tool's specific geometry, for example.

Deep grooves for stiffening ribs are seen in many tools and can potentially encounter release failures well before the rest of the mold unless they are plated to the same tolerances required of the entire tool.

Aluminum as a choice for the frame yields a more-even current distribution throughout the assembly, which has a significant impact on minimizing pitting in the plated surface. Minimal pitting is a primary performance requirement for many customers' projects, especially for in-mold finishing tools.

The number of wires that are required depends on what it takes to conform to the geometry, which can be 300 or more for a large, complex tool, like a fiberglass bathtub or for an automotive body panel. This network of individual wires makes it possible for the overall assembly to become an inverse duplicate of the forms to be plated, which is critical for maintaining a consistent plating thickness within a narrow tolerance range over very geometric, complex surfaces.



Images courtesy of Surfacetec.

Precise placement and fixity of the bladed anodes ensure that they remain centered within the grooves during the plating operation, avoiding burning of the groove surfaces by contact, which leads to areas of inconsistent plating film thickness.

As with every mature process, there is always room to evolve. The anode component of the plating process is no exception. For example, many chrome-plated tools, especially those for high-percentage, glass-filled parts, have grooves for stiffening ribs in the molded component. These grooves can experience release failure well before the rest of the mold. Reliably chrome plating the grooves to the same tolerances as the rest of mold will increase the lifecycle and maintenance intervals, and improved release and resin flow will decrease cycle time.

One solution for accomplishing these benefits is a system of individual blade anodes that rests within the grooves. This common method has been refined to enable the blades to remain centered within the grooves while submerged in the plating bath. This is a critical step for preventing the blades from contacting the mold and causing burning of the groove faces, which leads to unplated areas or inconsistent film thickness within the grooves. Another refinement addresses the current differential between the wire and blade anodes, ensuring uniform plating thickness with both anode types.

Molds with grooves for stiffening ribs that use these methods can yield groove-wear patterns consistent with the wear on the rest of the mold, which improves molding performance, tool life cycle and maintenance intervals. MMT

CONTRIBUTOR
Luis Gonzalez is president of Surfacetec.

FOR MORE INFORMATION

Surfacetec / 630-521-0001
luis@surfaceteccorp.com / surfaceteccorp.com

ADVERTISERS' INDEX

Search Machines Smarter

Techspex is the world's largest database of new machine tools with specifications of over 8,600 machines from more than 600 builders.

TECHSPEX

The Machine Tool Search Engine

IN PARTNERSHIP WITH:

MoldMaking TECHNOLOGY®

techspex.com

COOLINGCARE

AUTOMATIC MAINTENANCE, DIAGNOSTICS & CONSERVATION OF COOLING CHANNELS

LIFE CYCLE MANAGEMENT

HOT RUNNER SERVICE CENTER

BEFORE

AFTER

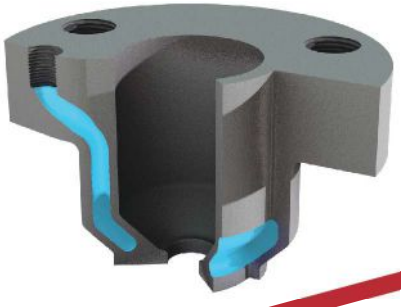
DME IS COMMITTED TO HELPING YOU WITH THE MAINTENANCE AND SERVICE OF ANY HOT RUNNER SYSTEM

DME ConformalCooling

COOLING IS YOUR NEXT BIG OPPORTUNITY

ELIMINATE THE HOTSPOT

New Standardized Conformal Cooling Components incorporated into your mold provides additional cooling in "hotspot" areas that conventional cooling methods are unable to reach.



DME®

Three Components to **Increasing Productivity**

COOLING CARE: Automatically return cooling performance to its original levels, delivering more output and quality parts.

HOT RUNNER SERVICE CENTER: Cost effective refurbishment and repair.

CONFORMAL COOLING: Lower cycle times, less scrap.

You Need It, DME Has It!
Check out DME's entire portfolio, available online 24-7
store.milacron.com

2019 16-23 October Düsseldorf Germany

KSHOW 2019
16-23 October Düsseldorf, Germany
Hall 1, Booth 1C05

Call toll-free: 800.626.6653
Or visit us at: www.store.milacron.com

MILACRON®