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2025 DIE CASTING CONGRESS &TABLETOP

OCTOBER 7-9, 2025 | MILWAUKEE, WI

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Chairman's Note

The 2025 Die Casting Congress & Tabletop

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Welcome to this issue of Die Casting Engineer, featuring additive manufacturing and advanced technology as its themes, as well as serving as the show guide for the 2025 Die Casting Congress and Tabletop.

We are excited to return to the beautiful city of Milwaukee, Wisconsin, the host city for this year's event. NADCA's Wisconsin Chapter 12 is one of the active chapters in our association, and we look forward to having great participation at this premier event.

Over three days, attendees will have the opportunity to see some of the latest developments from casting industry suppliers in the exhibit area, attend congress sessions, celebrate industry awards, and network with peers from the global die casting industry.

As an association, we are pleased to welcome representatives from the global die casting industry. With the recent increase in government incentives to expand manufacturing in the USA, our organization is experiencing increased involvement from international companies in the die casting industry. We thank you all for participating.

This year NADCA has again sold out all available floor space to exhibitors who are eager to present and share the latest technologies for our industry. Invest in learning more about new products and processes that can help your team become more successful.

Attendees can look forward to participating in the Congress technical sessions led by global experts, covering topics including the die cast process developments using AI in casting, innovative die casting materials, advanced tooling materials and processes, structural die casting alloys, automation, and much more. These presentations promise to deliver cutting-edge technology, ongoing research insights, and effective management tools to bolster our industry's competitiveness.

The NADCA awards luncheon is an opportunity to join with fellow industry members and together celebrate milestones in member company safety, quality, casting designs, and industry involvement. Don't miss this always exciting industry event.

Take full advantage of this event to expand your network of industry connections and further develop your industry knowledge.

Expand and sharpen your knowledge, skills, and abilities through participating in the many options available at the NADCA 2025 Die Casting Congress and Tabletop.

Thank you for your continued support of NADCA!

"Take full advantage of this event to expand your network of industry connections and further develop your industry knowledge."

Andrew Ryzner
Editor
North American Die Casting Association

"During this interesting time for our industry and our country - please try and catch some of the congress sessions for the latest talking points!"

Welcome to Milwaukee!

Welcome again to another Show Guide edition of Die Casting Engineer magazine - this time for the 2025 Die Casting Congress & Tabletop to be held in Milwaukee, Wisconsin from October 7-9, 2025. I hope many of you who are reading this are either already here reading this or are planning on attending when this shows at your doorstep before the show.

Let's call it like it is and say this is certainly an interesting time for our industry and for our country - be it tariffs being placed, withdrawn, replaced and so on, to the new innovations available through what AI is giving us on our computer systems and how it may relate to casting, automation, design, and anything else you can think of involving computers to help your business. Topics such as these and more are scheduled to be discussed during the congress sessions at this year's tabletop show. I would highly recommend if you have the time to attend some of these to hear about the latest and greatest in tech and whatever news presenters can bring you in an ever-changing digital world.

Like I'm sure I said the last time we found ourselves in this location, Milwaukee is a great city to peruse after show hours. We are of course in the land of cheese and beer, those two things go great together, so why not treat yourself to some of that while you're here. I'm sure I'll do a bit of that myself, in moderation of course. And who knows, based on the current Major League Baseball standings, maybe the Milwaukee Brewers will be in the midst of a deep playoff run! They've been playing great baseball lately at the time of this writing!

Within the show guide you will find a letter from the Mayor that talks about these things and more - with great recommendations of things to check out after show hours if you feel so inclined.

Thank you all for your support and I hope you all have a great rest of the year!

NADCA Government Affairs

H.R. 1 Signed into Law: Landmark Tax Overhaul for U.S. Manufacturers

On July 4, 2025, President Donald Trump signed into law H.R. 1—the "One Big Beautiful Bill Act"—marking the most significant pro-manufacturing tax reform in years. The legislation delivers a comprehensive package of incentives designed to spur domestic production, accelerate capital investment, and strengthen the competitive position of U.S. industry. NADCA members flew to Washington, D.C. in June 2025, met with lawmakers, and made the industry's voice heard.

At the core of the law is the permanent restoration of immediate expensing for domestic research and development (R&D) costs, retroactive to January 1, 2025. Small businesses with gross receipts under $31 million receive an even greater benefit, as they can apply the provision retroactively to January 1, 2022. This change reverses the prior requirement to amortize R&D over five years, allowing companies to deduct costs upfront and reinvest savings directly into innovation. Foreign R&D remains subject to a 15-year amortization schedule.

The bill also permanently extends 100 percent bonus depreciation for qualified property—such as machinery and equipment—while doubling Section 179 expensing limits to $2.5 million, with a $4 million phaseout threshold. Separate from bonus depreciation, the law creates a new special 100 percent first-year depreciation allowance that applies to "qualified production property," including facilities where manufacturing occurs, if construction begins between January 19, 2025, and January 1, 2029. Capital-intensive firms gain further relief through the reinstatement of the EBITDA standard for interest deductibility under Section 163(j), easing access to growth-related financing.

Additional business-friendly provisions include a permanent 20 percent pass-through income deduction under Section 199A, now with expanded eligibility and a new inflation-indexed minimum deduction. The law also makes permanent the estate tax exemption at $15 million per individual ($30 million filing jointly) indexed for inflation, broadens the paid family leave tax credit, and allows greater flexibility in 529 education plans for workforce training. Other measures—such as a qualified overtime income deduction—further target workforce retention and competitiveness.

In a notable policy shift, H.R. 1 phases out or eliminates several clean energy tax incentives enacted under the Inflation Reduction Act. Credits for electric vehicles, hydrogen production, and renewable electricity will sunset by 2028, signaling a pivot toward traditional industrial investment priorities.

For U.S. manufacturers, the "One Big Beautiful Bill Act" provides rare long-term tax certainty. By locking in favorable treatment for R&D, equipment purchases, and business income, the legislation equips companies with the confidence to make multi-year investment decisions—cementing its place as a milestone in American manufacturing policy.

Tariffs Trimmed for Some as Targeted Rates Take Effect

After months of tense talks and economic brinkmanship, the August 7, 2025, tariff rollout set the stage for a more selective form of trade pressure. The U.S. has locked in revised reciprocal rates ranging from 10 percent to 41 percent for virtually every country. Canada is subject to a 35 percent rate on imports that do not comply with the U.S. Mexico Canada Agreement (USMCA) country of origin requirements with Mexico receiving a ninety-day extension to remain at 25 percent for non-USMCA conforming imports.

In July and early August, Washington finalized a string of agreements with the EU (15% reciprocal tariff rate), UK (15%), Japan (15%), Indonesia (19%), South Korea (15%), and Vietnam (20%). Those discussions helped certain nations avoid the heaviest penalties, trading tariff relief for concessions in areas from agricultural market access to digital trade rules. Of note to NADCA members purchasing equipment from the EU, the 15 percent tariff rate is inclusive of the MFN General Duty rates and not in addition as is currently the case with most other countries. This leaves imports from the EU subject to a final flat rate of 15 percent and does not remove the 50 percent Section 232 tariffs on imports of steel, aluminum, or copper.

While businesses now have more certainty, the pressure is far from gone. U.S. trade officials say the new rates still serve as leverage to address long-term deficits, but they concede the recalibrated schedule is also about keeping key allies onside.

Administration Imposes 50 Percent Section 232 Copper Tariffs

On July 30, 2025, President Donald Trump issued a proclamation under Section 232 of the Trade Expansion Act, imposing a 50 percent tariff on specified copper products effective August 1, 2025. The measure applies to semi-finished copper items such as pipes, wires, rods, sheets, and tubes, as well as copper-intensive derivatives including fittings, cables, connectors, and electrical components. Only the copper content is subject to this duty; non-copper portions will be assessed under reciprocal or other applicable tariffs. Products covered by the automotive Section 232 tariffs are excluded from the copper rate. All covered imports must carry precise copper content declarations for U.S. Customs and Border Protection (CBP) review, and misreporting may result in civil penalties, revocation of import privileges, and possible criminal prosecution. Items entering through U.S. foreign trade zones must be classified as "privileged foreign" and pay the applicable duty upon entry into U.S. commerce.

Several categories are excluded from the 2025 copper tariffs: ores, concentrates, mattes, cathodes, anodes, and copper scrap. Nevertheless, Commerce is tasked with reviewing cathode and anode supply conditions by June 30, 2026, with the option to recommend phased tariffs—15 percent in 2027 and 30 percent in 2028—if vulnerabilities remain. Scrap copper will remain duty-free but must meet a new domestic sales requirement of 25 percent high-quality scrap sold in the United States. An export licensing system may be used to enforce compliance.

Additional provisions apply to domestically produced copper input materials. Starting in 2027, 25 percent of U.S.-produced ores, concentrates, cathodes, and anodes must be sold domestically, increasing to 30 percent in 2028 and 40 percent in 2029. Duties under this proclamation are ineligible for drawback. The non-copper portion of covered products remains outside Section 232 copper tariff scope and will continue under the applicable tariff regime.

Within 90 days, the Department of Commerce will initiate a formal inclusion process for potential expansion of covered derivative products. CBP will implement enhanced Harmonized Tariff Schedule classification and compliance measures. The administration has characterized the action as necessary to address national security concerns, but stakeholders note that U.S. smelting capacity remains limited, potentially constraining the intended benefits.

U.S. Launches Section 301 Probe into Brazil's Trade Practices

On July 15, 2025, the Office of the U.S. Trade Representative (USTR) kicked off a formal Section 301 investigation targeting Brazil's trading conduct—following instructions from President Trump. The inquiry zeroes in on whether Brazil's policies unfairly discriminate against American businesses across six critical sectors: digital commerce and electronic payments, preferential tariff treatments, anti-corruption enforcement, intellectual property safeguards, ethanol market access, and illegal deforestation issues.

Central to the investigation is Brazil's tendency to offer lower tariffs to other nations while imposing higher rates on U.S. exporters, notably slapping up to an 18 percent tariff on American ethanol. This creates an uneven playing field that puts U.S. producers at a distinct disadvantage.

Beyond tariffs, the USTR also points to broader problems: Brazil's anti-corruption measures fall short, intellectual property laws are weak, and lax enforcement on deforestation allows illegal logging and agriculture to thrive—undercutting lawful competitors on the global stage.

The USTR is inviting public feedback on these concerns, with written comments due by August 18, 2025. A public hearing will follow on September 3 in Washington, D.C., while the agency also seeks formal consultations with Brazilian officials. If the investigation finds Brazil's practices violate trade rules, the USTR may propose countermeasures, including tariffs or other trade sanctions.

Supreme Court Limits District Courts' Power to Issue Nationwide Injunctions

In a landmark 6–3 ruling in Trump v. CASA, Inc., the U.S. Supreme Court significantly curtailed the authority of federal district courts to issue nationwide injunctions blocking federal policies beyond the parties involved in a case. This decision marks a major shift in federal litigation, emphasizing judicial restraint and limiting sweeping court orders that had become increasingly common in recent years.

At issue was President Trump's executive order on birthright citizenship, which lower courts had blocked nationwide despite the legal challenges involving only a small group of plaintiffs. Writing for the majority, Justice Amy Coney Barrett ruled that injunctions should be confined geographically to the court's jurisdiction and apply only to the parties before it. She characterized nationwide injunctions as extraordinary remedies that exceed a district court's authority and disrupt the judicial process by creating inconsistent legal outcomes across the country.

The ruling clears the way for the Trump administration's contested policy to take effect in jurisdictions where it had been temporarily halted. While district courts retain the power to enjoin unlawful government action, the Court underscored that such relief must be narrowly tailored and consistent with long-standing principles limiting judicial overreach.

Justice Sonia Sotomayor dissented, cautioning that restricting nationwide injunctions could leave widespread harms unaddressed and force individuals in other areas to file duplicative lawsuits. She defended the use of universal injunctions as sometimes necessary to provide meaningful

and comprehensive relief against federal policies causing broad, immediate impact.

This decision is expected to reshape litigation strategies for advocacy groups, states, and other challengers of federal policies, who may now need to pursue multiple lawsuits across different jurisdictions or rely more heavily on appellate courts for nationwide remedies. It also signals a broader judicial philosophy favoring clear institutional boundaries and reinforces appellate courts as the primary venue for resolving disputes with national implications.

SBA and DOL Partner to Strengthen U.S. Manufacturing Through Workforce and Capital Alignment

On July 16, 2025, the U.S. Small Business Administration (SBA) and the Department of Labor (DOL) formalized a strategic partnership to strengthen U.S. manufacturing through a newly signed Memorandum of Understanding (MOU). This agreement focuses on enhancing support for small manufacturers, who represent nearly 98 percent of all manufacturing firms in the country, by aligning capital access with workforce development initiatives—two critical pillars for revitalizing domestic production.

Under the MOU, the Department of Labor will expand its Registered Apprenticeship Program and leverage resources such as American Job Centers and labor market analytics to better tailor training programs to the evolving needs of manufacturers. Labor Secretary Lori Chavez DeRemer highlighted that this effort is fully aligned with President Trump's "America First" agenda, describing it as a "workforce-centered approach to industrial resurgence" that ensures America's workforce is prepared to seize new opportunities.

Meanwhile, the SBA will amplify outreach and training on its core financial tools, including the 7(a), 504, and microloan programs, to improve small manufacturers' access to capital and federal contracting opportunities. The agency will also promote flagship initiatives like the Made in America Manufacturing Initiative and the Onshoring Portal, which connects businesses to over one million domestic suppliers, alongside ongoing regulatory streamlining efforts designed to ease reshoring and boost industrial growth.

Although the MOU does not entail direct funding or staffing commitments, it establishes a framework for interagency coordination, information sharing, data exchange, and joint training activities through April 2027. SBA Administrator Kelly Loeffler emphasized that the partnership represents "a unified front to equip American manufacturers with the capital, workforce, and momentum to lead the next era of industrial growth." Together, the SBA and DOL aim to spark renewed investment, rebuild domestic supply chains, and strengthen the nation's economic and security position through enhanced collaboration and resource alignment.

EPA Proposes to Rescind GHG Endangerment Finding

In a move that could redefine the scope of U.S. climate policy, the Environmental Protection Agency has proposed rescinding the 2009 Endangerment Finding, which has served as the cornerstone for greenhouse gas regulations for over 15 years. Administrator Lee Zeldin announced the plan on July 30, 2025, describing it as the most significant deregulatory initiative in the agency's history. The proposal, published in the Federal Register on August 1, would also eliminate related vehicle emissions standards, with the EPA estimating $54 billion in annual consumer savings and $170 billion in reduced compliance costs for small businesses.

The EPA's central argument rests on a narrower interpretation of Section 202(a) of the Clean Air Act, asserting that it does not permit regulation based on global climate concerns. The agency also questions the scientific basis of the original finding, arguing that updated assessments no longer support its conclusions. In addition to its primary position, the EPA outlines an alternative justification, inviting the public to weigh in on both the legal and scientific aspects during the 45-day comment period ending September 15.

Notably, the EPA will also reevaluate the 2009 Greenhouse Gas Endangerment Finding, which determined that greenhouse gases (GHGs) pose risks to public health and the environment. The Clean Air Act (CAA) mandates that the EPA regulate air pollutants if they are found to "cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare." This finding provides the EPA with the legal authority to regulate GHGs and has served as the basis for numerous GHG regulations.

EPA Delays Implementation of TCE Rule Exemptions Amid Legal Challenges and Regulatory Freeze

The Environmental Protection Agency (EPA) has once again postponed the rollout of key exemption provisions under its trichloroethylene (TCE) risk management rule, extending the effective date for limited-use carveouts to August 19, 2025. This marks the second delay since the sweeping restrictions were finalized in December 2024 under the Toxic Substances Control Act (TSCA).

The TCE rule imposes broad prohibitions on the manufacture, processing, and distribution of the toxic solvent—linked to cancer, reproductive harm, and neurological damage—while allowing narrowly tailored exemptions for critical industrial applications such as defense systems and advanced battery technologies. These exemptions require strict workplace safety standards and EPA oversight.

The latest postponement reflects ongoing legal and administrative hurdles. In January 2025, the U.S. Court

of Appeals for the Third Circuit issued a stay halting enforcement after manufacturers including PPG Industries and Microporous LLC challenged the rule. Additionally, the regulatory freeze instituted by the Trump administration earlier this year has further complicated the EPA's timeline. The agency has aligned its implementation schedule with the court's review process as it continues to evaluate the rule.

Despite the delay of the exemption provisions, the broader ban on most TCE uses remains fully in effect. EPA has indicated that it may reconsider aspects of the rule depending on litigation outcomes and stakeholder feedback, potentially initiating formal rulemaking to adjust regulatory requirements.

For now, companies hoping to utilize the exemptions must await further guidance, with mid-August currently the earliest anticipated timeframe for clarity on regulatory enforcement and potential adjustments.

EPA Reconsidering PCE Risk Management Rule

The U.S. Environmental Protection Agency (EPA) has announced a reconsideration of its final risk management rule for perchloroethylene (PCE), issued in December 2024 under the Toxic Substances Control Act (TSCA). The original rule phases out certain uses, including a 10-year transition away from PCE in dry cleaning, and requires workplace chemical protection programs (WCPPs) to limit exposure. It also sets an existing chemical exposure limit (ECEL) of 0.14 ppm over an 8-hour time-weighted average.

In a July 30, 2025, Federal Register notice, EPA invited public comment through August 29 on potential revisions. The agency wants feedback not just on whether the 0.14 ppm limit should stay, but also whether higher levels—such as 0.50 ppm (acute non-cancer) or 0.47 ppm (cancer-related)—could still protect workers. They're also interested in real-world data on how the rule is affecting operations, what workplace protection programs look like in practice, and whether safer substitutes for PCE are actually available and effective.

Small manufacturers have been particularly vocal, noting that compliance costs and technology upgrades could be significant. The U.S. Small Business Administration's Office of Advocacy is pushing EPA to give small-entity concerns more weight this time around.

Dr. Die Cast

At a recent NADCA Conference there were presentations on progress using 3D metal printing. Of interest to die cast tooling is that the part envelope is growing, but we are still restricted to die insert/core sizes. Not full inserts.

Some die casters and tool shops used Stereolithography (SLA) to create plastic prototype models of the casting. It is very useful in demonstrating difficult geometry and parting lines and in some cases to demonstrate design improvements that will help both the customer and die casting supplier.

3D metal printers are defined by the process. Direct Metal Laser Sintering (DMLS), and is also known as Selective Laser Melting (SLM) or Selective Laser Sintering (SLS) and others.

You can now produce an insert in two or more alloys. For example, starting with a copper base layer for improved heat transfer and ending with the H-13 or Maraging steel for the cavity surface. Component sizes are mostly limited by the X-Y "Bed" size.

Complex cooling channel configurations can be created that reduce or eliminate shrinkage porosity, reduce cycle time, and reduce or eliminate die solder. Water lines can be designed much closer to the cavity surface than we are accustomed to. For this reason, water flow will generally be much lower than we are used to. For best results, I recommend using thermal imaging to regulate the cooling/heating.

If you experience tool wear such as erosion, the insert can be welded or restored to its original shape using the same machine. Where can I get the equipment? You are talking six to seven figure investments. Most die casters and smaller tool shops go to the bigger shops that have made the investment and are in the business of providing components on a custom basis.

Be sure to check out the exhibitors offing this technology at the upcoming Die Casting Congress & Tabletop - October 7-9 in Milwaukee, WI. A full exhibitor list is available on page XX of this issue.

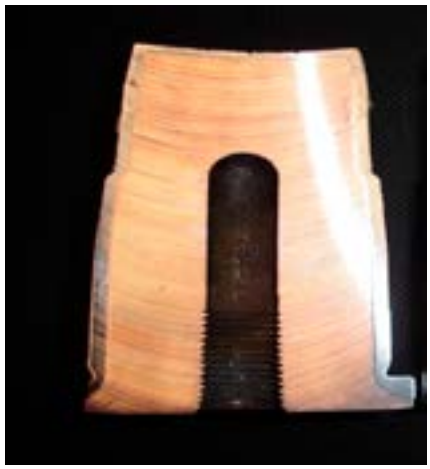

***Figure 1** – A Sectioned 3D Printed Bi-Metallic Core: Thin Layer of H13 Surrounding Copper*

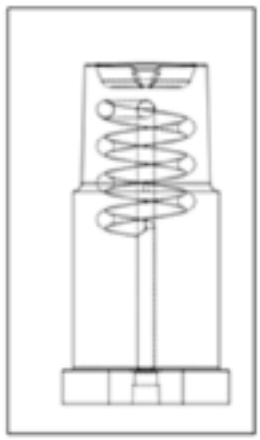

***Figure 2** – Example of Conformal Cooling Line Design in a Core*

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Important: Appropriate Personal Protective Equipment (PPE) must be worn by anyone in proximity to molten metal.

NADCA Reports

NADCA NEWS

NADCA Unveils 2025 Themes for DCE

Arlington Heights, IL - NADCA has announced the 2026 themes for Die Casting Engineer magazine. DCE's themes are:

- Die Casting Componenets & Equipment; Die Casting Machines
- Die & Plunger Lubricants/Plunger Tips; High Integrity Processes & Alloys
- Cast Materials (Al, Mg, Zn, etc); Die Materials
- Additive Manufacturing; Advanced Technologies
- Computer Modeling & Simulation; Defects; Design
- Die Coatings & Surface Treatments; Post Casting/ Secondary Operations

To submit your article proposal, please contact Andy Ryzner at ryzner@diecasting.org. If you are interested in advertising email Athena Catlett at catlett@diecasting.org.

NADCA Scholarship Program Accepting Applications

Arlington Heights, IL - The North American Die Casting Association (NADCA) is now accepting applications for its David Laine Scholarship through October 1. David Laine was instrumental in developing safety standards in the die casting industry and was also a founder of the Die Casting Research Foundation. He provided vigorous representation for the die casting industry in Washington, D.C., speaking out for the programs and legislation that would best serve not only the die casting industry, but the numerous industries it serves. The scholarship was founded in 1975 as a tribute to David Laine and is supported entirely by both corporate and individual contributions from the die casting community.

To qualify for this scholarship, students must have worked or interned in a die casting company, or a supplier to the die casting industry. In 2024, NADCA awarded nearly $25,000 in scholarships to 10 full-time undergraduate students located across the North America.

Additional information about the scholarship and its eligibility requirements, are available on NADCA's website.

UPCOMING EVENTS

Executive Conference Touches Down in Clearwater, March 2026

Arlington Heights, IL - NADCA is excited to announce that the 2026 Executive Conference will be held at the Sandpearl Resort on March 1-4, 2026 in Clearwater, Florida.

The tentative agenda, housing link and conference registration will be opened later this year. An announcement will be made via email and our newsletter when these items are opened.

Until then, pencil these dates into your calendar!

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DID YOU KNOW?

NADCA's **in plant education** programs bring expert training directly to die casting facilities, offering a **convenient and tailored** approach to workforce development. NADCA ensures that the training is highly relevant and immediately applicable to the **specific challenges** and equipment used by the facility. This **hands-on** approach allows employees to engage with **practical demonstrations,** ask questions relevant to their processes, and explore real-world solutions alongside their peers, fostering collaboration and a **deeper understanding** of the material. NADCA ensures that participants not only grasp the concepts but can also implement them effectively to **improve productivity, quality, and efficiency** at their facility.

Printing Hot - Carbon Steels from the Metal 3D Printer A Great Solution for Die Casting!

M. Dimter
Innoteque Solutions
Kornwestheim, Germany

Christoph Dörr
TRUMPF Laser- und Systemtechnik GmbH
Ditzingen, Germany

Abstract

There are now Metal-3D printers on the market that can be used to print carbon tool steels with a very high process reliability. A solution that the die casting industry had to wait a long time for. Carbon steels such as H13, Uddeholm DIEVAR® or Böhler W360 from the Metal-3D printer are entering now massive the die casting industry and the printed inserts no longer only offer the many advantages of conformal cooling, but now also ensure a very long and safe tool lifetime in die casting.

In addition, they offer die casters and toolmakers the safety of using these steels, which they have been using and trusting in conventional production for decades. With this paper we will talk about a short description why these tool steels can now be printed additively with the so-called 500°C printers, but also we will show real practical examples, how the new possibilities are establishing themselves in the die casting industry and what great advantages they offer.

History

Metal 3D-printing in powder bed has become the most successful industrial additive process for metals over the past 15 to 20 years. However, with the gradual establishment in series production, the demands of industrial companies regarding the process are also increasing. In addition to the general desire for shorter production times, the main demands are aiming towards a wider range of printable materials, higher component quality and reliable initial production - even complex parts should therefore succeed right from the start without approximation tests.

Preheating the build chamber up to 200 degree Celsius still can be seen as today´s industrial standard in metal 3D-printing, but honestly it´s just a compromise between cost and complexity of machine and the possible range of printable materials. Preheating up to 200 degree Celsius already induces less residual stress in some materials like aluminum, but is not sufficient to avoid formation of hot cracks when printing high carbon tool steel grades. Until now, the higher carbon content has prevented the process-reliable production of components of these materials in metal 3D-printing. But by heating the substrate plate to 500 degree Celsius this will change.

Adaptation of Machine to Deal with a 500 Degree Celsius Process

Throughout the years, whenever the necessity for higher preheating of the build chamber came up, machine-builders tended to simply add a heating-device inside a standard machine. Such modified machines already allowed to prove the general concept of higher preheating temperatures, but didn´t fulfill the needs of industrial production machines. Problems like thermal distortion, thermal drift and most significantly long cooling times at the end of the build job could be seen on such systems which haven´t been developed for high temperature applications.

TRUMPF, already gaining experience with their 500 degree Celsius machine “TrumaForm” around the years 2000 to 2006, took those challenges and set up the TruPrint 5000 system, designed from the beginning as an industrial production system for 500 degree Celsius applications. Lots of engineering capacity was spent into details like a watercooled frame, thermal decoupling of the (also watercooled) optical bench to minimise thermal drift of lasers, but also on superior gas flow, a high purity gas atmosphere and a user-friendly powder-handling. As a result, actual TruPrint 5000 sets the standard for industrial high temperature applications (see fig. 1).

***Figure 1** – TP500´s build and supply cylinders / schematic view into build cylinder with preheated substrate plate.*

High Machine Availability and Powder Recycling

Higher preheating also means a longer cooling phase at the end of each build-job – sometimes up to 20 hours, mainly depending on the build-temperature and volume of the printed component.

Only a suitable overall concept can prevent these long machine downtimes – one industry proven solution is the interchangeable cylinder principle, which is capable of dealing with temperatures up to 500 degree Celsius. The additive process takes place in an interchangeable build-cylinder. Once the 3D-printing process is complete, the build-cylinder with the hot part and powder inside is moved to a separate cooling station. The machine can be immediately loaded with a new build-cylinder (and a full powder supply-cylinder, if needed) and run the next build job nearly without interruption, while the previous build-job cools down externally, shielded by an argon-atmosphere (see fig. 2).

***Figure 2** – Maintime-parallel cooling down of hot build cylinder / inert powder cycle.*

Another possible disadvantage of the 500 degree Celsius preheating could be the poorer recyclability of the powder: As higher temperature leads to more oxidation, this could reduce the recyclability of powders, creating excessive waste powder which means loss of money. Therefore a counterstrategy had to be developed. Both the process chamber and the interchangeable cylinders are flooded with argon before production begins. This creates a system atmosphere with low residual moisture and a residual oxygen content at a very low level of just a few ppm. In compression tests with H11, chemical tests showed that the powder had the same oxygen content as new powder, even after several build cycles. Due to the low oxidation, the powder remained very free-flowing, and the particles did not adhere to each other. The powder could therefore be easily removed from cooling lines for example, without leaving any residue (see fig. 3 and 4).

***Figure 3** – Oxidized powder at standard oxygen level.*

***Figure 4** – Oxidation-free powder due to minimized oxygen level.*

Both aspects, high machine availability and superior longtime-powder-quality, put this 500-degree Celsius machine onto an industrial level and make it a solid base for testing new high-performance materials.

Preheating - How it Works

Residual stresses and distortion in metal 3D printing with carbon-containing steels are always an issue, especially when manufacturing large, high-volume components. In particular, when there are large jumps in the cross-section of the geometry (volume jumps), there are large temperature differences and thus non-uniform heat dissipation. This leads to thermally induced residual stresses in the component: there is a risk that the component will warp. During the metal 3D-printing process or afterwards it delaminates (i.e., detaches from the carrier plate by bulging) and sometimes even cracks (see fig. 5).

An effective countermeasure is to keep the top of the substrate plate at a temperature of 500 degree Celsius throughout the build process. On the one hand, the increased preheating temperature reduces the thermal gradients, i.e. the temperature drops and increases, for example at the edges. On the other hand, the yield strength is lowered. The combination of these two factors means that residual stresses are already reduced during additive manufacturing.

To prove this, studies with the material Ti64 were done, as this material tends to have much higher internal residual stresses as for example high-carbon tool-steels. Studies have shown that 500-degree Celsius preheating reduces deflection in Ti64 by 95 percent compared to the current industry standard of 200-degree Celsius preheating (see fig. 6). The lower thermal stress thus increases geometry accuracy, and this has positive effects both before and after the printing process: in the design phase, many support structures and simulation steps that were previously necessary to prevent deformation, delamination and cracking are eliminated. This increases the design freedom of the parts and subsequently also reduces the post-processing effort, as fewer supports have to be removed. Although the heat distribution in the part varies depending on the part geometry, it could be shown that high-temperature processing has the same positive effects in all cases and materials – only absolute numbers will vary depending on part geometry and material.

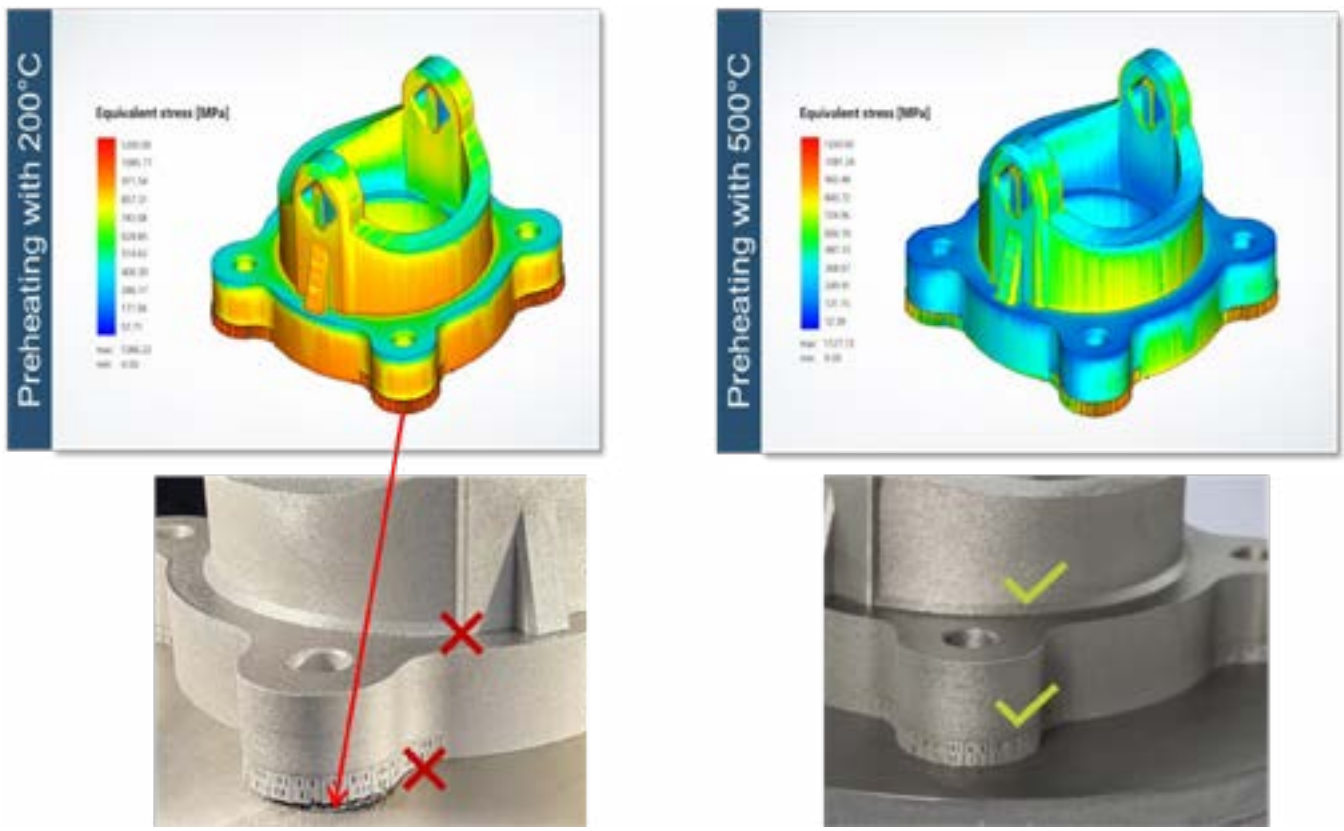


***Figure 5** – Comparison of simulated residual stress / related build results in Ti64 at 200°C and 500°C.*

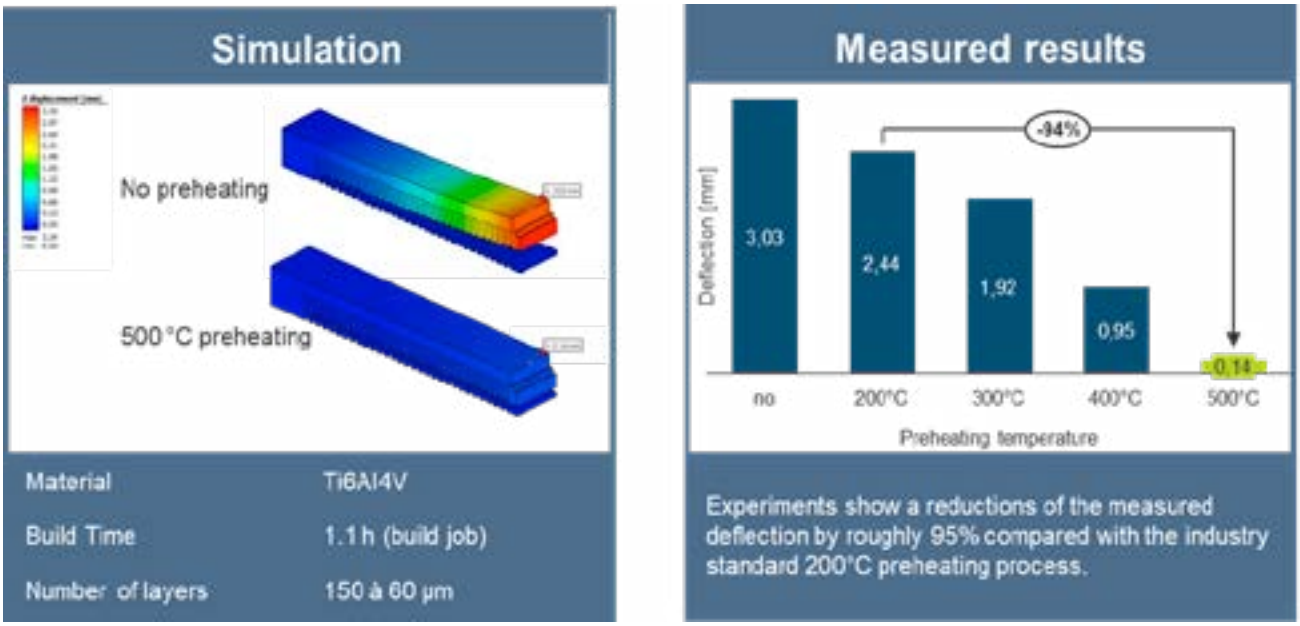


***Figure 6** – Deflection of Ti64 cantilever-parts built at different preheating temperatures.*

Printing High-Carbon Tool-Steels Like H11/H13

The many advantages of manufacturing tools or inserts using metal 3D printing are widely known: It is often the only possible process for such tasks, especially to incorporate complex cooling channels that improve the cooling properties of tools and dies. But until now, there has been one problem: The industry prefers carbon steels because they are highly wear-resistant and polishable. If H11/H13 is printed with a preheating of 200 degree Celsius, as has been common practice up to now, hard and brittle martensite forms during the short cooling phase (which can be seen as a self-quenching from liquid material of actual layer towards the already solidificated previous layers at a rate of 1000 K/s). As a result, cracks often form in the component. Adapting laser-parameters to add a lot of excessive temperature into small parts will also preheat them, but this strategy won´t work for midsize and big parts that are usually seen in mold and die applications. H11/H13 needs preheating-temperatures of at least 400 degree Celsisus for crack-free printing but also for crack-free welding of conventional H11/H13 in case of repair-welding (see fig. 7).

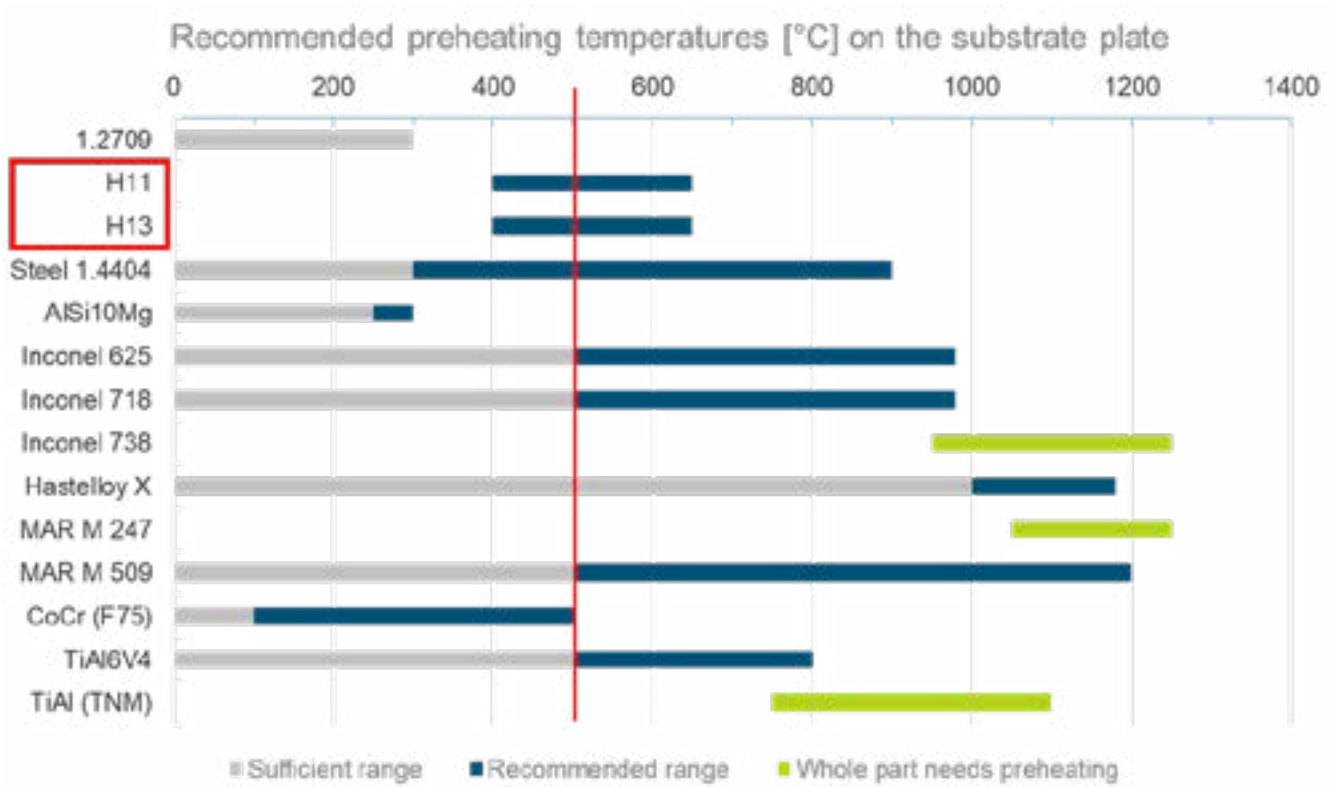
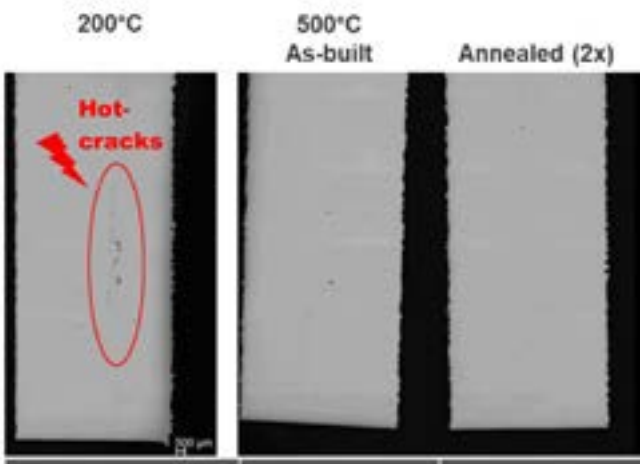


***Figure 7** – Recommended preheating temperatures for different materials.[1]*

The 500 degree Celsius preheating removes this limitation. The higher base temperature slows down the cooling gradient during printing, making it smoother and thus preventing the formation of undesirable martensite. Microscopic examinations showed that 3D-printed H11/H13 components have a density of up to 99.99 percent. They also reach same level of conventionally produced H11/H13 components in terms of strength, elongation at break and hardness. There is also no difference in polishability (see fig. 8 and 9). Preheating at 500 degree Celsius now makes it possible to print H11/H13 in a process-safe manner and to further post-process the parts as if they were conventional ones.



	As built	Annealed (2x)
Density	99.9%	99.9%
Hardness	53 ± 1.2 HRC 558 ± 19 HV1	54 ± 0.1 HRC 580 ± 2 HV1

***Figure 8** – Crack-free printing of H13 at 500°C.*

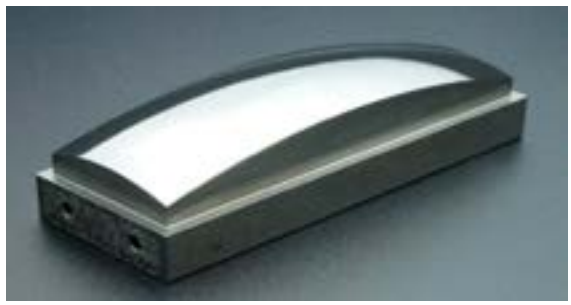


***Figure 9** – Polishing-sample (H13; heat-treated).*

Die Makers' Requests for Materials with Extended Die Lifetime

Now that it´s possible to print materials at 500 degree Celsius in general, customers from mold and die industry start their individual requests for additional materials besides the commonly known tool steel grades like H11/H13. Very often they think about expanding lifetime of their molds and dies, means using materials with better wear-resistance. But also economic aspects like materials with higher heat-conductivity to reduce cycle-times are key aspects. In regards to HPDC, customers mainly focus on materials with higher wear-resistance and heat-conductivity at the same time (see fig. 10).

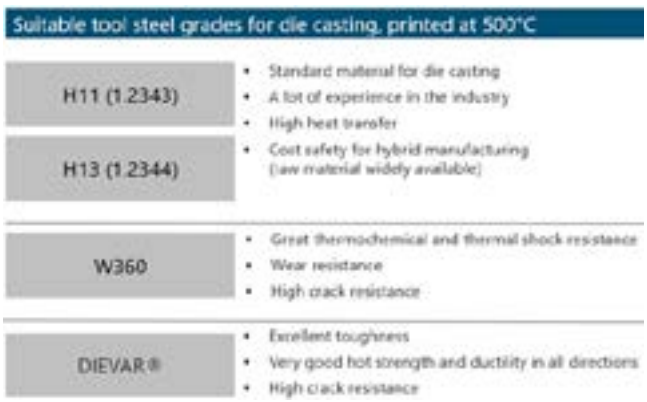


***Figure 10** – Comparison of printed carbon steel materials actually used in HPDC applications.*

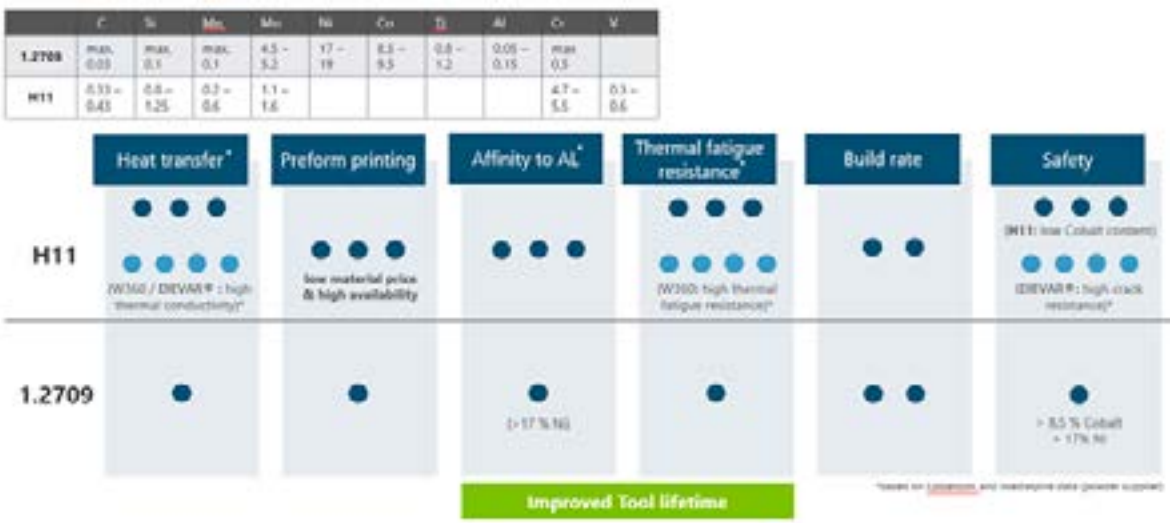


***Figure 11** – Comparison of (printed) H11, W360 and DIEVAR® to maraging steel 1.2709.*

H11 and H13 still represent today´s standard for conventional molds and dies, as nearly any toolmaker has gained lots of experience with these hot working tool steels. Additionally, they are quite cheap and also available in the required dimensions.

3D printed inserts from H11 or H13, instead of using maraging steel 1.2709 for printing, do have a significant impact both to heat dissipation from the tool surface and to die lifetime. Heat conductivity of H11/H13 is around 25% higher than heat conductivity of 1.2709, and the presence of carbides within H11/H13 leads to much better wear resistance, contributing to die lifetime (see fig. 11 on the previous page).

Nevertheless, when aiming for most demanding applications like shot blocks, even H11 and H13 are limited due to their material properties, whilst materials like W360 or DIEVAR® - developed especially for critical die casting applications - will simply outperform them with ease. Their material composition gives much better resistance against hot cracking, better ductility and toughness compared to H11/H13. Despite from a higher price per kg, they should be customer´s choice.

Printing different inserts and shot blocks out of DIEVAR® at 500 degree Celsius, it could be seen that printing in a hot chamber not only prevented hot cracking of material during the build job, but also lead to very low distortion even of high volume parts. This correlates to the deflection of the cantilever parts built from titanium TI64 (see fig. 6) and underlines, that the build chamber´s temperature has significant impact on deflection of parts, no matter what material is used for printing.

Dimensional accuracy when printing DIEVAR® is typically around ±0,1 mm to ±0,2 mm, which sometimes allows to use inserts "as printed", means without the need for machining of the overall surface.
In addition, high surface quality inside cooling channels lowers risk of cracking when in use even more (see fig. 12 and 13).

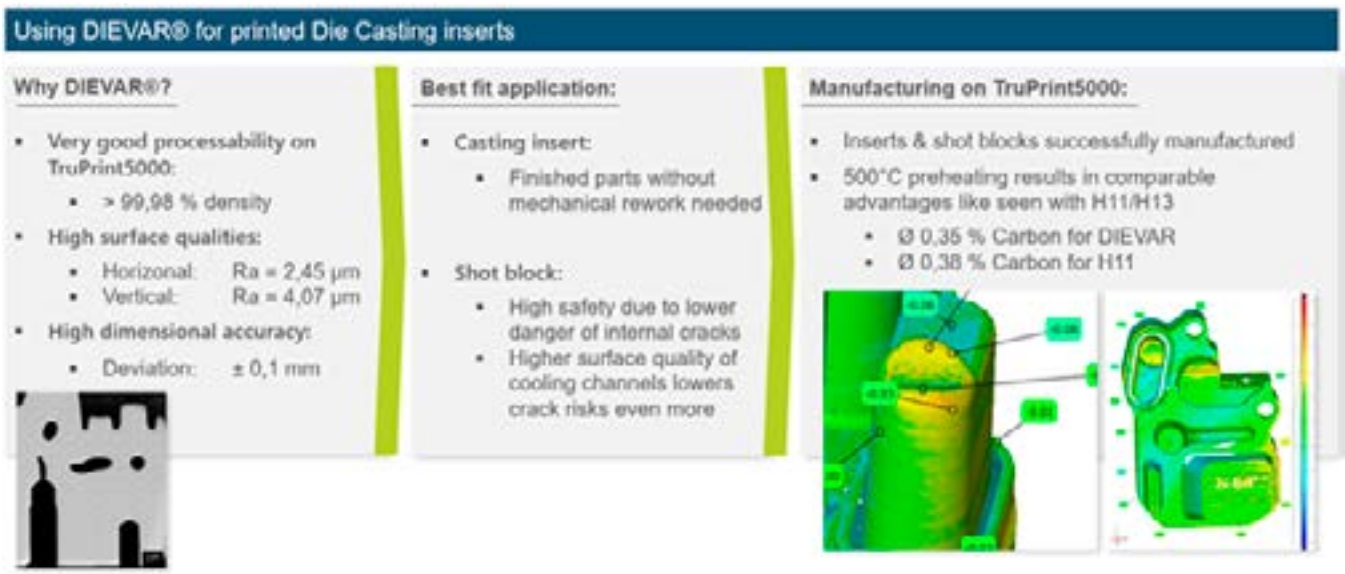


***Figure 12** – Some results/material properties for 3D printed DIEVAR®.*

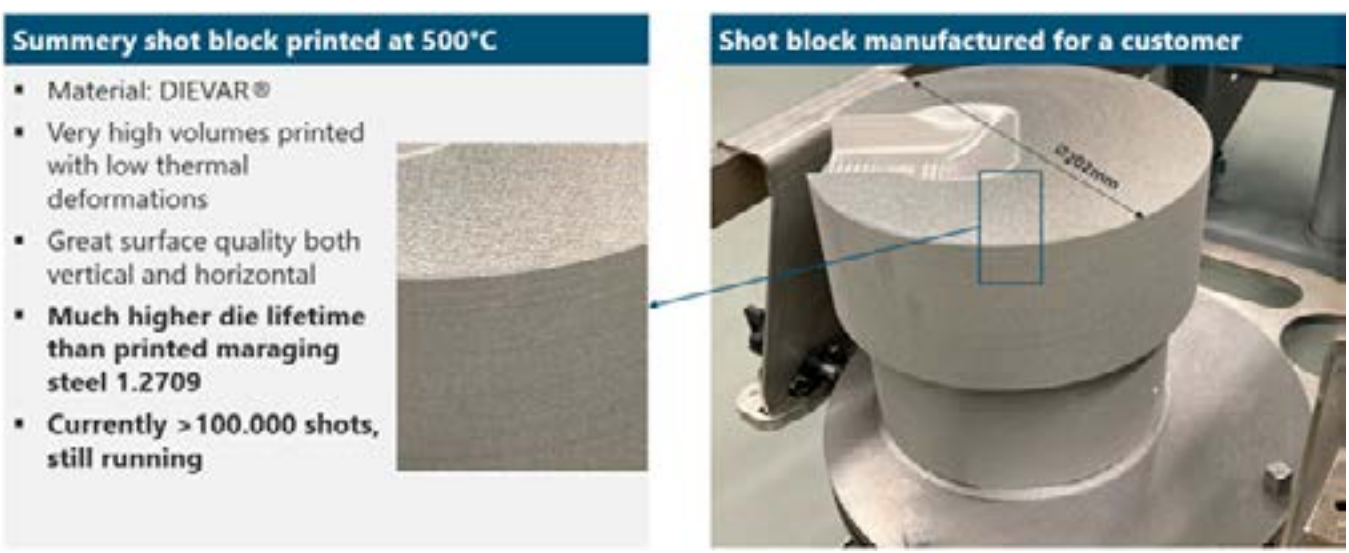


***Figure 13** – 3D printed shot block (diameter 202 mm).*

Conclusion

Suitable materials like Böhler W360 and Uddeholm DIEVAR®, made for demanding HPDC applications, have entered the market, as it is now possible to print those materials using an industrial system offering a 500 degree Celsius preheating of the build platform.

Especially the results for DIEVAR® are very promising. Its surface quality and dimensional accuracy after printing is very high, which allows finish machining with only a minimum of stock material or even use of inserts "as printed" with no need to machine the contour area at all. Some parts made from DIEVAR® already exceeded a lifetime of more than 100,000 shots and are still running in production.

Also there´s customer feedback to similar W360 applications, reaching approx. 280.000 shots without any failure due to excellent material properties and gaining significant economical savings by implemented conformal cooling additionally.[2]

Successful and economic printing of such high-quality parts (e.g. shot blocks) at high temperatures needs lowest level of remaining oxygen inside the build chamber, to avoid oxidation or even sintering of powder, thus creating too much waste-powder or scrap-parts due to unremovable powder. Running the print-process at only some ppm of remaining oxygen, the powder can be reused several times without lack of quality. Shielding of parts under argon during cool-down at the end of the build-process is also a must to avoid trouble with powder-quality or oxidation of the part´s surface. Preferably the cool-down should happen in an external cooling-station, as this avoids machine-down-time of up to 20 h after each build-job.

Considering approx. 30% of cycle time reduction when using shot blocks with conformal cooling, it really makes sense to print them, even though a high-end printer has to be used to achieve the necessary part quality.

The choice of materials is now up to the customers and their applications. Materials, offering even better heat conductivity and better wear resistance then H11 and H13, are available right now. Each case should be simulated and checked before printing, as changes of the cooling system and/or material have impact in a very complex manner, especially to the cooling performance and lifetime of printed inserts - at the same time.

References

1. *ILT Aachen, 2016*
2. *Schöpf, G., "Herkules unter den Metallpulvern," x-technik Additive Fertigung, 3/September 2022, pp 14-18*

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Modeling Pore Formation in Additively Manufactured High Pressure Die Casting Dies

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Abstract

The presence of pores in additively manufactured high pressure die casting (HPDC) dies has emerged as a critical challenge due to its pronounced effect on both functionality and reliability. A numerical model was developed to depict the pore formation induced by molten pool instability in 18Ni300 steel. The present study employs the Laminar flow model to treat fluid dynamics, and also utilizes the volume of fluid (VOF) algorithm to track vapor-liquid water interaction. Computational fluid dynamic (CFD) simulation revealed that as the laser traversed, the keyhole within the molten pool experienced inward flow towards the center, subsequently enveloped by the liquid interface. This led to the formation and separation of gas bubbles along the laser path. These dispersed bubbles originated from ambient gas and vapor and give rise to pores due to declining temperatures and reduced fluidity of the molten metal. Upon solidification, these pores are distributed along the melt pool boundaries (MPBs).

Introduction

Selective laser melting (SLM) has transformed the production of components with intricate structures and internal cavities, allowing for greater design and geometric flexibility[1]. However, defects within additively manufactured dies, particularly porosity, have garnered significant attention due to their potential role in the initiation and propagation of cracks[2]. To accurately predict the complex factors contributing to pore evolution within the molten pool during the SLM melting and solidification process, computational fluid dynamics (CFD) simulations have been instrumental in elucidating the mechanisms behind pore formation. Numerous studies have utilized CFD simulations to investigate keyhole dynamics, including aspects of fluid flow and heat transfer involving multiple phases[3].

Research has shown that porosity is a prominent and serious defect, arising from the formation of delicate vapor cavities due to the evaporation of molten liquid at high temperatures[4]. The presence of porosity severely compromises mechanical properties, such as the tensile and yield strength of the solidified alloy. It is a major factor affecting the microstructure continuity and fatigue life of the dies[5]. Additionally, porosity can significantly reduce the overall durability and performance of the manufactured components, leading to premature failure under operational stresses.

To gain a deeper understanding of the origins and effects of keyhole-induced pores, particularly their impact on the premature failure of SLM manufactured conformal cooling die inserts, this study evaluates the interplay between keyhole formation and molten pool evolution. Factors such as heat transfer, melting, solidification, evaporation, recoil pressure, surface tension, buoyancy, and gravity are considered. Recoil pressure and surface tension significantly influence pore formation, with higher recoil pressure increasing molten pool oscillation and leading to vapor and gas entrapment in the molten pool. A high temperature gradient forms a deep keyhole, further contributing to pore formation. By understanding the periodic oscillation of the keyhole, we can better comprehend how it leads to porosity defects. Additionally, the microstructure of the solidified molten pool near the crack area within the die insert was examined to determine the initiation and propagation of cracks.

Simulation Establishment

Solid Model Geometry

The geometry was created using NX 1946 Siemens PLM Software, as shown in Figure 1a. Figure 1b displays the cracked die insert. The crack, which causes water leakage, is visible on the outer surface of the die insert. It runs longitudinally along the outer surface of the protruding part, following the path of the conformal cooling channels (CCC).

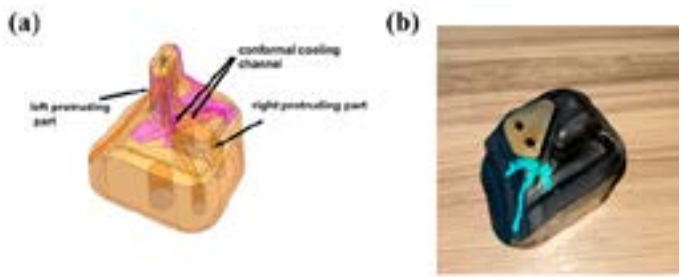

***Figure 1** – Die insert geometry and cracked die insert: (a) geometry; (b) die insert.*

The commercial CFD software ANSYS Workbench 2022 R2 with the Fluent package was used successfully. The geometry was designed using NX 1946 Siemens PLM Software, as depicted in Figure 2. This figure illustrates non-uniform distribution mesh structures generated using a hexahedral method. To increase accuracy, the mesh size

was decreased from the outer elements to the inner elements. This design resulted in 705,911 elements connected with 675,000 nodes. Additionally, the interface of the two domains has a finer mesh size compared to the internal domains. The geometry's length, width, and height are measured at 0.45 mm, 0.2 mm, and 0.3 mm, respectively.

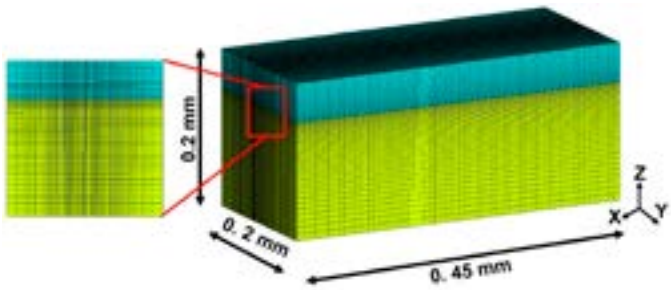

***Figure 2** – SLM model mesh structure.*

Numerical Model

In this study, Ansys Fluent uses the energy, continuity, momentum governing equations to solve the simulation. They are given by

Continuity:

$$\nabla \cdot \left(\rho \vec{v}\right) = 0 \qquad (1)$$

Momentum:

$$\nabla \cdot \left(\rho \vec{v}\vec{v}\right) = -\nabla p + \nabla \cdot \left(\mu \nabla \vec{v}\right) \qquad (2)$$

Energy:

$$\nabla \cdot \left(\rho \vec{v} c_p T_f\right) = \nabla \cdot \left(k_f \nabla T_f\right) + q \qquad (3)$$

where k_f, ρ, $\vec{v}$, P, T_f, c_p, and q are the effective conductivity, density, velocity, static pressure, temperature, sensible enthalpy, stress tensor and the Gaussian heat source, respectively.

It uses a Gaussian heat source model to simulate the laser[6,7]. The energy density of a Gaussian heat source can be calculated as follows[8]

$$q = \frac{2AP}{\pi R^2} exp\left(-\frac{2r^2}{R^2}\right) \qquad (4)$$

where P is the laser power, R is the radius of the laser spot, r is the radial distance from a point on the powder bed to the center of the laser spot, and A is the energy absorption rate of the material In addition, the volume of fluid method (VOF)[9] is used to track the free surface boundary of the melt pool. In the VOF method, an extra fluid volume function VF is defined, which is located at the center of the grid. The value ranges between 0 and 1, where VF = 0 represents an empty grid, and V_F = 1 represents a full grid.

$$\frac{\partial V_F}{\partial_t} + \nabla \cdot \left(\vec{v} V_F\right) = 0 \qquad (5)$$

Boundary conditions and properties

Figure 3 illustrates the schematic model of the SLM process along with its boundary conditions. The geometry is segmented into two domains: the gas phase is represented in the upper domain, while the metal phase occupies the lower domain. These phases are subjected to heat convection and radiation. A wall boundary condition is applied to the upper surface for the pressure inlet, whereas the lower surface serves as a pressure outlet. The laser beam heats the metal surface, causing an increase in temperature. When the temperature surpasses the solidus temperature, the metal undergoes a phase change, resulting in melting and the formation of a molten pool. Table 1 provides the thermal physical properties of 18Ni300 Maraging steel. Table 2 displays the initial boundary conditions: T_{env} represents the initial environmental temperature, Q_{laser} denotes the laser beam power input, v_0 signifies the laser beam radius, and r_0 indicates environmental pressure.

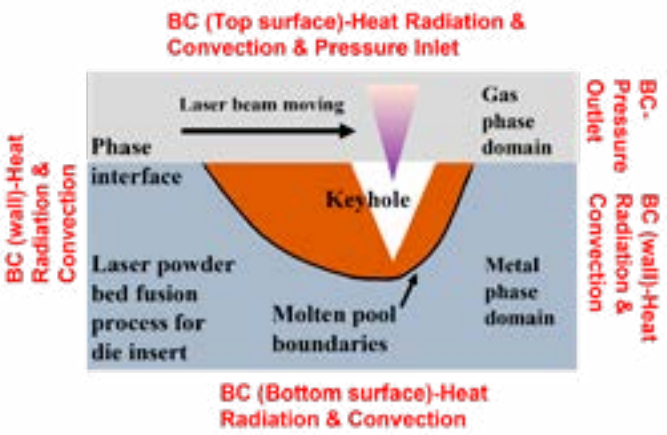

***Figure 3** – SLM process representation and its boundary conditions for the study.*

***Table 1** – Physical properties of 18Ni300 steel[10, 11].*

Parameters	Values
Density, ρ (kg m-3)	7502, T = 1387 K
Thermal conductivity, k (W m-1 K-1)	25.96, T = 1387 K
Specific heat, C_p (J kg^{-1} K^{-1})	563.83, T = 1387 K
Solidus temperature, T_s (K)	1387
Boiling temperature, T_v (K)	2862
Latent heat of vaporization, L_v (J kg^{-1})	6.09e^6
Latent heat of fusion, L_m (J kg^{-1})	2.564e^5
Surface tension, σ (kg s^{-2})	1.76
Latent heat of fusion, L_m (J kg^{-1})	256400

***Table 2** – Boundary conditions.*

Environmental temperature	Laser power	Scan speed	Laser radius
(T_{env}, K)	(Q_{laser}, W)	(v_0, mm s^{-1})	(r_0, m)
300	195	300	3.5e-5

Results and Discussion

Evolution of Molten Pool and Pores Formation

Figure 4 illustrates the evolution of molten pool morphology over time in the XZ section view at y = 0 mm, accompanied by the corresponding temperature field. By 27.75 μs, the molten pool widens and deepens as it approaches the laser beam center. Subsequently, the molten pool expands further, and the depth of the depression increases significantly due to heightened recoil pressure. When the temperature continues to rise, recoil pressure induces a repulsive force at the surface of the molten pool, creating a depressed opening filled with vapor and ambient gas. As the vapor and opening increases, keyhole formed within the molten pool, resulting in a heat transfer transition from conduction mode melting to the keyhole mode melting[12]. As the keyhole forms and time progresses, the molten pool consistently maintains similar width and depth across various time intervals. However, the keyhole experiences changes over time, particularly at the gas-liquid interface near the laser beam center, demonstrating substantial morphology oscillation and temperature fluctuations.

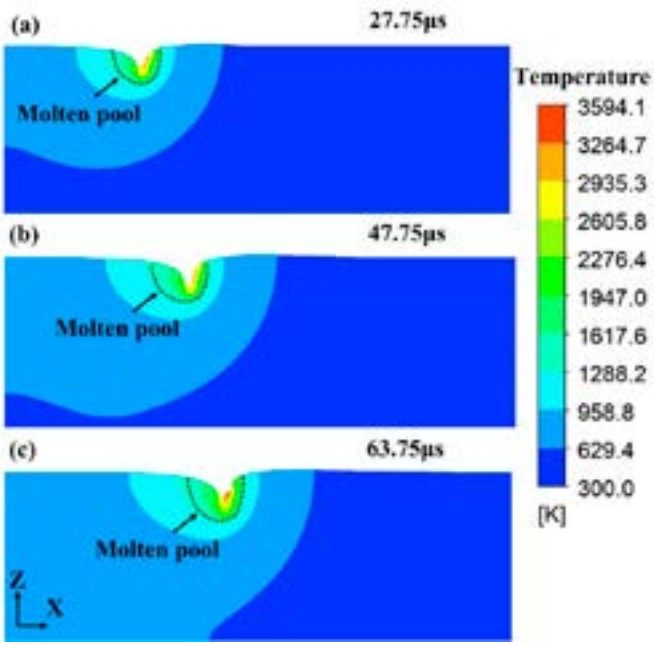

***Figure 4** – Evolution of molten pool morphology over time in the XZ section view, along with the corresponding temperature field.*

Figures 5a, b and c display the corresponding temperature evolution of the alloy phase from 55.75 μs to 63.75 μs in the YZ section view at x = 1.5e^{-4} m during the SLM process. After the laser beam impacts the alloy surface, the alloy temperature rapidly increases, causing melting and evaporation as it changes from 1387 K (solidus temperature) to 2862 K (boiling temperature) in less than 20 μs. At 55.75 μs, the molten pool surface first becomes depressed due to decreasing surface tension, a consequence of rising temperatures. Once the temperature exceeds the melting point, the higher temperature in the center of the molten pool results in lower surface tension[13]. As the laser movement drives the temperature beyond the boiling point, the previously depressed opening widens and deepens due to the repulsive force of recoil pressure. When the temperature continues to rise at 63.75 μs, the recoil pressure intensifies as more material evaporates. Consequently, the combined effect of recoil pressure and surface tension induces the formation of a keyhole.

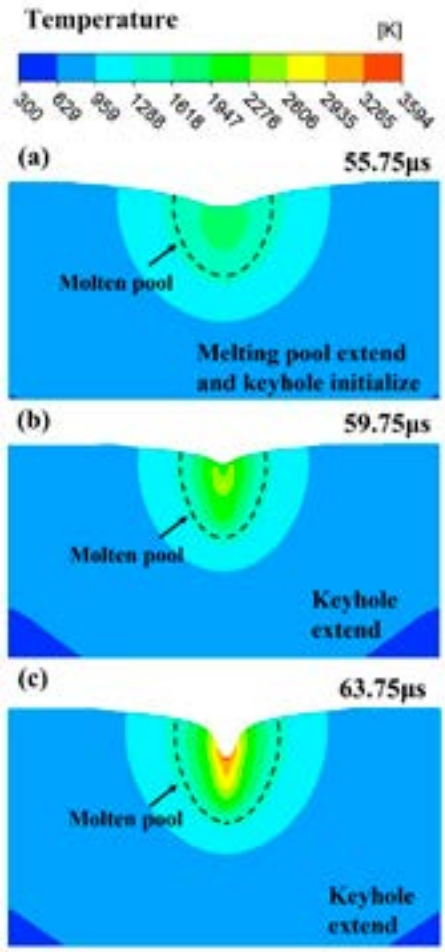

***Figure 5** – Morphology of the molten pool and keyhole evolution in the YZ section view.*

Figure 6 illustrates the evolution of pore formation, keyhole dynamics, and molten pool morphology over time, alongside temperature and velocity fields in the XZ section view. At 141.75 μs (Figure 6a), newly formed vortices (indicated by red arrows) appear at the front and rear vortices. These vortices indicate molten metal flow from the periphery towards the center, causing a downward flow from the top to the bottom of the keyhole, resulting in a deeper and sharper molten pool morphology. Additionally, the vortices flow liquid metal towards the area around the bottom of the keyhole. Meanwhile, there is a slight reverse flow trend in the upper part of the melt, leading to temperature variations on the keyhole wall. Both recoil pressure and surface tension are temperature dependent, with higher surface temperatures correlating to increased recoil pressure and decreased surface tension[14]. Consequently, molten flow is stronger in higher temperature regions compared to lower temperature regions, amplifying keyhole morphology oscillations. As time increases, accelerated molten flow destabilizes the bottom part of the keyhole. Driven by robust clockwise flow, molten metal behind the upper rear keyhole

wall flows towards the front keyhole wall, resulting in keyhole collapse. Figure 6b depicts the temperature field in the YZ section view at 156.05 μs, showcasing vector acceleration influenced by integrated recoil pressure, surface tension, buoyancy force, and gravity. At the bottom of keyhole, a bubble migrates towards the rear side of the molten pool due to outward molten flow. However, during solidification, bubbles travel along the molten flow and become trapped in the solidified metal, leading to pores formation. Figures 6c and d illustrate the pore formation, keyhole dynamics, and molten pool morphology corresponding to temperature fields at 143.2 μs and 156.05 μs in the YZ section view.

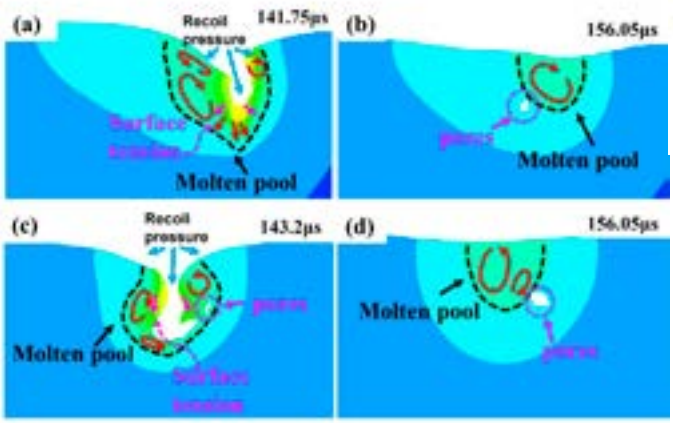

***Figure 6** – Pore formation with temperature field observed in both XZ and YZ section views.*

Crack Initiation and Propagation

Figure 7 depicts the microstructure around the cracks in the longitudinal section of the insert die after etching. In Figure 7a, molten pools are shown to overlap layer by layer along the SLM build direction, with the main crack running parallel to this direction, consistent with the findings of Kaufmann et al.[15]. The temperature gradient and composition segregation between adjacent "track-track" molten pools generate residual stresses that promote crack propagation[16]. Figure 7b illustrates molten pools overlapping layer by layer perpendicular to the laser scan direction. Additionally, Figure 7c shows tiny pores in the matrix. These pores, aligned parallel to the crack, suggest a connection between pore formation and cracking. The pores were formed during the SLM process due to incomplete melting of powders, resulting in small voids, and energetic vaporization bubbles generated during laser scanning[17].

Figure 8 provides a schematic representation of pore formation in the SLM die insert and the subsequent initiation and propagation of cracks. In the SLM process of an 18Ni300 steel die insert, keyhole oscillation results in pore formation within the molten pool. The thermal stress concentration at these pore locations initiates cracks. These cracks then propagate along the pores and molten pool boundaries (MPBs), eventually leading to water leakage and the failure of the die insert.

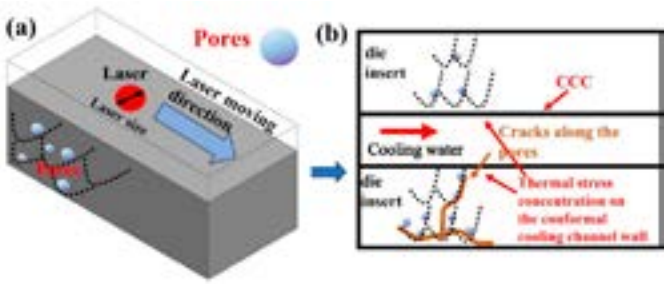

***Figure 8** – Schematic illustration depicting pore formation and the initiation and propagation of cracks.*

Conclusion

Pores were observed in the molten pool of a HPDC die insert with conformal cooling channels, produced via SLM. The conclusions are as follows:

1. The numerical model, which includes melting, solidification dynamics, buoyancy forces, surface tension effects, recoil pressure, and evaporation flux, accurately simulates the complex physics of the SLM process. This allows for precise prediction of molten pool behavior and temperature distribution.
2. Vapor generation increases internal pressure due to higher viscosity, which impedes water flow. Prolonged exposure to high pressure causes cracks to form on the surface of the conformal cooling channel, affecting the microstructure of the fabricated part.
3. The results emphasize the crucial role of heat transfer considerations in die casting processes that utilize conformal cooling dies.

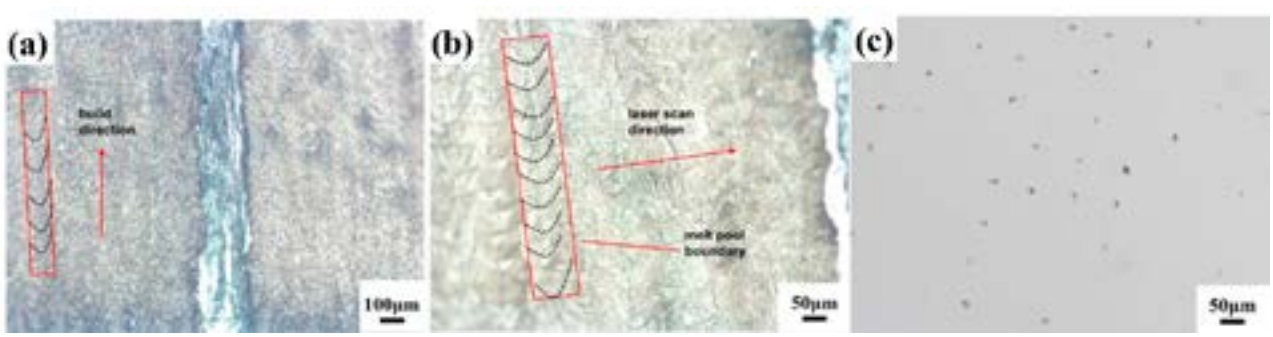

***Figure 7** – Optical microscopy (OM) images of the microstructure in the longitudinal section.*

References

1. *K. Kurtulus, A. Bolatturk, A. Coskun, B. Gürel, An experimental investigation of the cooling and heating performance of a gravity die casting mold with conformal cooling channels, Appl Therm Eng. 194 (2021) 117105. https://doi.org/10.1016/j.applthermaleng.2021.117105.*
2. *X. He, C. Tang, C. Vian, C.-S. Wong, S.-W. Juang, W. Vian, X. Wang, Understanding conformal cooling in the diecasting of aluminum alloys, IOP Conf Ser Mater Sci Eng. 1281 (2023) 012010. https://doi.org/10.1088/1757-899x/1281/1/012010.*
3. *J.U. Brackbill, D.B. Kothe, C. Zemach, A continuum method for modeling surface tension, J Comput Phys. 100 (1992) 335–354. https://doi.org/10.1016/0021-9991(92)90240-y.*
4. *A.P. Boeira, I.L. Ferreira, A. Garcia, Alloy composition and metal/mold heat transfer efficiency affecting inverse segregation and porosity of as-cast Al–Cu alloys, Mater Eng. 30 (2009) 2090–2098. https://doi.org/10.1016/j.matdes.2008.08.032.*
5. *P. Bidare, A. Jiménez, H. Hassanin, K. Essa, Porosity, cracks, and mechanical properties of additively manufactured tooling alloys: a review, Adv Manuf. 10 (2022) 175–204. https://doi.org/10.1007/s40436-021-00365-y.*
6. *Kik T. Computational Techniques in Numerical Simulations of Arc and Laser Welding Processes. Materials. 2020;13:608. doi: 10.3390/ma13030608.*
7. *Kik T., Moravec J., Novakova I. New method of processing heat treatment experiments with numerical simulation support. Modern technologies in industrial engineering V; Proceedings of the ModTech 2017 International Conference; Sibiu, Romania. 14–17 June 2017.*
8. *Rochalski D., Golański D., Chmielewski T. Welding heat source models in the analysis of temperature field. Weld. Technol. Rev. 2017;89:5..*
9. *S.S. Lafmejani, A.C. Olesen, S.K. Kær, VOF modelling of gas–liquid flow in PEM water electrolysis cell micro-channels, Int J Hydrogen Energy 42 (2017) 16333–16344. https://doi.org/10.1016/j.ijhydene.2017.05.079.*
10. *L. Yan, B. Yan, Numerical simulation and experimental study on selective la-Ser melting of 18Ni-300 maraging steel, Preprints (2021). https://doi.org/10.20944/preprints202105.0114.v1.*
11. *W. Wu, X. Wang, Q. Wang, J. Liu, Y. Zhang, T. Hua, P. Jiang, Microstructure and mechanical properties of maraging 18Ni-300 steel obtained by powder bed based selective laser melting process, Rapid Prototyp J. 26 (2020) 1379–1387. https://doi.org/10.1108/rpj-08-2018-0189.*
12. *A. Samaei, Z. Sang, J.A. Glerum, J.-E. Mogonye, G.J. Wagner, Multiphysics modeling of mixing and material transport in additive manufacturing with multicomponent powder beds, Addit Manuf. 67 (2023) 103481. https://doi.org/10.1016/j.addma.2023.103481.*
13. *J. Kroos, U. Gratzke, G. Simon, Towards a self-consistent model of the keyhole in penetration laser beam welding, J. Phys. D Appl. Phys. 26 (1993) 474–480. https://doi.org/10.1088/0022-3727/26/3/021.*
14. *J. Brackbill, D. Kothe, C. Zemach. A Continuum Method for Modeling Surface-Tension. J Comput Phys. 1992;100(2):335-54.*
15. *N. Kaufmann, M. Imran, T.M. Wischeropp, C. Emmelmann, S. Siddique, F. Walther, Influence of Process Parameters on the Quality of Aluminium Alloy EN AW 7075 Using Selective Laser Melting (SLM), Physics Procedia. 83 (2016) 918–926. https://doi.org/10.1016/j.phpro.2016.08.096.*
16. *W. Liu, C. Chen, S. Shuai, R. Zhao, L. Liu, X. Wang, T. Hu, W. Xuan, C. Li, J. Yu, J. Wang, Z. Ren, Study of pore defect and mechanical properties in selective laser melted Ti6Al4V alloy based on X-ray computed tomography, Materials Science and Engineering: A. 797 (2020) 139981. https://doi.org/10.1016/j.msea.2020.139981.*
17. *G.H. Zeng, T. Song, Y.H. Dai, H.P. Tang, M. Yan, 3D printed breathable mould steel: Small micrometer-sized, interconnected pores by creatively introducing foaming agent to additive manufacturing, Materials & Design. 169 (2019) 107693. https://doi.org/10.1016/j.matdes.2019.107693.*

2025 DIE CASTING CONGRESS &TABLETOP

OCTOBER 7-9, 2025 | MILWAUKEE, WI

OFFICIAL SHOW GUIDE!

REGISTRATION NOW OPEN!

Passion For Technology & Innovation

Bole Machinery – Global Leader in Advanced Injection Molding Solutions.
A high-tech innovator and global manufacturer of cutting-edge injection molding systems, serving customers across 73 countries worldwide. With decades of expertise in plastic forming solutions for automotive, appliances, electronics, aerospace, foods, packaging, medical, constructions, piping and more. Bole is synonymous with reliability, efficiency, and breakthrough technology in the plastics processing industry.

Introducing the latest metal molding technology – Thixomolding to the North American Die Casting industry.

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WELCOME TO MILWAUKEE

On behalf of the NADCA Board of Governors and the NADCA headquarters staff, it is my pleasure to welcome you to the 2025 Die Casting Congress & Tabletop. This one-of-a-kind die casting show provides a wealth of information to die casters, suppliers to the die casting industry, OEMs, designers, end users of die castings, and others seeking to gain die casting knowledge. Please take advantage of all the technology transfer and networking opportunities being offered. I am also pleased to welcome you to Milwaukee, Wisconsin. There is much to see and do outside of the convention center, and I encourage you to go explore as you have time. Both the Brewery and the Deer Districts offer many casual and fun activities.

On the exhibit floor, you will find displays featuring over 120 suppliers that are highlighting their most recent product developments and information about their services. The nearly 30 congress sessions are featuring presentations on the latest research and technologies covering topics such as additive manufacturing for tooling, computer modeling & simulation, advanced die casting alloys, mechanical properties of die castings, extending die life, data driven process control, secondary operations, and improved metal melting & handling. In addition, a presentation on NADCA's R&D projects, as well as a Washington D.C. update presentation, will be held. The Tuesday afternoon "Welcome Party" will provide for more networking opportunities and the "Industry Awards Luncheon" on Wednesday will recognize the outstanding achievements of this year's award winners. These various offerings during the event are ones you will not want to miss!

The Industry Awards Luncheon will recognize the winners of the 2024 Safety Awards, the Die Casting Competition, the Emphasis on Education Award, the Committee Member of the Year Award, and Best Congress Paper Award. This Awards Luncheon is only $20, and the revenue helps to sponsor our National Scholarships.

Lastly, I wish to thank all the attendees, exhibitors, and presenters for your participation and support! Your contributions continue to keep this event a highly valuable one that NADCA is proud to host. I hope you enjoy this year's Die Casting Congress & Tabletop and that it provides you with a beneficial and memorable experience.

Enjoy the show!

Mike Meyer, President
North American Die Casting Association

MAYOR CAVALIER JOHNSON
CITY OF MILWAUKEE

August 13, 2025

Dear Die Casting Congress & Tabletop Attendees,

Welcome to Milwaukee. It is an honor to host the 2025 Die Casting Congress & Tabletop, and I am pleased you have chosen our city for this important gathering. Milwaukee has a proud tradition of manufacturing and craftsmanship, and it is fitting that your industry, which shares these values, is meeting here.

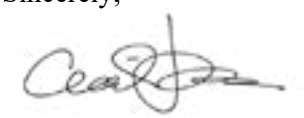
The newly expanded Baird Center, located in the heart of our walkable downtown, provides an outstanding setting for your sessions, exhibits and networking. Just beyond the conference halls, you can experience the Milwaukee Art Museum with its remarkable architectural design and extensive collections that span centuries and continents. Discovery World offers engaging, hands-on exhibits that highlight science, technology and freshwater exploration. The Harley-Davidson Museum presents an extraordinary look at American engineering and design, telling the story of one of the most iconic brands in the world.

Milwaukee's neighborhoods offer a variety of experiences that reflect the character of our city. The RiverWalk leads to the Historic Third Ward, home to the Milwaukee Public Market where local vendors feature cheeses, seafood, fresh produce and artisan specialties. The Old World Third Street Entertainment District showcases our brewing heritage with historic architecture and welcoming gathering spots. Brady Street invites exploration with its mix of restaurants, cafes and unique boutiques, while Walker's Point has earned national recognition for its exceptional dining and lively evening scene.

There is much more to explore beyond the immediate downtown area. Bay View combines a relaxed, neighborhood feel with outstanding local dining and music venues. The Historic Bronzeville District celebrates Milwaukee's African American heritage through cultural events, art galleries and performance spaces. Our lakefront parks and trails offer a peaceful place to enjoy the natural beauty of Lake Michigan, whether you prefer a morning run, a leisurely walk or simply a moment to take in the view.

On behalf of the City of Milwaukee, I wish you a successful conference and a memorable visit. We are proud to share Milwaukee with you and look forward to welcoming you back in the future.

Sincerely,



Mayor Cavalier Johnson

CITY HALL | 200 EAST WELLS STREET, ROOM 201 | MILWAUKEE, WI 53202
414-286-2200 | FAX 414-286-3191 | MAYOR@MILWAUKEE.GOV

GENERAL INFORMATION

Registration Hours -

BAIRD CENTER - GRAND BALLROOM FOYER

Monday, October 6: 2:00 pm – 4:00 pm
Tuesday, October 7: 8:00 am – 4:00 pm
Wednesday, October 8: 8:00 am – 4:00 pm
Thursday, October 9: 8:00 am – 12:00 pm

Technical Sessions -

BAIRD CENTER - ROOMS S103ABC & S103D

Tuesday, October 7: 8:00 am – 3:00 pm
Wednesday, October 8: 8:00 am – 4:30 pm
Thursday, October 9: 8:00 am – 11:15 am

Exhibit Hours -

BAIRD CENTER - GRAND BALLROOM

Tuesday, October 7: 9:00 am – 4:00 pm
Wednesday, October 8: 9:00 am – 4:00 pm
Thursday, October 9: 9:00 am – 1:00 pm

EXHIBITOR SERVICES: BAIRD CENTER- GRAND BALLROOM

Global Experience Specialists (GES) will be available during move-in and move-out as well as during the show for exhibitors. They will be around to answer questions and resolve any exhibitor issues.

NADCA BOARD & COMMITTEE MEETING SCHEDULE: BAIRD CENTER - ROOM S101D

Wednesday, October 8
Finance Committee: 2:00 pm - 3:15 pm

Thursday, October 9
Board of Governors: 8:30 am - 11:00 am

SHOW OFFICE

The Show Office will be located at registration and will be open Monday, October 6 - Thursday, October 9 from 8:00 am - 2:00 pm.

THE FINE PRINT

Policy on Audio and Video Recording: North American Die Casting Association reserves the right to any audio or video reproduction of any part of Die Casting Congress & Tabletop Recordings (audio, video, still photography, etc.) intended for personal use, distribution, publication or copyright without the express written consent of the association and the individual authors or exhibitors is strictly prohibited. Cameras are prohibited on Show Floor.

Minimum Age Requirements: For the safety of our guests, children under the age of 16 are NOT permitted on the Show Floor without an adult.

Antitrust Policy: The Antitrust Policy statement of North American Die Casting Association is available to anyone attending Die Casting Congress & Exposition. Copies are available at registration.

AIRPORT

The Baird Center is conveniently located in the heart of Milwaukee. It is located 8 miles from Milwaukee Mitchell International Airport.

TAXI

Approximately $30.00 one way to/from airport.

TRANSPORTATION

Traveling from Milwaukee Mitchell International Airport to downtown Milwaukee is simple and convenient, thanks to a variety of accessible transportation options. Visitors can take advantage of the Milwaukee County Transit System (MCTS), which offers affordable bus service connecting the airport with key downtown locations.

For those preferring a more direct route, taxi services and rideshare options like Uber and Lyft are readily available, providing door-to-door convenience. Rental car facilities are also located on-site.

PARKING

Baird Center offers convenient, indoor parking in its own dedicated garage, providing easy access to events at the Center itself as well as Miller High Life Theatre and UW-Milwaukee Panther Arena. You can enter the garage via either:

501 W Kilbourn Ave (Kilbourn Ave entrance)

500 W Wells St (Wells Street entrance)

SHOW APP

There is an official show app for the Die Casting Congress & Tabletop! This app provides you with access to up-to-the-minute information about the show, congress sessions, exhibitors, special events and notifications.

You can search more information about our exhibitors, browse congress session topics and abstracts as well as create a personalized schedule for yourself. The app is absolutely free to download on your device!

Scan here for the show app!

GET IT ON Google Play

Download on the App Store

THE CASTING CORE

NADCA VIRTUAL REALITY PROJECT

Tuesday, October 7
10:00 am - 4:00 pm
Wednesday, October 8
10:00 am - 5:00 pm

Experience the world of die casting from the comfort of an air-conditioned office. Go between the die halves without worrying about injuring yourself. Learn about die casting in an immersive setting, without having to wear safety glasses, gloves, and ear plugs. Virtual reality (VR) offers a new way to experience die casting. New hires now have a chance to virtually interact with a die casting machine; learning about the different components, how to start up the machine, and what happens when process settings are changed. Users can also explore a stack melt furnace and reverberatory furnace to learn more about charging and tapping the furnace and cleaning the metal. In the Fire Safety app learn about how to handle a fire when molten metal is present. Find out how to put out a fire at the die casting machine, why you should never put water in molten metal, and the correct way to put out a magnesium fire. Visit the NADCA VR Booth at the show and try out VR Die Casting developed by Purdue University Northwest Center for Innovation through Visualization and Simulation (CIVS).

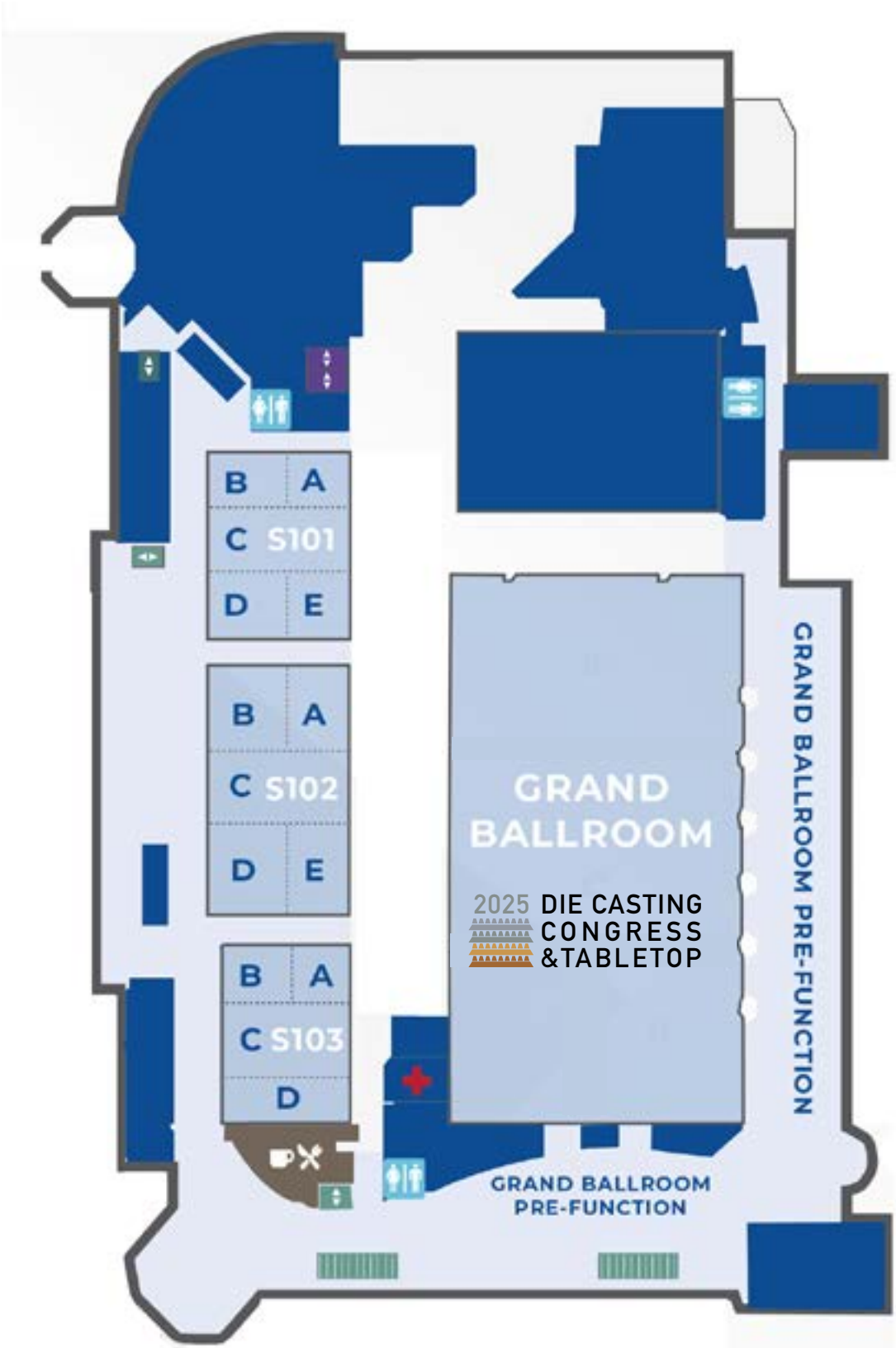
NADCA CASTVIEW DEMONSTRATION

Tuesday, October 7
10:00 am - 4:00 pm
Wednesday, October 8
10:00 am - 5:00 pm

Originally developed by Dr. Allen Miller and Alex Rebello at the Ohio State University, CastView provided a light-weight thermal and flow analysis software for the die casting industry. The software was able to quickly identify thick and thin sections on a casting. Over time though the software was unable to run on newer operating systems. Dr. Charles Monroe, at the University of Alabama, revived CastView with help from his graduate students William Warner and Zhen Yang. Now, instead of needing to load software onto your computer you can run a thick and thin section analysis on the cloud using Google Colab. Zhen Yang continues to enhance CastView, with the latest version of the software able to recommend gating locations using AI. Feel free to bring an STL of a casting geometry with you to test at the booth.

MILWAUKEE MAP

BAIRD CENTER SOUTH BUILDING



SCHEDULE OF EVENTS

TUESDAY OCTOBER 7		WEDNESDAY OCTOBER 8		THURSDAY OCTOBER 9
Artificial Intelligence Revolution in Die Casting 8:30 - 9:30 am | S103 ABC	Advanced Additive Manufacturing Materials 8:00 - 9:00 am | S103 D	Aluminum Skin Formation Effects in Die Casting 8:00 - 9:00 am | S103 ABC	Extending the Life of the Die 8:00 - 9:30 am | S103 D	Computer Simulation for Improved Casting Process 8:00 - 9:30 am | S103 ABC
Improving Die Casting with Automation 9:45 - 10:45 am | S103 ABC	Conformal Cooling in Additively Manufactured Dies 9:15 - 10:45 am | S103 D	Utilizing Secondary Metal for Aluminum Alloys 9:15 - 10:15 am | S103 ABC	Aluminum Alloys for Structural Castings 9:45 - 11:15 am | S103 D	Board of Governors Meeting 8:30 - 11:00 am | S101 DE
Exhibits Open 9:00 am - 4:00 pm | Grand Ballroom		Understanding the Industry through Benchmarking 10:30 - 11:30 am | S103 ABC	Exhibits Open 9:00 am - 4:00 pm | Grand Ballroom	Exhibits Open 9:00 am - 1:00 pm | Grand Ballroom
Young Professionals Organization Mentor Lunch 12:00 - 1:30 pm | S101 DE		Awards Lunch 12:15 - 2:00 pm | S102		Innovations in Metal Injection 9:45 - 11:15 am | S103 ABC
Discussion Panel on Current Risk / Reward of AI and Automation 1:00 - 3:00 pm | S103 ABC	Government Affairs Report 1:00 - 3:00 pm | S103 D	Discussion Panel on Big (Giga / Mega) Castings 2:30 - 4:30 pm | S103 ABC	Finance Committee Meeting 2:00 - 3:15 pm | S101 DE	
Welcome Party 3:00 - 4:00 pm | Grand Ballroom				

Schedule as of 8/13/25. Subject to change.

SPECIAL EVENTS

Welcome Party

Tuesday, October 7
Show Floor
3:00 - 4:00 pm
Price: Complimentary

Having such a good time meeting with exhibitors on the show floor that you wish you had more time? Now you do! Join us for After Hours with the Exhibitors. With more than 100 exhibitors we want to make sure that you have every opportunity to visit the show floor. Kick back and relax with a drink or two all while getting to spend a little extra time learning about all the new technologies and products that the exhibiting companies have to offer. No ticket required.

Die Casting Awards Lunch

Wednesday, October 8
Room: S102
12:15 - 2:00 pm
Price: $20 per person

Take an afternoon break to converse and network with exhibitors and attendees alike. The following awards will be honored during this special event:

- Industry Awards
- Committee Member of the Year Award
- Best Congress Paper Award
- Industry Education Award
- International Die Casting Design Competition
- 2024 Safety Awards

UPCOMING EVENTS

2025

October 22	Die Materials Meeting *Arlington Heights, IL*
October 23	R&D Meeting *Arlington Heights, IL*

2026

January 11-17	International Delegation & Euroguss *Germany*
February 4	Die Materials Meeting *Indianapolis, IN*
February 5	R&D Meeting *Indianapolis, IN*
March 1-4	Executive Conference *Clearwater Beach, FL*
March 1	Board of Governors Meeting *Clearwater Beach, FL*
April 28-30	Plant Management Conference *Cincinnati, OH*
June 9-10	Government Affairs Briefing *Washington, D.C.*
June 9	Board of Governors Meeting *Washington, D.C.*
June 17	Die Materials Meeting *Arlington Heights, IL*
June 18	R&D Meeting *Arlington Heights, IL*
September 29 - October 1	Die Casting Congress & Tabletop *Grand Rapids, MI*
September 30	Committee Meetings *Grand Rapids, MI*
October 1	Board of Governors Meeting *Grand Rapids, MI*
October 21	Die Materials Meeting *Arlington Heights, IL*
October 22	R&D Meeting *Arlington Heights, IL*

2027

October 18-20	Die Casting Congress & Exposition *Indianapolis, IN*

THE NADCA BOOKSTORE

Shop the bookstore in person at the show. We will have a limited number of our publications for purchase at the event, just drop by the bookstore in the Grand Ballroom Foyer, near registration.

YIZUMI

YouTube YIZUMI_Official YIZUMI_Official

THINK TECH FORWARD

MG Series

YIZUMI Thixomolding Machine

Committed to becoming a leader in Thixomolding

5000⁺ Ultra-Large MGII Model to Be Released

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Smarter Equipment: AI-Powered Die Casting Machines

Customized solutions tailored to your production needs, processes, and factory environment

Join us on-site for a hands-on experience and step into the role of an AI die casting process engineer

HII-S Series

High-End Cold Chamberdie Casting Machine

High-performance Product Line Customizedfor Globa Markets

Greatly Improved Injection Performance

NADCA

2025 DIE CASTING CONGRESS &TABLETOP

YIZUMI Booth: **219**

Baird Center Milwaukee, Wisconsin

October 7-9, 2025

YIZUMI Precision Machinery (USA) Corporation

Address: 3424 State Route 309 Iberia, OH 44833

Tel: 740-382-5600 Email: sales@us.yizumi.com us.yizumi.com

2025 DIE CASTING AWARD WINNERS

For the last 51 years NADCA has sponsored its Die Casting Competition to showcase outstanding die cast designs, while acknowledging the continuous contribution die casters provide to the manufacturing industry.

Competition in the manufacturing industry continues to push the abilities of die casters to design and produce castings that are more complex, higher quality, and less expensive. Winners of the 2025 NADCA Die Casting Competition exhibit the advantages of using the die casting process. Some of the castings were able to reduce cost and improve component safety by integrating a multiple piece assembly into one casting. Other winners utilized new technology to improve the process and create a higher quality part. The ability to hold consistent dimensions when producing components with superior properties continues to expand the markets that die castings are used in.

Categories in the competition are grouped by material and include aluminum, magnesium, zinc, and other alloy families, including aluminum and magnesium structural die casting. Both custom and captive casters are eligible. For each category, there are four equally weighted criteria: ingenuity of casting and/or product design, overall quality, cost savings as compared to other manufacturing processes, and the part's contribution to expanding the market for die castings. A panel of independent judges, acknowledged experts, with no ties to eligible casters, choose the winners.

NADCA will honor this year's award winners at its 2025 Die Casting Industry Awards Luncheon on Wednesday, October 8 at 12:15 – 2:00 pm CDT during the Die Casting Congress & Tabletop in Milwaukee, WI. The luncheon is an exceptional opportunity to meet this year's winners and learn more about their innovations.

TO COMPETE IN 2025

Innovative die casting design entries may be entered in the 2026 Die Casting Design Competition. All award-winning castings will be displayed next year at NADCA's Die Casting Congress & Tabletop, September 29 – October 1 in Grand Rapids, MI.

The competition is open to die castings from aluminum, magnesium, zinc, semi-solid & squeeze, and other alloy families. Within each category, there are more specific levels: aluminum under 1 pound; aluminum 1-to-10 pounds; aluminum over 10 pounds; aluminum structural; aluminum any size with decorative finish; zinc under 6 ounces/non-electroplated; zinc over 6 ounces/non-electroplated; zinc any size with decorative finish; magnesium over 0.5 pound; and magnesium under 0.5 pound.

Any number of die castings may be entered in the awards competition. Complete and submit a separate entry form for each casting or assembly of castings. As-cast entries are required (post trimming). The metal surface cannot be improved or concealed by tumbling, shot blasting, coating or other surface treatments. NADCA encourages sending secondary processed samples, but these must be in addition to the as-cast parts.

Castings submitted for the competition MUST have approval in writing from the customer allowing NADCA to use the casting(s) in exhibitions and magazine articles. When possible, information and photographs describing the design process will be published in Die Casting Engineer magazine, but because of proprietary reasons, not all information can be shared. Such exceptions should be noted on your entry form.

More information and electronic entry form can be found at www.diecasting.org/castings/competition. All entries must be submitted by June 22, 2026. For more information, contact: Beau Glim at glim@diecasting.org.

Send sample casting(s) to:
NADCA - 2026 Casting Competition
3250 N. Arlington Heights Rd., Ste. 101
Arlington Heights, IL 60004

2025 AWARD WINNER

ALUMINUM – UNDER 1 LBS

BENDA TOOL & MODEL WORKS

PART: Housing HH3100M
MATERIAL: 383
WEIGHT: .775 lbs (.35 kg)
END MARKET:
Electronic Communications

CASTER AWARD NOMINEES:
Daniel Patterson, Victor Paniagua, Ricardo Paniagua, Broderick Gillard, & Jose Espinoza Lopez
CUSTOMER:
Dalton World Communication, Inc

FUNCTION OF PART
Housing for a multiband handheld radio.

PREVIOUS PROCESS TO PRODUCE PART
New product.

ADVANTAGES GAINED
The die casting process was chosen because of the ability to hold consistent dimensional specifications.

Benda Tool & Model Works
900 Alfred Nobel Dr.
Hercules, CA 94547
USA

2025 AWARD WINNER

ALUMINUM – 1-10 LBS

TWIN CITY DIE CASTINGS CO.

PART: LED SUV Headlight Bracket
MATERIAL: 380
WEIGHT: 1.79 lb (.81 g)
END MARKET: Automotive

CASTER AWARD NOMINEES:
Devon Berrios, Arlan Cook, Bob Krismer, Tony Yaritz, & John Wasko
CUSTOMER:
North American Lighting

FUNCTION OF PART
LED headlight alignment.

PREVIOUS PROCESS TO PRODUCE PART
The product was prototyped as a plastic assembly with die cast heat sinks. The part combines the assembly in a complete die casting.

ADVANTAGES GAINED
Die casting reduced the assembly cost and time. The casting design includes lifters, mechanical and hydraulic slides. Parts produced with die casting were able to meet the machined tolerances. GD&T call-outs (flatness, profiles, and position) held a tolerances less than .05mm, even across slides, lifters, and cavity steel. Blade ejection included in the cover half.

Twin City Die Castings Co.
520 Chelsea Rd.
Monticello, MN 55362
USA

2025 AWARD WINNER

ALUMINUM – STRUCTURAL

XIAOMI AUTO TECHNOLOGY CO, LTD.

PART: Front Cabin Triangular Beam Assembly
MATERIAL: Alcoa C891F
WEIGHT: 11.7 lbs (5.3 kg)
END MARKET: Automotive
CASTER AWARD NOMINEES: Cui Qiang, Liao Pingwei, Dai Tailiang (Xiaomi Auto Technology Co, Ltd), Xinyan Yan (Alcoa Corporation), Cheng Shuai (CSMET New Materials Group Co., Ltd), Zhang Lei (KPSNC)
Developed in partnership with Alcoa.

Xiaomi Auto Technology Co., Ltd
Room 618, 6th Floor, Building 5, Courtyard 15, Kechuang 10th Street
Beijing, Beijing 102600
China

Alcoa Technical Center
859 White Cloud Rd
New Kensington, PA 15068
USA

CSMET New Materials Group Co., Ltd
699 Zhenyan Road, Zhangyan Town
Jinshan District, Shanghai 201514
China

HASCO KSPG Nonferrous Components (Shanghai) Co., Ltd.
No. 1288 Xingxian Road
Jiading Industrial Zone, Shanghai 201815
China

FUNCTION OF PART

The front cabin triangular beam assembly serves several essential functions:
Connect the left and right front shock absorber tower and front dash panel
Meet the installation and fixing requirements of five major thermal management modules, including the air conditioning compressor, refrigerant module, cooling module, air conditioning box, high-efficiency particulate air filter

PREVIOUS PROCESS TO PRODUCE PART

Traditional design methods were used to join more than 20 steel stamping components by welding. In addition, the air-conditioning compressor is mounted to the steel triangular beam via one adapter structure.

ADVANTAGES GAINED

The front cabin triangular beam assembly has the following notable characteristics: Modular and Integrated Design, Modular Assembly Design, Bench Closed-loop Verification Technology, Extra-large Front Trunk Volume, Higher Safety, Higher Rigidity, and New Heat Treatment-free Cast Aluminum Material

2025 AWARD WINNER

ZINC – UNDER 6 OZ

SHAKESPEARE MACHINE STAMPING

PART: JZ Zinc Flange
MATERIAL: Zamak 3
WEIGHT: 1.6 oz (44 g)

END MARKET: Power Tools
CASTER AWARD NOMINEES:
James Haarsma

Shakespeare Machine Stamping
2801 S Memorial Dr.
Racine, WI 53403
USA

FUNCTION OF PART

The JZ Zinc Flange is one of a series of Shakespeare's center hub flanges that function as the center component linking the arbor to the grinding wheel.

PREVIOUS PROCESS TO PRODUCE PART

These parts were originally produced on a 6-cavity tool using a conventional zinc die casting machine. The casting undergoes an orbital riveting process, highly deforming the hub around the center arbor of the grinding wheel. This dual requirement of functionality combined with a high-quality surface made this casting process historically difficult to manufacture.

ADVANTAGES GAINED

To produce these parts, Shakespeare invested in the newest technology in the zinc industry, including an 80T Frech hot chamber die casting machine, a 2-drop hot runner manifold system, and tooling by Contour Tool uniquely designed for the hot runner system. More cavities: eliminated the casting sprue and allowed for a redesign of the layout to increase cavities from 6 to 10. Shorter cycle time: hot runner technology allowed the cycle time to be reduced to 6.3 seconds per shot. Higher production rates: Faster cycle times and more cavities allow for a production rate of 5,700 parts per hour. Quality improvements: Improvements in surface quality and significant reduction in porosity resulted in a defect rate of zero. Additional work: Shakespear has converted additional tools to the hot runner system based on the success of this part.

2025 AWARD WINNER

NOVEL APPLICATION OF DIE CASTING

LAKESIDE CASTING SOLUTIONS

PART: Baseball Cleat
MATERIAL: Zamak 3
WEIGHT: 23 oz (6.5 g)
END MARKET: Sporting Goods

CASTER AWARD NOMINEES:
Adam Yager
CUSTOMER:
Kicks Industries

FUNCTION OF PART

Transform sneakers into cleats with YARDKICKS all metal baseball cleat. Cleats are installed onto shoes to increase traction on playing surfaces.

PREVIOUS PROCESS TO PRODUCE PART

Previous versions of the part were made with a plastic cleat.

ADVANTAGES GAINED

All-metal cleats increase the life and strength of the product. The all-metal cleats are manufactured more economically than previous versions. The all-metal cleats were part of a reshoring project, with parts now being manufactured and kits assembled in the United States of America.

Lakeside Casting Solutions
#2 Lakeside Dr.
Monroe City, MO 63456
USA

PROLONG
Surface Technologies

(630) 762-6500
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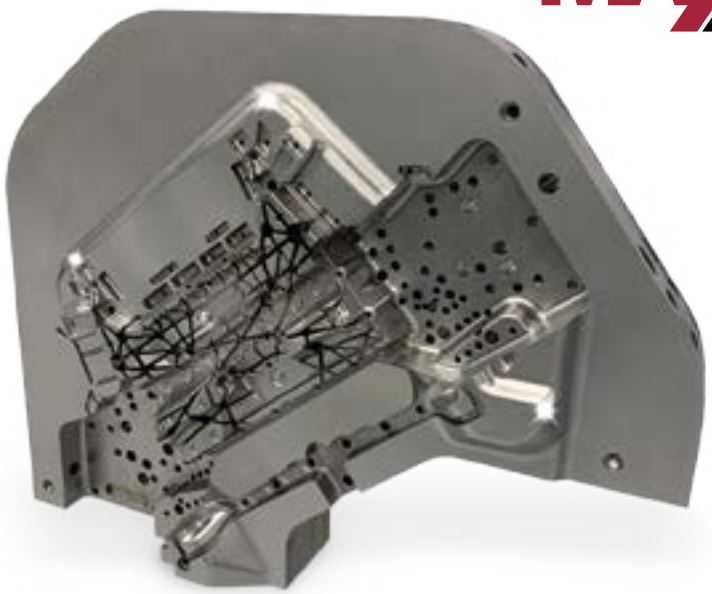

- Ultimate heat check resistance
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2024 SAFETY AWARDS

The North American Die Casting Association is pleased to announce this year's Safety Award Winners. These companies' records demonstrate a strong focus on employee safety and well-being. NADCA's Safety Award Program was developed to honor its Corporate Members that both exceed and meet the average U.S. national safety standards for all manufacturing in a given year.

PERFECT AWARDS

Companies that have maintained a safety record during 2024 with 0 lost days/transfers/restrictions are awarded with a "Perfect" award.

Boyd Allenton
Allenton, Wisconsin

Dart Casting, Inc.
124th Plant
Alsip, Illinois

Dart Casting, Inc.
Kedvale Plant
Alsip, Illinois

Dart Casting, Inc.
Lombard Plant
Alsip, Illinois

General Die Casters, Inc.
Twins Machining Plant
Twinsburg, Ohio

High Temperature Systems, Inc.
Chagrin Falls, Ohio

Latrobe Machine Corporation
Latrobe, Pennsylvania

Lincoln Electric Automation, Inc.
Columbus, Ohio

Metal Mechanics, Inc.
Schoolcraft, Michigan

Michigan Die Casting
Dowagiac, Michigan

NEMAK USA – Kentucky Plant 2
Glasgow, Kentucky

New GLDC LLC
Muskegon, Michigan

Omni Die Casting, Inc.
Massillon, Ohio

Pace Industries Fayetteville
Fayetteville, Arkansas

Pace Industries Jackson
Jackson, Tennessee

Pace Industries Jel
Chelmsford, Massachusetts

Pace Industries Maple Lake
Maple Lake, Minnesota

Pace Industries Muskegon 1
Muskegon, Michigan

Pace Industries Muskegon 3
Muskegon, Michigan

Pyrotek, Inc.
Columbia City, Indiana

OUTSTANDING AWARDS

Companies with DART (days away, restricted or transferred) records equal to, or less than 1.8 (based on 2023's "All Manufacturing Industries" average of total recordable cases) are recognized with an "Outstanding" award. The DART for nonferrous metal die casting foundries in 2023 was 2.3, so any members who receive NADCA Safety Awards have safety records remarkably better than average!

Audubon Metals
Henderson, Kentucky

Cascade Die Casting Group, Inc.
Mid-State Division
Grand Rapids, Michigan

Castool Tooling Systems
Uxbridge, Ontario

Chicago White Metal Casting, Inc.
Bensenville, Illinois

Finkl Steel
Chicago, Illinois

Lakeside Casting Solutions
Monroe City, Missouri

Mercury Marine Castings
Fond Du Lac, Wisconsin

Nebraska Aluminum Castings Inc.
Hastings, Nebraska

Nemak USA - Wisconsin Taylor
Sheboygan, Wisconsin

Pace Industries Cambridge
North Billerica, Massachusetts

Pace Industries de Chihuahua S.A. de C.V.
Chihuahua, Chihuahua

Pace Industries Grafton
Grafton, Wisconsin

Pace Industries Harrison
Harrison, Arkansas

Pace Industries Latrobe Main
Loyalhanna, Pennsylvania

Pace Industries Saltillo
Saltillo, Coahuila

Patterson Mold and Tool
St. Charles, Missouri

Rohde Brothers, Inc.
Plymouth, Wisconsin

Spartan Light Metal Products
Mexico, Missouri

Stellantis - Kokomo Casting Plant
Kokomo, Indiana

The Schaefer Group Inc.
Beavercreek, Ohio

voestalpine High Performance Metals LLC
Elgin, Illinois

Wheelabrator - Norican Group
LaGrange, Georgia

NADCA PROGRESS AWARD FOR SAFETY IMPROVEMENTS

NADCA's Progress Award for Safety Improvements recognizes companies with a recorded safety DART improvement of 25% or more compared to the prior year. NADCA is proud to recognize these award-winning companies.

Benda Tool & Model Works
Hercules, California

Cascade Die Casting Group, Inc. Atlantic Division
High Point, North Carolina

Cascade Die Casting Group, Inc. Mid-State Division
Grand Rapids, Michigan

Empire Die Casting Co.
Macedonia, Ohio

Fort Recovery Industries Assembly Plant
Fort Recovery, Ohio

General Die Casters, Inc. Twins Machining Plant
Twinsburg, Ohio

Hyatt Die Cast & Engineering Corporation
Cypress, California

Lakeside Casting Solutions
Monroe City, Missouri

Michigan Die Casting
Dowagiac, Michigan

Nebraska Aluminum Castings Inc.
Hastings, Nebraska

Nemak USA - Alabama
Sylacauga, Alabama

Nemak USA - Wisconsin Taylor
Sheboygan, Wisconsin

New GLDC LLC
Muskegon, Michigan

Pace Industries Grafton
Grafton, Wisconsin

Pace Industries Harrison
Harrison, Arkansas

Pace Industries Jackson
Jackson, Tennessee

PIAD Precision Casting
Greensburg, Pennsylvania

RCM Industries Inc. - Inland Die Casting Company
Wheeling, Illinois

Ryobi Die Casting (USA) Inc.
Shelbyville, Indiana

Spartan Light Metal Products
Mexico, Missouri

Stellantis - Kokomo Casting Plant
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Tesla Inc.
Lathrop, California

voestalpine High Performance Metals LLC
Elgin, Illinois

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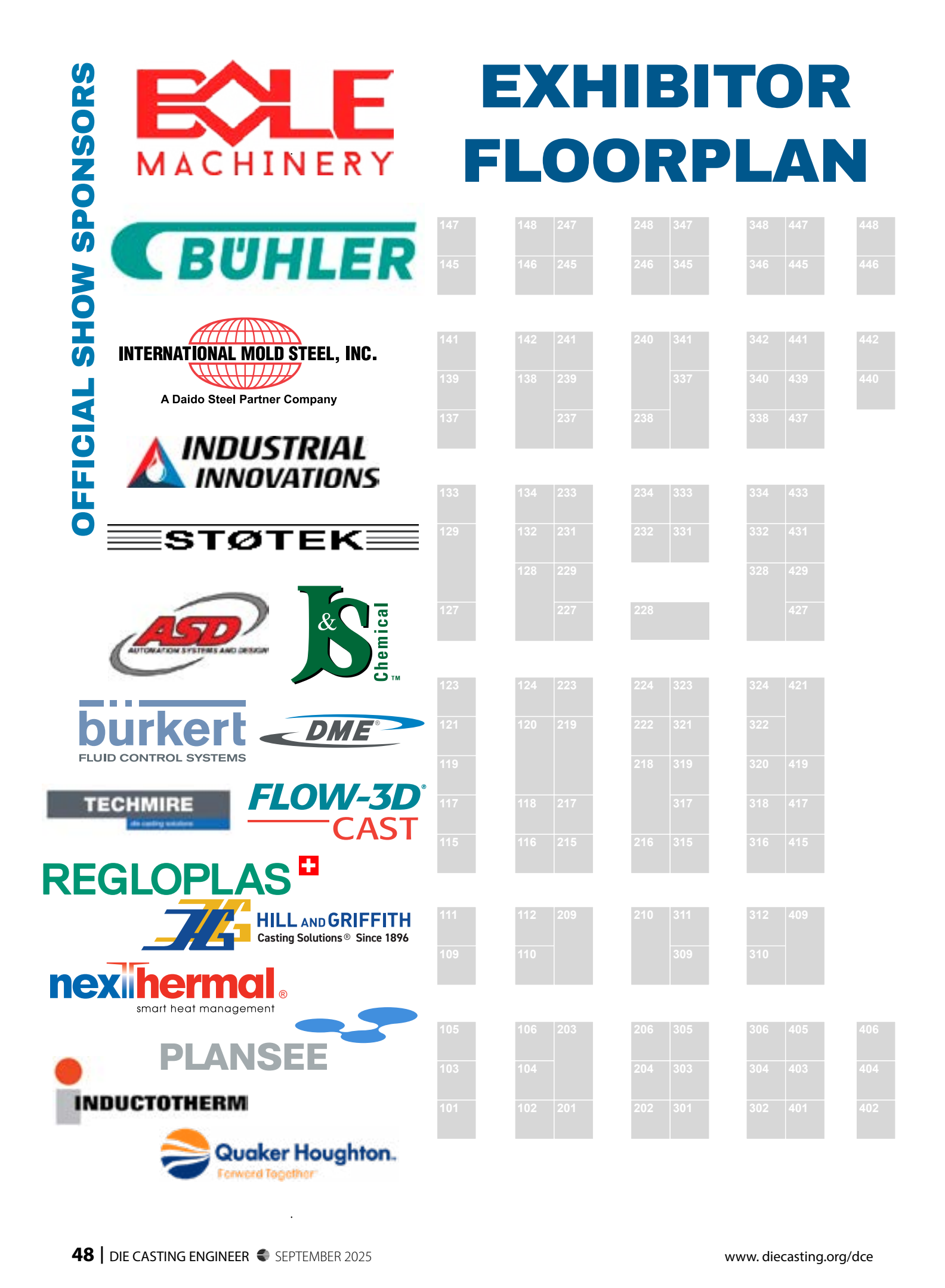

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202	Allied Metal Company
446	Astaras Inc
421	BOLE MACHINERY INC
303	EGA Spectro Alloys
245	Kind Special Alloys US
127	Metropolitan Alloys Corp
124	Plansee
403	Valor Alloys, LLC
141	Viking Technologies

Automation

448	ATD Engineering & Machine
123	Bedford Machine & Tool, Inc
242	COLOSIO SRL
447	EcoShot Inc.
210	Fill USA, Inc.
218	Frech USA Inc.
129	Idra North America Inc.
317	Inductotherm Corp.
409	Industrial Innovations Inc.
217	Laubinger + Rickmann GmbH & Co. KG
110	Lethiguel USA
148	Lincoln Electric Automation
306	Sinto America
138	SIR ROBOTICS INC
441	Stucchi USA
401	Visi-Trak Worldwide LLC
404	Zitai USA - Die Casting Equipment Group

Die Casting Machines

118	Absolute Haitian Die Casting Systems
421	BOLE MACHINERY INC
203	BuhlerPrince, Inc.
242	COLOSIO SRL
431	Die Cast Press Manufacturing Company Inc
218	Frech USA Inc.
104	Hanson International
129	Idra North America Inc.
142	ItalPresseGauss S.r.l.
237	NCC Die Casting LLC
347	Ningbo Hansen Precision Machinery Co., Ltd.
139	Pfefferle Casting Solutions
138	SIR ROBOTICS INC
441	Stucchi USA
246	UBE Machinery Inc
404	Zitai USA - Die Casting Equipment Group

Die Steel

304	DME Company
206	Ellwood Specialty Metals – USA
240	Prolong Surface Technologies
132	Proterial America, Ltd.
105	Swiss Steel USA

Dies

115	Aulbach Automation GmbH abk Pressenbau
123	Bedford Machine & Tool, Inc
439	Die-Tech & Engineering
304	DME Company
116	Dynamo Inc
332	Exco Engineering
218	Frech USA Inc.
204	G.H. Tool & Mold
209	Hellebusch Tool and Die Inc
224	International Mold Steel
110	Lethiguel USA
216	OEE Companies
433	Patterson Mold and Tool
139	Pfefferle Casting Solutions
301	Phygen Coatings Inc
240	Prolong Surface Technologies
321	SAPP Inc.
306	Sinto America
441	Stucchi USA
128	Techmire

145	Zeman Tool & Mfg
404	Zitai USA - Die Casting Equipment Group

Equipment

448	ATD Engineering & Machine
115	Aulbach Automation GmbH abk Pressenbau
123	Bedford Machine & Tool, Inc
421	BOLE MACHINERY INC
103	Brondolin North America
203	BuhlerPrince, Inc.
315	Burkert Fluid Control Systems
242	COLOSIO SRL
431	Die Cast Press Manufacturing Company Inc
440	Die Therm Engineering, LLC
427	Die-Pro LLC
447	EcoShot Inc.
332	Exco Engineering
210	Fill USA, Inc.
218	Frech USA Inc.
316	General Kinematics
302	Godfrey & Wing LLC
342	Goff Inc
445	Griffin Tool Inc.
311	Hypertherm, Inc.
129	Idra North America Inc.
317	Inductotherm Corp.
409	Industrial Innovations Inc.
110	Lethiguel USA
309	Lindberg/MPH
237	NCC Die Casting LLC
216	OEE Companies
132	Proterial America, Ltd.
312	Pyrotek Inc
223	Regloplas Corporation
429	SECO/WARWICK CORPORATION
247	Shibaura Machine Company, America
348	SINC Thermal
306	Sinto America
319	Socitec US LLC
133	Sterling
405	StrikoWestofen
128	Techmire
238	Test Industry America Inc.
437	The Oilgear Company
246	UBE Machinery Inc
141	Viking Technologies
401	Visi-Trak Worldwide LLC
248	Wollin USA
145	Zeman Tool & Mfg

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442	B&L Information Systems LLC
417	Bholster Technologies
234	EKK, Inc.
415	FLOW-3D CAST
323	MAGMA Foundry Technologies Inc.
338	NovaCast USA Inc.
138	SIR ROBOTICS INC

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203	BuhlerPrince, Inc.
431	Die Cast Press Manufacturing Company Inc
447	EcoShot Inc.
332	Exco Engineering
210	Fill USA, Inc.
104	Hanson International
217	Laubinger + Rickmann GmbH & Co. KG
309	Lindberg/MPH
340	Nexthermal Corporation
433	Patterson Mold and Tool
306	Sinto America
138	SIR ROBOTICS INC
401	Visi-Trak Worldwide LLC
111	X-RIS USA Inc.
219	YIZUMI Precision Machinery (USA) Corporation

Lubricants

447	EcoShot Inc.
215	Hill and Griffith Company
409	Industrial Innovations Inc.
101	J&S Chemical Corp
237	NCC Die Casting LLC

240	Prolong Surface Technologies
305	Quaker Houghton

Machining

123	Bedford Machine & Tool, Inc
421	BOLE MACHINERY INC
431	Die Cast Press Manufacturing Company Inc
439	Die-Tech & Engineering
332	Exco Engineering
210	Fill USA, Inc.
445	Griffin Tool Inc.
104	Hanson International
311	Hypertherm, Inc.
110	Lethiguel USA
216	OEE Companies
138	SIR ROBOTICS INC
145	Zeman Tool & Mfg

Materials

446	Astaras Inc
215	Hill and Griffith Company
224	International Mold Steel
309	Lindberg/MPH
340	Nexthermal Corporation
124	Plansee
240	Prolong Surface Technologies
403	Valor Alloys, LLC

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203	BuhlerPrince, Inc.
315	Burkert Fluid Control Systems
102	Castec Corporation
328	Castool Tooling Systems
431	Die Cast Press Manufacturing Company Inc
304	DME Company
302	Godfrey & Wing LLC
215	Hill and Griffith Company
245	Kind Special Alloys US
146	Krapohl-Wirth Consulting GmbH
110	Lethiguel USA
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340	Nexthermal Corporation
216	OEE Companies
312	Pyrotek Inc
247	Shibaura Machine Company, America
348	SINC Thermal
319	Socitec US LLC
133	Sterling
441	Stucchi USA
201	Transmet Corp
403	Valor Alloys, LLC

Surface Treatment

102	Castec Corporation
447	EcoShot Inc.
137	Fisa North America Inc.
345	Oerlikon Balzers
240	Prolong Surface Technologies
305	Quaker Houghton
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306	Sinto America
201	Transmet Corp

Trim Tooling

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445	Griffin Tool Inc.
237	NCC Die Casting LLC
433	Patterson Mold and Tool
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3D Printing

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332	Exco Engineering
406	Kimura Foundry Co., Ltd.
124	Plansee

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Since 1971, Colosio has produced 2,300 Die Cast Machines (Hot & Cold Chamber up to 4,400 tons) and fully Automated Cells with custom engineered Robotics and RELBO Spray Systems. Industry Experts with 100% internal know-how. Leader in Shot End Technologies (Full-Control, RealTime), Energy Efficiencies (Green Line), State of the art HMI software with "touch screen" Predictive Maintenance Technologies. Colosio USA Center offers Parts and Skilled Technicians for all USA customers.

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(937) 274-4866
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United States
(616) 822-4016
www.dietherm.com

Diehl Tool Steel **134**

3475 Spring Grove Ave
Cincinnati, OH 45217
United States
(513) 242-8900
www.diehlsteel.com

Die-Pro LLC **427**

315 Forest Ave
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United States
(920) 550-2333
www.die-pro.com

Die-Tech & Engineering 439

4620 Herman Ave
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Die-Tech is a full-service tooling manufacturer in its 42nd year serving the industry. Our experienced engineering team - including designers, programmers, skilled machinists, and die makers - utilizes high-speed 5-axis CNC machining to produce complex dies with exceptional precision, quality, and speed. ISO and AS9100 certified and family-owned, we serve industries including automotive, aerospace, consumer electronics, appliances, and furniture. Built with American components, our tools are engineered for high performance and delivered on aggressive timelines.

DME Company 304

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(800) 626-6653
www.DME.net

For over 80 years, DME has been the backbone of the die casting industry, providing unparalleled support and innovation. Our commitment to die casters is stronger than ever, offering a wide range of standard and engineered products, along with cutting-edge aftermarket solutions.
Through our eSTORE, available 24/7, members gain access to a full catalog of innovative components and resources designed to enhance production capabilities.

Dynamo Inc 116

7-107 Kyoei Street
Seto, Aichi 489-0984,
Japan
+1 708 261 6492
www.dynamoinc.us

EcoShot Inc. 447

5524 Fortune Circle S, Suite F
Indianapolis, IN 46241
United States
(317) 912-4498
www.ecoshotinc.com

EGA Spectro Alloys 303

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Rosemount, MN 55068-2510
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(612) 480-6124
www.spectroalloys.com

Aluminum is the world's greatest recycling success story – and EGA Spectro Alloys is at the heart of it. For over 50 years in Minnesota, we have turned what is used into what is new. We use premium equipment in our end-to-end production process to produce a complete line of AA die cast and foundry aluminum alloys. Our commitment to quality is reflected in every step of our process, from the careful segregation, sorting, shredding, and drying of scrap, to our advanced continuous casting and highly developed quality management process. We provide better solutions through innovation, making us regional leaders in aluminum recycling.

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499 Honeybee Lane
New Castle, PA 16105
United States
(724) 657-1160
www.elwd.com

ELLWOOD Specialty Metals Group is the leading tool steel and aluminum distributor for use in die casting dies, plastic molds, forging dies, and many other tooling applications. Our steel and aluminum grades are used to produce parts for automobiles, trucks, aircraft, and consumer products across North America. The variety of our steel products include hot work tool steels, plastic mold steels, cold work tool steels, forging die steels, stainless grades, and heavy plates. We also offer a comprehensive portfolio of aluminum cast, rolled, forged, and extruded products for various industries.

Exco Engineering 332

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Canada
(905) 853-8568
http://www.excoeng.com

Fill USA, Inc **210**

44160 Plymouth Oaks Blvd
Plymouth, MI 48170
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(312) 973-9486
www.fill-usa.com

Leading through innovation.
As the innovation leader in machining solutions for the aluminum die cast industry, Fill is internationally renowned for developing best-in-class solutions. Fill supports all production processes from the raw part to the machined, cleaned, tested and assembled finished part. Distinguished by many years of experience and technical proficiency, Fill takes overall responsibility for even the most complex automation processes. Working with Fill assures customers a decisive competitive advantage.
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(847) 299-8400
www.fisa.com

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Santa Fe, NM 87505
United States
(505) 982-0088
www.flow3d.com/products/flow-3d-cast/

Based in Santa Fe, New Mexico USA, Flow Science has been a pioneer in CFD software development for over 40 years. Our company mission is to provide our customers with best-in-class flow modeling software and exceptional technical training and support services. The FLOW-3D family of products offer highly accurate and versatile CFD solutions to meet the unique challenges of manufacturing in the 21st century.

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Die casting systems by the Frech Group offer improved productivity with smart application of leading technologies. Frech Die Casting cells are built to last and simple to operate with intuitive controls and flexible interfaces. The Frech Group also includes important market brands like Robamat, Meltec, VDS, Spesima, and Frech ZPF.

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www.toolingtechgroup.com/companies/gh-tool-mold

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United States
(815) 455-3222
www.generalkinematics.com

Godfrey & Wing LLC **302**

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Aurora, OH 44202
United States
(330) 562-1440
www.godfreywing.com

Goff Inc **342**

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Seminole, OK 74868
United States
(405) 278-6200
www.goff-inc.com

Griffin Tool Inc. **445**

2951 Johnson Rd.
Stevensville, MI 49127
United States
(269) 429-4077
www.griffintool.com

Hanson International **104**

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Saint Joseph, MI 49085-9581
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(269) 429-5555
www.hansoninternational.com

Hanson International specializes in designing, building, sampling, and inspecting precision molds and high-pressure die cast dies, primarily for the automotive industry. Based in St. Joseph, Michigan, we provide the die cast industry with durable, efficient, high-quality tooling. Our single-source assurance and single point of contact ensure exceptional service and support from design through delivery.

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United States
(636) 239-7543
www.htdinc.com

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United States
(800) 543-0425
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Since its inception in 1896, Hill & Griffith has maintained a top priority around quality and service, using these two fundamental aspects to reach customer satisfaction for 128 years. Investment in people, research, product development, and facilities will ensure we continue to be a leader with our customers and the industries we serve.
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Hypertherm, Inc. **311**

PO Box 14
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(603) 643-3441
www.hypertherm.com/solutions/applications/cast-trimming/

Idra North America Inc. **129**

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(765) 459-0085
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IDRA is an Italian company with the longest tradition among the manufacturers of pressure die casting machines for non-ferrous alloys.
IDRA die casting machines are well known all over the world for sturdiness, long duration and high advanced technical characteristics.
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IECI SRL **239**

2301 Solona Street
Haltom City, TX 76117
United States
00390306850370
www.iecionline.com

IECI is a leading Italian company in temperature control solutions for tools in die casting industry.
With over 50 years of experience, it also provides worldwide maintenance and repair services and innovative, high-quality solutions to its customers.
The head office is located in Paderno Franciacorta, Norh Itay area, while the subsidiary with local service its own warehouse is located in Haltom City (TX), USA.

Inductotherm Corp. **317**

10 Indel Ave Po Box 157
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United States
(609) 267-9000
www.inductotherm.com

Induction offers a highly efficient and eco-friendly method for melting aluminum, with significantly lower metal losses and carbon emissions compared to traditional fuel-fired furnaces. As more die casting operations pursue reduced C02 emissions, our induction technology supports their decarbonization goals while improving performance and reliability. With over 70 years of industry experience, Inductotherm Corp. is your trusted partner in reducing environmental impact without compromising productivity. Visit Inductotherm.com to learn more.

Industrial Innovations Inc. **409**

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www.industrialinnovations.com/

Industrial Innovations has over 45 years of experience in providing solutions-based lubrication management programs, and robotics integration for industrial environments. As the largest manufacturer of metalworking lubricant proportional mixers and spray application systems in North America, you can count on Industrial Innovations to deliver a world-class lubrication management solution.

International Mold Steel **224**

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(859) 342-6000
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International Mold Steel (IMS) supports the die casting community with NADCA certified grades DH31-EX™ and DHA™-World. These technologically advanced die steels can provide longer tool life, better part quality and lower total cost per part. IMS offers close collaboration with customers on steel selection, production process, machining, polishing, welding, coating and heat treatment.

ItalPresseGauss S.r.l. **142**

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Italy
+39 0309749300
www.italpressegauss.com

J&S Chemical Corp **101**

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United States
(770) 720-8100
www.jschemical.com

USA-based J&S Chemical is a leading manufacturer of specialty lubricants for the die casting industry. J&S Chemical's business philosophy is to create value for their customers by developing high quality, high performing, value added products. Substantial investment in R&D as well as their Technical Service Team, working on-site with their customers, is driving new product developments. Many of their brands are product leaders in the industry such as, TurboCast® (die release agents and liquid plunger lubricants), ShotBeads® (solid plunger lubricants) and TurboTrim™ (trimming fluids).

Kimura Foundry Co., Ltd. **406**

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Japan
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www.kimuragrp.co.jp/en

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Youngstown, OH 44512
United States
(330) 788-2437
www.kind-co.de/en

Krapohl-Wirth Consulting GmbH **146**

Im Pfeiferle 6
Adelsried, Bayern 86477
Germany
+ 49 8294 511 5865
www.kwcg.de

Krapohl-Wirth is the leading international foundry consulting company located in Europe, Asia and Africa with focus points: metal manufacturing, casting and processing. Our know-how can be found in the sectors: innovations, technology, infrastructure, technical manufacturing procedure, products, metallurgy, quality, scrap reduction, architecture, business+project management, interim mandates, active consulting during implementation, reconstructions, market+strategy, M&A-processes for buyers and sellers, etc. Our consultants have long-lasting metal and procedure experience and know-how from working in globally active companies.

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United States
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Germany
+49 2573 9388 – 0
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www.lethiguelusa.com

Lincoln Electric Automation **148**

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Lincoln Electric Automation is a trusted partner to the die casting industry, delivering Rimrock products and expert engineering to boost production quality, speed, and consistency. From spraying and ladling to part handling and finishing, our full-service team designs and integrates automation solutions—from single-tool upgrades to turnkey multi-robot cells.

Lindberg/MPH 309

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Lindberg/MPH is an industry leader in industrial melting and holding furnaces. Each furnace is designed to be low maintenance and energy efficient. Choose from a variety of custom options and sizes to meet your process and facility requirements. Available configurations include dry hearth, wet hearth, stack melter, and crucible or pot designs. Lindberg/MPH industrial melting furnaces are commonly used for aluminum or zinc and are also used for copper, lead, brass, bronze, and other materials. Our experienced engineers work closely with you to design industrial melting furnaces that meet your specifications.

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www.mcdanelceramics.com

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United States
www.metaliusa.com

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(313) 826-3212
www.metroalloys.com

Mo-Tech Corp 241

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United States
(651) 770-1515
www.mo-tech.com

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MUSTO ET BUREAU SRL 147

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NCC Die Casting LLC 237

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Haltom City, TX 76117
United States
(682) 703-1058
www.ncc-diecasting.com

NCC Die Casting, LLC provides all the components for the injection system in the high pressure die casting field: patented plunger tips with rings, lubricated rods, thermoregulated shot sleeves, lubricants and more. Thanks to high-quality products, deep know-how, and a long experience in the die casting sector, we guarantee good performances, a better quality of the casted parts, and a longer lifetime of each component. These results gain in time, cost savings and productivity.

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NovaCast USA Inc. 338

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United States
(630) 450-1647
www.novacastusa.com

Novy International, Inc. 419

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United States
(847) 619-5541
www.oerlikon.com/balzers/us/en/

Patterson Mold and Tool 433

1005 Portwest Drive
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United States
(636) 940-9988
www.pattersonmold.com

Patterson Mold and Tool is a full-service tool and die facility, serving the casting industry for 45 years. Our team of experienced and skilled craftsmen, array of CNC equipment, and quality system, (meeting both AS9100 and ISO 9001 standards), combine to make us a competitive and trusted supplier to our customers. Our products range from unit dies to dies for 3,000-ton machines, trim dies, and machining fixtures to complement our casting dies.

Pfefferle Casting Solutions 139

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Montreal, Quebec H4B 2T9
Canada
(514) 658-7563
www.pfefferle-casting-solutions.com

Pfeiffer Vacuum, Inc. 120

24 Trafalgar Square
Nashua, NH 3063
United States
(336) 538-1093
www.pfeiffer-vacuum.com

Phygen Coatings Inc 301

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Phygen's XVD surface enhancement reduces soldering, erosive die wear and minimizes heat checking on core pins and dies with a one-of-kind improved PVD process. Phygen solutions offer extended die life and improved "as cast" part quality for your most demanding needs and has been a leader in innovation and research advances the die casting industry. Phygen offers tailored solutions and personal customer service.

Plansee **124**

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+43 5672 600-0
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Plansee is a global leader in high-performance tungsten and molybdenum solutions, with decades of expertise in refractory metals and powder metallurgy. As the largest U.S. producer, we ensure fast, reliable delivery across North America. Together with Mi-Tech Tungsten Metals, part of the Plansee Group, we provide ready-to-install tungsten composites for the most demanding applications. In die casting, our materials excel under extreme heat, wear, and precision requirements—supported by innovation, quality, and technical excellence.

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Spokane, WA 99201
United States
(866) 797-6835
www.pyrotek.com

Quaker Houghton **305**

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With a comprehensive product range and unrivalled process expertise and experience, Quaker Houghton provides the complete solution to improving your die casting performance. We cover all your die casting needs from die release agents, plunger lubricants, application equipment, quench agents, trim lubricants, and ladle coatings to porosity sealing, metal removal fluids, greases, and fire resistant hydraulic fluids. Visit us and learn how our innovative fluid solutions can make an end-to-end difference in your operations.

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(269) 769-6441
www.regloplas.com

REGLOPLAS is a global leader in the production of temperature control equipment and solutions for the plastics, die casting, food, and other temperature-critical industries. The company is a significant contributor to these industries' continued efficiency and quality advancements. Stringent and diverse customer requirements are met by highly specialized teams in development, production, and international sales. Regloplas owns and runs plants in Switzerland, Germany, France, the United States, and China. Additionally, the company collaborates with a global network of independent representatives in over 50 countries. The company, which was founded in 1961, is family-owned and employs 200 employees worldwide.

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United States
00393348108947
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SECO/WARWICK CORPORATION **429**

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United States
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www.secowarwick.com

Shape Process Automation **231**

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United States
(248) 602-8818
www.shapeprocessautomation.com

Shibaura Machine Company, America **247**

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Elk Grove Village, IL 60007-5031
United States
(847) 709-7409
www.shibaura-machine.com/die-casting-machines/

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1464 Hoff Industrial Drive
O Fallon, MO 63366
United States
(314) 423-9460
www.sincthermal.com

Sinto America **306**

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(517) 371-2460
www.sintoamerica.com/

Sinto America provides a comprehensive line of shot blasting machines and surface treatment systems for a wide range of applications. With solutions including shot blasting and shot peening, Sinto offers processes tailored to any treatment purpose, production volume, or material condition. As your 3-in-1 solutions provider, Sinto delivers equipment, abrasives, and expert support to help you meet your production goals efficiently and effectively—all backed by industry-leading technology and service.

SIR ROBOTICS INC **138**

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United States
(682) 269-1456
www.sir-robotics.com

SIR Robotics is a global leader in advanced robotic automation solutions. SIR designs and delivers turnkey robotic cells for operations such as cutting, grinding, plasma trimming, welding, handling, and complex assembly for foundry applications. With regional support centers across North America, SIR Robotics, Inc. ensures local project management, engineering, and after-sales service. Leveraging partnerships with leading robot brands, SIR's solutions integrate 2D/3D vision, AI, and offline programming to meet demanding cycle times and precision requirements.

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United States
(800) 842-7668
www.vibro-dynamics.com

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New Berlin, WI 53151
United States
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STOTEK Inc. **322**

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Pewaukee, WI 53072
United States
(262) 737-5055
www.stotek.com

STØTEK is a manufacturer of high-tech and high-efficiency melting, holding, and dosing furnaces for the aluminum diecast and foundry industry.
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StrikoWestofen 405 **405**

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StrikoWestofen is a world-class leader in melting, dosing & holding solutions for 60+ years. Our StrikoMelter PUREFFICIENCY® is the most energy-efficient melting solution. It consumes less than 800btu/lb. with a metal yield up to 99% and a service life exceeding 20 years. It's the industry standard for fast ROI and low operating costs. Additionally, connecting to Norican's Monitizer digital 4.0 solution companies can identify further savings opportunities and boost output maximizing your efficiency and profitability.

Stucchi USA **441**

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United States
(847) 956-9720

Swiss Steel USA **105**

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United States
(800) 323-1233
www.swisssteel-group.com/en

Swiss Steel Group, one of the world's leading producers of special steel long products, produces Hot Work Die Steels in Germany (Deutsche Edelstahlwerke) and North America (Finkl Steel) and distributes these products via its global network. Both DEW and Finkl Steel Hot Work Die Steels are processed and distributed locally by Swiss Steel USA and Canada.
The product portfolio includes 2344 Magnum, 2367 Superclean, E40K and Superdie, all produced and certified according to the latest NADCA Die Materials specification. In addition, Swiss Steel USA provides vacuum heat treatment services from their Carol Stream, IL facility. Please visit our websites: www.finkl.com and www.swisssteel-international.us.

Techmire **128**

185 Voyageur
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Canada
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www.techmire.com

TECHMIRE is the world leader in the design and manufacture of multiple-slide die-casting systems for precision components in zinc, lead and magnesium alloys, including:
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Techmire provides cost-effective solutions to manufacturers of die cast components to cast complex parts with faster cycle speed, higher material utilization and superior part quality.

Test Industry America Inc. **238**

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United States
(262) 203-5265
www.test-industry.com

The Oilgear Company **437**

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United States
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Oilgear is a global leader in hydraulic pumps, valves, and motion-control systems, trusted by OEMs for over 100 years. Serving die casting, metal processing, aerospace, and offshore oil & gas, we deliver turnkey hydraulic solutions—from shot control valves and high-pressure pumps to custom power units. Backed by expert engineering, global service, and proven reliability, Oilgear helps customers achieve maximum productivity, efficiency, and safety. www.oilgear.com.

The Schaefer Group Inc **109**

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United States
(937) 253-3342
www.theschaefergroup.com

The Wasmer Company **106**

3115 N 21st Street, Suite 3
Sheboygan, WI 53083
United States
(920) 827-2300
www.wasmerco.com

The Wasmer Company blends human intuition and advanced technology to deliver holistic energy efficiency and industrial optimization solutions. Specializing in facility audits, emissions reduction, process automation, and lighting and HVAC improvements, they help clients enhance productivity, reduce operational costs, and minimize environmental impact; all while ensuring human and product safety. With a boots-on-the-ground approach tailored for long-term partnerships across manufacturing sectors, Wasmer drives smart, sustainable performance for businesses and the planet.

Tomorrow Technology **341**

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PRODUCT SHOWCASE

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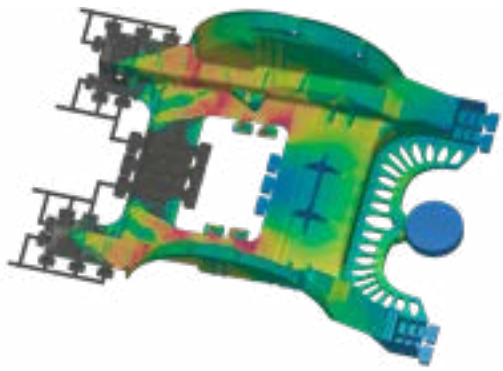

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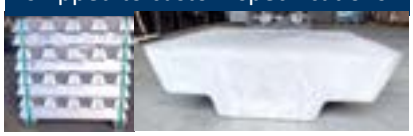

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CONGRESS SESSIONS

TUESDAY OCTOBER 7		WEDNESDAY OCTOBER 8		THURSDAY OCTOBER 9
Artificial Intelligence Revolution in Die Casting 8:30 - 9:30 am | S103 ABC	Advanced Additive Manufacturing Materials 8:00 - 9:00 am | S103 D	Aluminum Skin Formation Effects in Die Casting 8:00 - 9:00 am | S103 ABC	Extending the Life of the Die 8:00 - 9:30 am | S103 D	Computer Simulation for Improved Casting Process 8:00 - 9:30 am | S103 ABC
Improving Die Casting with Automation 9:45 - 10:45 am | S103 ABC	Conformal Cooling in Additively Manufactured Dies 9:15 - 10:45 am | S103 D	Utilizing Secondary Metal for Aluminum Alloys 9:15 - 10:15 am | S103 ABC	Aluminum Alloys for Structural Castings 9:45 - 11:15 am | S103 D	Board of Governors Meeting 8:30 - 11:00 am | S101 DE
Exhibits Open 9:00 am - 4:00 pm | Grand Ballroom		Understanding the Industry through Benchmarking 10:30 - 11:30 am | S103 ABC	Exhibits Open 9:00 am - 4:00 pm | Grand Ballroom	Exhibits Open 9:00 am - 1:00 pm | Grand Ballroom
Young Professionals Organization Mentor Lunch 12:00 - 1:30 pm | S101 DE		Awards Lunch 12:15 - 2:00 pm | S102		Innovations in Metal Injection 9:45 - 11:15 am | S103 ABC
Discussion Panel on Current Risk / Reward of AI and Automation 1:00 - 3:00 pm | S103 ABC	Government Affairs Report 1:00 - 3:00 pm | S103 D	Discussion Panel on Big (Giga / Mega) Castings 2:30 - 4:30 pm | S103 ABC	Finance Committee Meeting 2:00 - 3:15 pm | S101 DE	
Welcome Party 3:00 - 4:00 pm | Grand Ballroom				

Schedule as of 8/13/25. Subject to change.

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Tuesday, October 7

ARTIFICIAL INTELLIGENCE REVOLUTION IN DIE CASTING

8:30 - 9:30 am
Session Chair: Adam Kopper
Room: S103ABC

A Machine Learning Approach to Predicting Externally Solidified Crystal Formation in Aluminum Die Casting Process

Buwei Chen, Jianyue Zhang, Zhaoliang Yuan, Gabirel Garcia, Rui Wang, Chen Chen, Alan Luo (The Ohio State University); Qigui Wang, Liang Wang (General Motors)

Externally solidified crystals (ESCs) can readily form in high-pressure die casting (HPDC) process, leading to a significant reduction of casting quality and performance. This study explores the feasibility of using machine learning (ML) to predict ESC formation and optimize the casting process to minimize ESC formation in a structural cast aluminum alloy. Tensile bar specimens were produced with a HPDC mold, then tested to identify ESCs on fracture surfaces. Seven ML models were employed and evaluated, including: Decision Tree, Random Forest, Logistic Regression, Neural Network, K-Nearest Neighbors (KNN), Support Vector Machine (SVM), and Naive Bayes. Random Forest and Classification Tree show a high accuracy of 95% in predicting ESC formation. Neural network, KNN, SVM and Logistic Regression also present a good accuracy over 74%, while Naive Bayes is with a low accuracy of 68%, unsuitable for ESC prediction. Moreover, the importance of HPDC process parameters in ESC formation was ranked, including superheat, liquidus temperature of the cast alloy, die and shot sleeve temperatures, vacuum level, intensification level, shot speed, and plate thickness. By analyzing all the ML prediction results, the top 4 factors that determine the ESC formation are ranked as follows: Superheat > Liquidus temperature > Plate thickness > Die temperature. The results highlight the potential of machine learning in defect prediction in HPDC products, offering a path to optimize the processing parameters and reduce casting defects.

AI-Powered Optimization in Die Casting: Practical Steps and Low-Hanging Fruit

Mark Wiemer (Norican Group | Monitizer, and StrikoWestofen Technologies)

Die casting is a complex process, with many interlinked variables that affect quality and cost. That makes it difficult to improve results through conventional analytics. Artificial Intelligence (AI) optimization is the best way to handle this complexity. It can deliver results today.

This paper will explain the elements of a typical AI system, then considers how to best to plan and run an AI project for a die casting operation. It will give practical examples and share results of successful implementations. Including an in-depth HPDC case study where scrap rates dropped by 52% after adopting AI, and an LPDC example that saw scrap rates down 29%. Energy savings and metal loss reductions are also touched upon.

Topics will include tips on project planning actions, typical project timelines, the tasks required in each phase and how to overcome challenges like incomplete data and operator non-compliance with AI suggestions.

ADVANCED ADDITIVE MANUFACTURING MATERIALS

8:00 - 9:00 am
Session Chair: Corey Vian
Room: S103D

Assessment of Tungsten Heavy Alloys for Die Casting Applications: Additive Manufacturing and Simulation Results

Rafael Cury, Bernhard Mayr-Schmoelzer, Dirk Handtrack, Paul Rudnik, Raphael Somweber (Plansee); Caleb Glotfelty (MiTech Metals)

Additive manufacturing (AM) of metals has evolved significantly over the past two decades, with early advancements driven primarily by beam-based technologies such as laser powder bed fusion and directed energy deposition. In recent years, sinter-based additive manufacturing (SBAM) has emerged as a compelling alternative, offering advantages in material flexibility, cost efficiency, and compatibility with conventional powder metallurgy feedstocks. This study demonstrates the feasibility of employing SBAM techniques for the fabrication of tungsten heavy alloy (WHA) components, which are widely used in die casting applications due to their exceptional density, wear resistance and thermal conductivity. Using elemental powder blends corresponding to the Densimet® D185 composition (97 wt.% W, 2 wt.% Ni, 1 wt.% Fe), WHA parts were produced via six distinct SBAM routes. These included filament and granule material extrusion, lithography-based metal manufacturing, metal binder jetting, metal selective laser sintering and mold slurry deposition. The resulting components were evaluated through a comprehensive suite of characterization techniques, including dimensional shrinkage analysis, densification behavior, microstructural integrity, chemical purity, and mechanical performance. All SBAM processes, apart from early-stage M-SLS trials, achieved near-theoretical sintering densities and exhibited the characteristic WHA microstructure of globular tungsten grains embedded in a Ni based matrix. Results were benchmarked against ASTM B777-15 standards and conventional press-and-sinter reference values. Mechanical testing demonstrated that the manufactured parts met or exceeded the required tensile strength and ductility

thresholds, confirming the structural viability of SBAM-produced WHAs. Demonstrator components such as tooling inserts and shot sleeves were successfully manufactured and evaluated for their potential integration into die casting environments, where enhanced thermal management and durability are considered as critical. The findings of this study highlight both the opportunities and current limitations of SBAM for WHA production. The results provide a practical framework for selecting appropriate AM technologies based on application-specific requirements, particularly in high-performance tooling and thermal management systems. Furthermore, this work supports the integration of SBAM into digital manufacturing workflows and simulation models using Magma Software, paving the way for more efficient and flexible production of refractory metal components in industrial settings.

Scalable Additive Manufacturing of a Large, Conformally Cooled, Tool Insert

Harald Lemke (Mac Lean & Fogg); Magda Coventry, Andrew Willett (Toyota Europe); Nicolas Praetzsch, Tim Lantzsch, Wilhelm Meiners (Fraunhofer Institution Aachen)

The Metal Laser Powder Bed Fusion (PBF-LB/M) process is gradually finding acceptance in the manufacturing of small tooling inserts with conformal cooling channels. However, scaling up to large tooling inserts remains challenging due to a variety of material and manufacturing issues. For example, traditional tool steel materials such as H11/H13 or M-300, not originally designed for the PBF-LB/M, show limitations such as low fracture toughness, high pre-heating requirements, or risky and complex post printing heat treatments. Further, most existing PBF-LB/M machines are either too small to accommodate large inserts or are ill equipped to print large areas with high solid volumes of high hardness tool steels.

This paper outlines how combined material and equipment innovations were applied to overcome such challenges. A production proven, low carbon, high hardness, high ductility tool steel (L-40), that was specifically designed for the PBF-LB/M process and prints directly to a required hardness of HRC 45 was selected and processed by a novel, five-laser gantry-based PBF-LB/M machine, featuring a build volume of 1.0 x 0.8 x 0.4 m^3, to print a large automotive Al-High-Pressure Diecasting (HPDC) production tool insert (bounding box 515 x 485 x 206 mm^3, volume >20,000 cm^3).

This work will comment on each of the required workflow steps of the large insert production process and address some of the technical and commercial challenges and their applied solutions. Technical aspects such as L-40 parameter transfer to the new machine and the resulting cooling channel surface properties will be highlighted. In addition, the applied hybrid manufacturing approach will be discussed that was required to lower the insert cost to target.

The publication will close with "lessons learned" of how to reduce lead time and printing cost even further to make PBF-LB/M printing the preferred process technology for all sizes of "heat prone" inserts including even for larger size inserts that might be needed for future (mega) giga-cast applications.

CONFORMAL COOLING IN ADDITIVELY MANUFACTURED DIES

9:15 - 10:45 am
Session Chair: Ante Lausic
Room: S103D

Tuning Laser Powder Bed Fusion for High Integrity, Conformally-Cooled H13 Steel Inserts

Ehab Samuel, Marc-Étienne Lamarche-Gagnon, Alexandre Gariépy (National Research Council of Canada)

The use of conformal cooling channels in die casting offers the advantage of more effective heat extraction from the incoming molten metal, which can translate into an increased quality of the product and better tooling durability. To ensure the desired die life, the minimization of internal defects in the additively manufactured tool steel (e.g., pores, cracks) is of critical importance. In this work, a process map approach was used to iteratively determine an optimal process window (laser power, laser scan speed, layer thickness, hatch distance, bed preheat temperature) to obtain a near-zero defect microstructure for H13 tool steel, as quantified through optical microscopy and image analysis, using laser powder bed fusion (LPBF). Test coupons, of increasingly complex geometries, were LPBF-printed in order to assess microstructure, mechanical properties and part integrity. Channel integrity was evaluated using surface roughness and overhang measurement techniques inside coupons containing channel segments at various degrees of inclination. The effectiveness of surface roughness mitigation techniques in the LPBF process, especially for the case of horizonal channel segments, is reported. This investigation therefore identifies a set of printing parameters suitable for cracking-prone H13 steel, as well as a methodology to determine appropriate parameters for other grades of tool steel.

Thermal Modeling of Architected Cellular Materials for Die Casting Cooling Channels

Jack G. Webster, Carl Söderhjelm, Diran Apelian (Advanced Casting Research Center (UCI))

Proper thermal management during the high pressure die casting (HPDC) process is essential for generating high-quality cast components as well as preserving mold life. Metal additive manufacturing offers unique benefits in the rapid production of casting dies and tooling. Novel technologies enabled through additive manufacturing, such as conformal cooling and heating lines, allow for truncated cycle times and more uniform heat extraction as compared to conventionally drilled

channels. However, premature failure of the mold may occur as a result of stress formation via steep thermal gradients between the metal cavity and bulk die. Heat flow through the mold accompanied by constrictions in material expansion or contraction governs the magnitude of thermomechanical stress at the casting surface. Latticed cooling channel inserts, which can be readily tailored through additive processes, are a promising remedy for the failure of casting dies through the redistribution of thermal stresses formed from high temperature gradients, offering distinct advantages in HPDC. Conductive heat transfer simulations with boundary conditions representative of aluminum die casting were performed on select lattice geometries to determine their thermal dissipation efficiency. Results from FEA modeling offer critical insights into the thermal conditions and behavior experienced by the die using this novel technology.

Effect of Channel Surface Roughness on the Fatigue Resistance of Tool Steels for Additively Manufactured Die Inserts

Stephen P. Midson, Alexandra G. Cantrell, Joy Gockel (Colorado School of Mines); Ali Keshavarz (voestalpine Additive Manufacturing Center); Patricia Miller (voestalpine High Performance Metals); Ante Lausic, Whitney Poling, Paul Wolcott (General Motors)

Additive manufacturing (AM), specifically laser powder bed fusion (PBF-LB), is being used for the fabrication of die inserts for the die casting process as it can produce inserts containing complex shaped conformal cooling channels. These channels are designed to follow the shape or profile of the cavity face of the die, helping to reduce excessive heat build-up at the die surface. However, the surface quality of the conformal cooling lines, especially on down-skin surfaces, is relatively poor, and these rough surfaces have been seen to initiate fatigue cracks that result in early failure of the die inserts. The objective of the project reported here was to examine the effect of cooling line surface roughness and material chemistry on the fatigue resistance of die materials. The approach was to fabricate 22 mm outside diameter (OD) cylinders 170 mm long containing a 5 mm inner diameter (ID) axial hole. Dog-bone shaped fatigue samples have been machined from these AM fabricated cylinders. The OD surfaces of the samples have been polished (as is normally performed for fatigue samples), while the ID of the cooling channels for most of the samples has been left as-built, to encourage the fatigue cracks to initiate at the surfaces of the 5 mm axial holes. Strain controlled uniaxial fatigue testing has been performed at 250°C using an R = 0.1. The effect on fatigue life has been examined for (1) the steel used to produce the samples (maraging 300 and Uddeholm DievarTM), (2) build direction (horizontal and vertical), (3) AM machine brand (EOS and Velo3D), and (4) surface condition of the conformal cooling line (as-built versus after smoothing using chemical milling). The results of the fatigue testing are presented, together with an analysis of the

fracture surfaces, identifying the locations of fatigue crack initiation. X-ray micro-computed tomography (micro-CT) scanning of several of the AM fabricated bars has also been performed, characterizing the locations and positions of artifacts such as porosity and large surface notches within the bars. A comparison of the surface of the conformal cooling channels is also presented, both in the as-built condition and after surface smoothing.

IMPROVING DIE CASTING WITH AUTOMATION

9:45 - 10:45 am
Session Chair: Yeou-Li Chu
Room: S103ABC

Anomoly Detection for Automated Surface Defect Inspection in Die Casting

Bin Chen, Xiaoming Wang (Purdue University); Corey Vian (Stellantis Kokomo Casting Plant)

Automated surface defect detection in die casting using computer vision remains a significant challenge. The difficulty is largely due to the subtle and small defects on large aluminum pieces. Additionally, shadows caused by complex geometries and intricate designs of cast parts and glare from highly reflective aluminum surfaces introduce additional complications to the detection.

This study explores the use of the latest advancements in anomaly detection and generative AI to enhance the sensitivity and robustness of surface defect detection in die casting. The proposed method involves training a model to generate defect-free images using the aluminum pieces without defects only. When the trained model takes an image of a defective part as input, it produces an output that shows greater deviation from the expected defect-free image, allowing for effective defect localization. In addition, this method can help reduce the impact of uneven lighting, shadows, and reflections especially when images are taken under controlled lighting conditions. It has achieved the state-of-the-art performance for detection small defects on a challenge dataset.

Optimizing Structural/Mega Castings with Total Cost of Ownership in Mind

Martin Hartlieb (Viami International Inc.); Philipp Hettich (Laubinger + Rickmann GmbH & Co. KG)

To make structural, up to Mega/Giga castings that can economically and viably replace stamped and welded assemblies in car bodies, the best possible compromise must be found between design (part integration and weight), properties, and economic production and assembly over the lifetime of the program. A lot of effort has been put into optimizing the die casting process and the die casting cell itself, as it is typically to most capital-intensive piece of machinery in a die casting facility. All other equipment (for subsequent process steps) needs to be synchronized with it, which means typical cycle times of 60 to 120 seconds are the objective for any subsequent process step. For structural die castings however, subsequent process steps like heat treatment, straightening, machining, surface treatment, as well as multiple quality tests, often represent more value added (and can make the casting more valuable) than the casting process itself, and significantly contribute to casting quality and properties. The alloy and heat treatment impact both properties and part geometry, especially wall thickness – and therefore weight of the casting. (Solution) Heat treatment can significantly elevate (especially dynamic) properties to a different level, make them more homogeneous in the casting, and enable significant weight reduction. A casting of a similar alloy in T6/T7 can have a 30-50% higher strength (220-250MPa YS instead of 140-170MPa) with the at least the same elongation than in F+PB/T5. But this heat treatment, and especially the straightening processes can equally require a significant investment in process and testing equipment and can also significantly contribute to scrap rate. However, they can also offer an early detection of process issues in the die casting process. By using the best suitable alloy and heat treatment, the part can be optimized in a way that, despite higher initial investment in the process, the total cost of ownership is significantly lower, and structural, up to Mega/

Giga castings can be a lot more viable as a solution compared to current sheet metal assemblies. An example of a structural casting will be given that was originally designed for T6 but then had to be redesigned for T5 as the straightening process (2.5h or manual straightening) was economically unviable and at the late stage in the project the sourcing of an intelligent straightening system was not possible. The design change caused a weight increase of the casting of almost 30%, which lead to equally increased metal costs, higher casting costs, and some additional machining, as well as significant additional tooling costs for new inserts. In T5 straightening of the castings was still necessary, but it was possible to be performed within a 5 minute cycle time in a semi-automatic system. The saving in heat treatment costs from T6 to T5 was minimal compared to the other cost increases of the casting. With an automatic straightening system properly planned and sourced a significant saving could have been achieved over the lifetime of the program.

Automatic, intelligent straightening systems are often used as they can render this an economically viable solution if the total lifetime costs of the parts are considered (including the possible significant weight reduction) and not just initial investment. Latest developments in more flexible intelligent straightening systems that can be used for multiple components and adjusted to new components after model changes can make this even more viable long term. These new systems – by decoupling the measurement from the correction step - can flexibly handle different variants of a component (allowing economical use even for smaller volumes), and they can be adjusted for subsequent products for a fraction of the initial investment. This presentation will illustrate current status and future trends of automatic straightening technologies for large structural castings.

DISCUSSION PANEL ON CURRENT RISK / REWARD OF AI & AUTOMATION

1:00 - 3:00 pm
Session Chair: Charles Monroe
Room: S103ABC

An engaging discussion exploring the current risks and rewards of integrating artificial intelligence (AI) and automation in high pressure die casting. Industry experts will share their experiences with using AI, machine learning, and automation to address the challenges they face in die casting. They will talk about the potential risks inherent in using AI and automation and how those risks may be avoided. This session will be a great opportunity for all attendees to learn more about AI and automation and how it is shaping the future of die casting.

GOVERNMENT AFFAIRS REPORT

1:00 - 3:00 pm
Session Chair: Omar Nashashibi
Room: S103D

An informative presentation examining how evolving government legislation is affecting the high pressure die casting industry. From import tariffs to environmental and energy efficiency deregulation to workplace safety standards, these laws can have significant implications for high pressure die casting. Omar Nashashibi, of Inside Beltway, will break down the latest information out of Washington D.C. and the impact it will have on the industry.

Wednesday, October 8

ALUMINUM SKIN FORMATION EFFECTS IN DIE CASTING

8:00 - 9:00 am
Session Chair: Alan Luo
Room: S103ABC

The Influence of Alloy Scheil Factors on Skin Formation in High Pressure Die Casting

Garrett C. Lange (Missouri University of Science and Technology); Jacob A. Belke (Mercury Marine)

In High Pressure Die Casting (HPDC) , a fine equiaxed microstructure, known as the skin or surface layer, can form along the casting surface before transitioning into a coarser microstructure throughout the rest of the casting. Skin has been observed in all HPDC materials and is advantageous due to its higher strength and lack of porosity. The thickness of the skin is controlled by the local solidification time, heat transfer coefficient, and temperatures of the incoming melt and die surface. However, sometimes a skin does not form even when the aforementioned factors are optimized to promote skin formation. This phenomenon is theorized to be alloy composition dependent, with each element affecting the growth of the skin either positively or negatively, controlled by the alloying element's Scheil factor, with low Scheil values maximizing the skin. This paper investigates the relationship between alloy composition and the thickness of the skin produced when all other skin growth factors are held constant. To study this relationship, 16 binary aluminum alloys were created using elements from a range of Scheil factor values, added at 0.5, 1, and 5 weight percentages, and gravity cast into a wedge-shaped copper die. The results support the assertion that alloying elements with low Scheil factors promote skin growth, and a new equation is presented relating alloy composition to skin thickness.

The Interplay Between Die Solder and the Skin Layer in High Pressure Die Casting

Jacob A. Belke (Mercury Marine); Paul G. Sanders (Michigan Technological University)

High Pressure Die Casting (HPDC) is a widely used manufacturing process for producing complex metal components with high precision and excellent surface finish. However, die soldering, a phenomenon where molten metal adheres to the die surface, poses significant challenges, leading to increased maintenance costs and reduced die life. Aluminum die solder can form more than 100 µm thick in one casting cycle. In HPDC, there is a transition where ultra-fine equiaxed grains at the surface cease, and larger equiaxed growth ensues as the nucleating driving force slows and the growth driving force increases, but not enough to grow columnar grains. This critical interface defines the extent of the skin, which is observed to form 100-200 µm thick. The skin layer is microstructurally stronger, porosity-free, and locally cooler from direct contact with the water-cooled die, leaving the hotter, porous matrix directly behind the skin weaker, which can yield during ejection. This study investigates the relationship between the skin layer, also known as the surface layer or chill layer, and die soldering in HPDC. By analyzing the microstructural characteristics and properties of the skin layer and solder, a new definition of die solder and its formation and growth mechanism is presented. The skin-solder hypothesis was tested with a permanent mold experiment, constraining the alloy (A380) and casting ejection temperature (300°C), and varying the core pin temperature. The findings conclude that solder can be mitigated through high cooling rate techniques, such as conformal cooled tools and alloy additions that promote the formation of the skin layer.

EXTENDING THE LIFE OF THE DIE

8:00 - 9:30 am
Session Chair: Stephen Midson
Room: S103D

Corrosion Analysis by Immersion Test of a Steel Alloy in Aluminum

Carlos M. Sacchelli, Sr. (Santa Catarina Federal University); Francisco Arieta (Tribosystems); Alexandre F. Michels, Carlos A. Costa (UCS)

The use of aluminum (Al) alloys in several automotive components, including structural ones, has grown with the aim of improving performance, safety and efficiency in this industrial segment. Thus, the high-pressure aluminum injection (HPDC) process is one of the main alternatives in the production of components and, consequently, the steel alloys of the construction materials of HPDC molds have deserved great prominence. However, due to the high thermal cycles of the injection process, they can lead to changes and modifications of the surface of the mold material due to the contact of the molten Al alloy during the useful life of the mold. Thus, the objective of this work was to analyze the surface modifications of the steel over time at the contact interface with the Al alloy. Through a controlled laboratory experiment, it was possible to simulate immersion cycles with Class E steel standardized by NADCA (North American Die Casting Association) # 207-2024 in aluminum alloy for a period of 1 to 40 hours. Preliminary results indicate that there are differences in the structure, attesting to the interaction between the mold materials and the aluminum alloy. It was also possible to identify the behavior of the evolution over time of the layer that suffered corrosion in the test specimens by adjusting the equation to the experimental data, corroborating data from the literature.

Toolox 46: An Innovation in Advanced Pre-hardened Tool Steels for Hot Work Applications

Hadi Torkamani, Håkan Engström, Baris Yildirim (SSAB Special Steels)

The demand for more efficient and reliable solutions in hot work tooling, e.g., in die casting applications, continues to grow. In response, the pre-hardened tool steels have become more attractive in this segment thanks to the advancements in machining techniques. This type of steel products offers many advantages by eliminating the need for post-machining heat treatment, thus simplifying production workflows-particularly in outsourced manufacturing/workshops, and minimizing the risk of distortion. Despite these advantages, suitable pre-hardened materials for demanding hot work applications have historically been limited. Toolox 46, a newly developed product by SSAB, addresses this gap by combining proper mechanical and workshop properties.

This paper introduces Toolox 46 as a suitable product for die casting dies and other hot work components. It highlights manufacturing aspects, key properties, and real-world application cases where Toolox 46 has demonstrated performance equal to or exceeding that of conventional ESR steels.

Die Life Extension in Asian Giga Casting Markets

Osamu Kanechika (Yasugi Works)

Proterial's Yasugi Specialty Steel in Japan has been producing exceptional steel since 1899. DAC-i has emerged as a superior solution for Giga Casting engineers in the Asian market, outperforming traditional H13 and H11 grades in die life longevity. DAC-i can obtain better high temperature strength, approximately 30% better toughness, and 100% anti-heat check resistance improvements compared to H13. This is attributed to advancements in heat crack resistance, achieved through enhanced material strength at elevated temperatures. These improvements have substantially reduced large die cracks and minimized water leakage from cooling holes. The increased toughness of DAC-i material ensures more reliable and efficient casting processes, bringing a solution for extend

UTILIZING SECONDARY METAL FOR ALUMINUM ALLOYS

9:15 - 10:15 am
Session Chair: William DiBacco
Room: S103ABC

Optimizing A380 Aluminum Alloy for Cost-Effective Recycling: Microstructure and Mechanical Properties

Gabriel Garcia, Jianyue Zhang, Alan Luo (The Ohio State University); Subodh Das, Jimmy Garren, Matthew Gavin (Audubon Metals)

With the surge in electric vehicle adoption and the drive for lightweight design, aluminum high pressure die casting has emerged as the preferred manufacturing process in automotive applications. This paper introduces Corelite®, a newly developed AlSi8Mg alloy engineered to deliver high mechanical performance without the need for conventional heat treatment. By incorporating zirconium as a microalloying element, Corelite® achieves significant grain refinement in the as-cast condition, resulting in excellent strength, ductility, and thermal stability—all while maintaining outstanding recyclability. The alloy consistently delivers yield strength above 120 MPa, tensile strength exceeding 250 MPa, and elongation over 14% in the F temper. Its optimized composition supports up to 98% recycled content and addresses common casting challenges such as fluidity, porosity, and die soldering. Corelite® represents a sustainable, energy-efficient, and cost-effective alternative to traditional heat-treated aluminum alloys, enabling next-generation casting solutions for automotive and other high-performance applications.

Next-Generation Heat-Treatment-Free Aluminum Alloy for Structural High Pressure Die Casting with High Recycled Content

Tao Wang (PSW Group)

A380 alloy, containing 3–4% Cu and < 0.1% Mg, is the most commonly used die cast aluminum alloy for non-structural applications. However, recycling it from end-of-life (EOL) automotive Twitch scrap requires costly Mg removal (de-mag chlorination) and Cu additions. This study presents newly designed secondary alloys with reduced Cu (1.7%) and increased Mg (0.4%) content to better align with Twitch scrap composition. Microalloying additions of Sr, Cr, and Ca were introduced to a base Al-7%Si-1.7%Cu-0.4%Mg alloy to enhance mechanical properties. Die-cast plate samples (3 mm and 5 mm thick) were analyzed. The NS-1 alloy (with Sr and Cr) showed refined eutectic Si and coarse sludge phases (~60 µm). NS-2 (with Ca) exhibited fully modified eutectic Si, fewer sludge particles, and refined β-AlFeSi needles in 3 mm plates. NS-3, serving as a baseline, contained no microalloying additions. All three alloys achieved yield strengths similar to A380 (150–160 MPa) with improved ductility. These results demonstrate the feasibility of redesigning A380 to better match scrap compositions, offering a cost-effective, more sustainable alternative by eliminating de-mag operations.

UNDERSTANDING THE INDUSTRY THROUGH BENCHMARKING

10:30 - 11:30 am
Session Chair: Beau Glim
Room: S103ABC

An International Benchmarking of HPDC Manufacturers: Perceptions and Capabilities

Carlos Alberto Costa (University of Caxias do Sul); Carlos Sacchelli (Universidade Federal de Santa Catarina)

This work presents a study performed within the international scenario aiming to understand and compare the differential elements that may influence competitiveness among die makers. The work was realized within the Brazilian Mover Program and was demanded by the Brazilian automotive aluminum parts supply chain companies. To develop the work, a research methodology was carried out in two stages. In the first stage, companies were

approached in the form of a qualitative interview, explaining the objectives of the research and how the information collected would be treated. In this stage also, as the interviewee felt comfortable, some more particular information was requested to understand the context of the company in its market. In a second stage, a closed questionnaire (survey) was sent through the Google Forms® tool to each respondent, in which demographic data related to the company's way of working, tools used, employees, types of equipment and taxes paid were requested. The survey was conducted in the year 2024.

A total of 20 companies responded to the survey. Of these, 11 companies stated that they were completely focused on the aluminum tool market: Brazilians (5), Americans (2) and Europeans (4). The data analysis was performed on these 11 companies' answers. The questions asked included the number of tools produced annually, the way and timing of responding to budgets, the use of technologies such as rheological analysis, ways of defining costs, average time of strategic production machines, as well as the profile of the companies' employees. They were also asked about work shifts, most outsourced services and average tax amounts. In relation to this part of the survey, the companies shown similar behavior, which creates some evidences of the minimum company profile in this kind of business.

Regarding the answers captured in the qualitative interviews, it was observed that material costs do not differ significantly in relation to the market, despite there being preferences for materials from certain types of manufacturers within different markets and countries. The lack of qualified professionals is a common problem cited by all companies, showing that actions in this area are of strategic importance. Similar salaries were observed between countries such as Brazil and Portugal and Italy, considering a highly qualified employee. The issue of tool costs in China is a common concern for tool manufacturers, who try to protect themselves by two strategies: being close to their customers and solving problems quickly, i.e. warranty services and after-sales support, and outsourcing part of the mold component to China, shorting the production time and costs. Also, the work shown that when considering die makers that are completely focused on aluminum HPDC tools, the number of companies is low, when comparing to polymers injection molding. Finally, the use of 3D printing to produce parts of the die tool is already a growing reality in these companies, with some of the adopting 3D printing technology as a complementary business unit.

More research is required to analyze additional companies and regions, such as Asia. The survey can also be improved to gather more data and give respondents feedback about their company's performance compared to others.

Energy Benchmarks in the U.S. Die Casting Idustry: A Multi-Plant Survey

Stephen P. Midson (Colorado School of Mines); Rob DeNeff (Performance Metal Casting Group); Beau Glim (North American Die Casting Association)

Energy usage - both gas and electricity - represents a significant portion of the cost of producing die castings, but despite this, there is little information in the open literature on the amount of energy needed to produce each pound of die castings. To address this gap, energy-usage data has been collected and analyzed from fifteen die casting facilities, including monthly electricity and gas consumption along with corresponding metal throughput. Most of the information was collected from aluminum die casters, although zinc and magnesium data has also been included. The study evaluates (1) the average metal output, (2) the total monthly energy usage in BTUs, (3) the gas-to-electricity usage ratio, and (4) the average energy (in BTUs) used per pound of metal produced. This evaluation was extended for a number of the facilities, to characterize melting, casting, and finishing operations, to determine how specific equipment affects energy usage. The results include benchmarks for best-in-class, to help manufacturers compare and optimize their own energy efficiencies.

ALUMINUM ALLOYS FOR STRUCTURAL CASTINGS

9:45 - 11:15 am
Session Chair: Paul Boone
Room: S103D

RidgeAlloy: A High Pressure Die Casting Alloy that Captures the Approaching Wave of Automotive Body Sheet Scrap

Martin Hartlieb (Viami International Inc); Sumit Bahl, Sunyong Kwon, Nicholas Richter, Amit Shyam, Ying Yang, Allen Haynes, Alex Plotkowski (Oak Ridge National Laboratory)

Rheocasting is currently considered as a high potential technology for resolving some of the problems of structural die castings of growing size. Traditionally, most structural die castings were produced in the AlSi10MnMg(Fe) alloy in T7 temper, achieving properties like min. 120 MPa YS, 180MPa UTS and 10% Elongation. With growing size and complexity of structural castings, OEMs are trying to avoid (solution) heat treatment to achieve final mechanical properties, which is why we now see the AlSi7MnMg (in some cases with some Cu) as the predominant alloy for large structural castings, where final targe mechanical properties in the range of 120-160MPa YS, 200-250MPa UTS and 6-12% Elongation are achieved in T5 temper or simply after paint bake cycles. The main issues with going to the lower Si content are (a) the reduced fluidity (and therefore castability), which can make it difficult to reduce wall thickness and cast very large complex shapes, and (b) the very large variation in mechanical properties (especially Elongation) in different regions of a casting. In addition, crash worthiness in AlSi7MnMg in T5/PM is much reduced compared to the AlSi10MnMg in T7. In Rheocasting, the AlSi7(Mn)Mg is ideal to cast into the most complex shapes, and has demonstrated a flow length almost 2 times longer than with liquid AlSi10MnMg alloys. It was possible to demonstrate that the range of properties (especially Elongation) is much more consistent/narrow in Rheocasting even in large structural castings, and crash worthiness is significantly improved. The properties of an alloy depend however on the Fe and Mn content and their tendency to form phases, as well as process parameters. Currently most structural Rheocastings are produced in the standard AlSi7Mg (A356) alloy in T5 or T6, without any Mn addition. Several OEMs, however, would like to cast the currently specified structural die casting alloy AlSi7MnMg also in the Rheocasting process. An Mn addition to the AlSi7Mg also allows working with higher injections speeds during the fast shot (normally not used in traditional Rheocasting of rather thicker-walled components). The paper describes the effect of different Mn and Fe contents - and the phases formed by those elements – on mechanical properties in structural castings.

Nanotechnology-Enabled High-Pressure Die Casting of Aluminum Alloy 7075

Guan-Cheng Chen, Alex Killips, Xiaochun Li (University of California, Los Angeles)

High-pressure die casting (HPDC) has been widely used in the automotive and consumer electronics industries to manufacture complex, thin-walled components, enabling part consolidation and cost reduction. Aluminum alloy 7075 (AA7075), valued for its lightweight nature and superior mechanical properties, is an ideal material for high-performance applications, especially in the aerospace and defense industries. However, the HPDC of AA7075 is hindered by hot cracking and poor fluidity resulting from its long freezing range. These issues limit near-net-shape production of AA7075 parts, instead costly machining is required to produce intricate geometries. To overcome these challenges, this study introduces the nano-treating approach, incorporating a small amount of nanoparticles into the molten metal to eliminate hot cracking and enhance the fluidity of AA7075. With nano-treating, HPDC of complex AA7075 thin-wall components was successfully demonstrated. After T6 heat treatment, the nano-treated samples exhibited a refined, equiaxed grain structure, achieving a tensile strength of about 550 MPa and ductility of about 7%, comparable to wrought AA7075. This study highlights the potential of nano-treating in HPDC, enabling the casting of high-performance materials traditionally considered difficult-to-cast while expanding applications across aerospace, defense, and low-altitude aerospace industries.

An Overview of the Development and Trend of NHT Aluminum Alloys and Mega-Casting

Yuebo Zhang, Yanjun Du, Shuai Cheng (CSMET); Xinyan Yan (Alcoa Technical Center)

Non-heat-treatment (NHT) alloys, as a new generation of high-performance aluminum alloys, demonstrate significant application value in automotive lightweighting due to their excellent liquidity, high strength, superior toughness, and enhanced production efficiency. This paper reviews the technological evolution of NHT alloys and their applications in mega-casting components for integrated structures.

In the 1990s, researchers began exploring aluminum alloy development through compositional design and process optimization to achieve high strength-toughness without traditional heat treatment. Early studies focused on microstructure regulation of Al-Si alloys but faced limitations in formability and cost, hindering large-scale adoption. After 2015, driven by the rise of the new energy vehicle (NEV) industry, Chinese enterprises such as CSMET addressed demands for critical components like battery trays and motor housings. By incorporating Mn, Mg, and grain refinement technologies, they successfully developed high-strength NHT alloys that can be directly used after die-casting, significantly reducing energy consumption and carbon emissions. Since 2019, CSMET has collaborated with domestic and international automakers to promote mass production of NHT alloys in key NEV structural components. Jointly developed compositional systems (e.g., Al-Si-Mn-Mg series) and vacuum die-casting processes with Alcoa resolved issues such as post-casting riveting cracks and high heat-treatment costs, establishing industry benchmarks.

From technical advancements, multi-element synergistic effects optimize precipitate distribution, achieving yield strength ≥120 MPa and elongation ≥10% without heat treatment.High-vacuum die-casting and mold temperature control technologies ensure precision and internal quality for complex structural parts. Applications in safety-critical components—including front cabins, rear floor panels, shock absorber towers, longitudinal beams, battery enclosures, and subframes-enable 15%-20% vehicle weight reduction and extended driving range.

Based on the application of C611 NHT alloy in mega-casting applications by Chinese NEV manufacturers such as NIO, Seres, and Chery. In the future, with the deepening of carbon neutrality goals, NHT alloys are poised to evolve towards higher strength, toughness, and recyclability.

DISCUSSION PANEL ON BIG (GIGA/MEGA) CASTINGS

2:30 - 4:30 pm
Session Chair: Rob DeNeff
Room: S103ABC

An exciting discussion panel exploring what the rise of big (giga / mega) die castings means for the future of the high pressure die casting industry. As automotive manufacturers, die casters, and suppliers navigate the expanding capabilities of giga / mega castings they are confronted with not only the opportunities, but also the hallenges of making ever larger die castings. Our panel of industry leaders will dive into the implications for tooling, machine capacity, alloy performance, quality control, and supply chain logistics.

Thursday, October 9

COMPUTER SIMULATION FOR IMPROVED CASTING PROCESS

8:00 - 9:30 am
Session Chair: Rob DeNeff
Room: S103ABC

Porosity Analysis in HPDC Magnesium Castings: Correlating CFD Simulations with CT Scans

Elizabeth J. Monte, Mehdi Farrokhnejad (Meridian Lightweight Technologies)

Porosity is a primary defect in high-pressure die casting (HPDC) parts. Computational fluid dynamics (CFD) simulations of the HPDC process offer the potential to predict and mitigate porosity through casting or tool design before production. However, simulation analysis thresholds must be correlated with production results. This study compares computed tomography (CT) scan results of porosity in thick-walled magnesium castings with CFD simulations. A shrinkage porosity-related simulation result correlates well with the locations of porosity, and a threshold is identified to differentiate locations based on the amount of porosity. A gas porosity-related simulation result also correlates with some locations and the extent of porosity. Finally, the fill pattern from the CFD simulation corresponds to visual defects observed on the castings.

Modeling of Aluminum Alloy Fluidity in High Pressure Die Casting

Xin He, Xiaoming Wang, Wei Vian (Purdue University); Corey Vian (Stellantis)

In high-pressure die casting (HPDC), the fluidity of aluminum alloys influences casting quality and die lifespan, which poses greater demands on alloy composition optimization and complex HPDC die system. This study employs multiphase computational fluid dynamics (CFD) simulation to investigate fluidity behavior by integrating alloy properties (viscosity, thermal conductivity, solidification range), process parameters (pouring temperature, injection velocity), and die parameters (geometry, preheating temperature) effects. Key findings reveal that a narrow solidification range and lower thermal conductivity prolong the molten state duration, which promotes the fluidity of the aluminum alloy. In contrast, higher magnesium, lower silicon and manganese levels, along with a wider solidification range, can impede fluidity by increasing viscosity and altering solidification dynamics. The simulations track melt-front movement and melt velocity, perform pore formation analysis via molten pool instability criteria, and use thermal-fluid coupling to predict defect

formation (cold shuts, porosity). This work provides a framework for alloy composition and die design optimization to mitigate defects in HPDC, addressing defects such as incomplete filling and porosity. This will improve the performance of aluminum products.

Getting the Full Benefit of Rheocasting with Optimized Engineering and Simulation

Martin Hartlieb (Viami International Inc.); Andreas Harborth (Project Engineering GmbH)

Rheocasting (applying the Rheometal/Comptech process) is gaining rapidly increasing interest for more and more applications and a growing number of OEMs and casters in different industries are adopting it. Starting from telecom/electronics applications (benefitting from increased conductivity), to industrial and a wide variety of vehicle applications (using the inherent advantages of the process for e.g. (large) structural, leak tight, and weldable parts), Rheocasting can solve many of the typical die casting problems and replace parts made in other process technologies or assemblies with reduced wall thickness (weight) and improved properties. To achieve these inherent advantages of Rheocasting, optimized engineering including simulations are needed or the project goals will not be reached. Initially simulations for semi-solid forming was done with plastic injection simulation software packages as the typical HPDC programs did not offer the capability to correctly simulate the semi-solid (non-Newtonian) fluid flow of metal in the die. At Project Engineering, the commercially available Flow3D software has been adapted to realistically simulate the Rheocasting process. Process engineering also requires a new and different set of skills and experience, and for experienced HPDC experts a very open mind, as many things are rather counter-intuitive. Bringing the right experience from other projects can therefore significantly shorten the learning curve and save a lot of time and money.

INNOVATIONS IN METAL INJECTION

9:45 - 11:15 am
Session Chair: Peter Ried
Room: S103ABC

Gating Design and Simulation of a 4140 Steel Rifle Lever for High-Pressure Die Casting

Danny Portillo, Sadie Beck (University of Alabama); Eric Kessenich (Mercury Marine)

This paper focuses on the design and evaluation of the gating system for a functional 4140 steel component to be manufactured through the high-pressure die casting (HPDC) process. Due to the absence of established practices for steel HPDC, current design rules for low melting point alloy HPDC were used as a starting point. These rules were adapted for steel by incorporating the relevant physical properties of the iron alloy. Key process parameters, gate velocity, filling time, and gate area were calculated using NADCA's standard procedures. The flow behavior at the gate was evaluated using an existing model derived from Ohnesorge's work. A value of the atomization constant, J, was determined for steel, allowing the estimation of a suitable gate velocity range. Simulations were performed using the calculated parameters to assess shrinkage porosity and air entrapment. Gate, runner, and vent geometries were developed and integrated into a casting model of a rifle lever. Building on prior simulations of Belov's experimental geometries presented at the NADCA 2024 Congress, a second gating design iteration—using thicker gates and lower velocities—was developed. The simulation results were compared against those from the aluminum-rule-based design. The final geometry will be used to produce physical castings, serving as the basis for future validation and follow-up studies.

Sialon Ceramics Sleeve for Die Casting

Takumi Ohata, Ryo Naganuma, Fumishige Tanigawa (Proterial, Ltd)

Sialon ceramic shot sleeves have proven to be very effective for improving the quality of die-cast products. Sialon's resistance to molten aluminum and greater insulating properties when compared to steel results in superior heat retention, excellent corrosion & wear resistance, and greatly reduced wash out of the shot sleeve.

An introduction to Sialon shot sleeves will be provided detailing their benefits for the production of large (mega & giga) die cast products.

Impact of Plunger Tip Material and Geometry on Temperature and Dimensional Stability

Paul Robbins, Shah Imani (Castool Tooling Systems)

This paper investigates the development of water-cooled plunger tips, focusing on various design enhancements and material options to improve their efficiency. The study particularly examines temperature distribution and the deformation or expansion of plunger tips. The effectiveness of these enhancements is assessed through computer simulations that analyze water flow, cooling rates, and biscuit formation. Computational Fluid Dynamics (CFD) is utilized to evaluate the cooling capabilities of the plunger tips, while thermomechanical simulations predict stress levels and potential deformation or expansion, offering insights into thermal stability and durability. Additionally, the research addresses plunger tip lubrication, emphasizing the importance of selecting appropriate lubricants, and explores how the design of gun-drilled cooling channels influences shot sleeve performance.

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20+ Questions with NADCA's 30+ Years Club Spotlight on: Cascade Die Casting Group, Inc.

Location: Headquarters is located in Grand Rapids, Michigan, with die casting plants in Grand Rapids; High Point, North Carolina; Sparta, Michigan

Year established: 1978 – nearly 50 years ago

Number of employees: 400

Alloys: Aluminum - 380, 360, 413. Zinc Z3, ZA8

Die Casting Machines: 35

Products/services: Complex custom aluminum and zinc die castings, CNC machining, assembly, vibratory debur, shot blasting and finishing

Markets Served: automotive, appliance, consumer electronics, medical, power storage, heavy truck and off-road sport industries

Company website: www.cascade-cdc.com

LinkedIn: www.linkedin.com/company/cascade-die-casting-group-inc

Facebook: www.facebook.com/CDCG7441

Year your company became a NADCA member?

1989

Was it a member of American Die Casting Institute (ADCI) or Society of Die Casting Engineers (SDCE)?

Both

Why are you a member of NADCA? What value does it bring to your organization?

Through participation on committees such as Research & Development, Cascade stays informed about the latest technical advancements and process innovations shaping the future of die casting. NADCA also plays a critical role for Cascade in government affairs, advocating on behalf of the industry and providing timely updates on legislation and regulatory developments in Washington, D.C., that may impact operations. Cascade benefits from access to a broad network of peers across the industry, creating opportunities to benchmark progress, share best practices, and collaborate on common challenges. In addition, NADCA's conferences and events offer outstanding opportunities for us in continued education, business insight, and meaningful networking that help drive long-term success.

What other (if any) associations is your company a member of?

Right Place of West Michigan, Grand Rapids Chamber of Commerce, Manufacturers Council of West Michigan, The Employers Association, National Association for Business Resources.

Recipient of "The Best and Brightest Companies to Work For" –

- West Michigan Region - 2022, 2023 and 2024 and 2025
- Charlotte, North Carolina Region - 2023 and 2024 and 2025
- National - 2023 and 2024 and 2025

Pat Greene, CEO

How long have you been involved in the die casting industry?

Since 1992

What is your favorite part your company has ever cast, and why?

We produced a removable Ford F150 pickup tie down cleat using zinc Zamak 3. After production started Ford determined that the tie down cleat needed to be locked with a lock and key into the pickup truck bed as it could also be removed from the pickup and used in a street fight as a brass knuckle.

What is the most niche market part your company has ever developed?

Aluminum (and zinc) mirror bases with difficult features, thin walls, tight tolerances and high volume requiring multiple robots in the die cast cell.

What market(s) have served your company the most consistently over the years?

Automotive and Appliances. Automotive is our fastest growing market, and we have served that market since the company started nearly 50 years ago. Through the years we have helped customers convert automotive parts from zinc to aluminum for light weighting. In appliances, zinc plays a key role as it is better for decorative finishes and plating, as well as castability.

What was the most challenging part your company has ever had to produce and how did you navigate the challenge?

Convertible top header bow. We needed to engineer the impact of aluminum shrinkage to get a part that consistently meets customer specifications and closely monitor quench tank temperature to meet straightness characteristics. The part has Class A surface finish requirements, tight porosity specifications, textured powder coat paint and is over 45 inches long.

Another challenging part was converting engine supports from a squeeze casting produced off-shore to a high pressure die casting. In this project we performed over 120 MagmaSoft simulations to eliminate porosity and improve efficiency.

Are you or other employees at your company involved in NADCA committees? If so, which ones, and why have you invested time in that?

- Government Affairs committee – allows us to understand what is going on in Washington, DC and how it impacts our industry. We participate in the annual "Fly In" where we meet with our congressmen and promote die casting and manufacturing.
- R&D committee – We stay current on technical developments in the industry and are able to help drive technical improvements through our input.
- Die Materials committee – Tooling is key to our success, and the materials and coatings used in tooling has seen significant advancement through the last several years. We are able to participate in discussions impacting this important area of our business.
- Finance committee – Our involvement allows us to participate in determining how we invest in the future of die casting for the benefit of all NADCA members.
- Board of Governors – allows us to understand and influence the direction of the industry, while working beside our peers to improve the future of die casting.

Have you or individuals at your company ever used NADCA education? What types if so?

We host the NADCA Chapter 3 education classes at our Great Lakes facility in Sparta, Michigan throughout the year and send participants to attend these classes.

Has your company been involved with any NADCA R&D projects, or implemented any research results?

Yes, several. Jeremy DeHoff, our Corporate Tooling Manager, is currently working on projects involving Failure Analysis of Additive Manufacturing Inserts as well as the Surface Engineering Task Force.

What NADCA product/service has provided the highest value for your company?

Benchmarking and plant assessments – these have allowed us to measure ourselves against our peers. We use this feedback to drive continuous improvements for areas needing advancement and recognize our people for those areas where we excel.

What changes or advancements in the industry have you been the most surprised by?

The aggressive pursuit of U.S. customer business by the Chinese since Covid has intensified competitive pressures on U.S. die casters. While tariffs offer short-term relief, the long-term solution lies in pro-manufacturing government policies that create a fair, level playing field for U.S. manufacturers. Die casting is a high-tech, engineering-driven industry. With our skilled trades, engineering innovation, and commitment to quality, we believe the U.S. manufacturing sector has a bright future — one that offers fulfilling and sustainable careers for American workers.

What does the future look like in your markets?

Die castings will continue to get more difficult, requiring us to continuously improve every day. Automotive use of aluminum castings is expected to grow, specifically in the machine tonnages we serve. We are pursuing new markets for aluminum castings to utilize our technical expertise. Zinc has great advantages when the many benefits of zinc offset the higher weight characteristics.

How have you been worldly competitive?

We stay competitive on a global scale through a combination of advanced technology, innovative engineering, and an exceptional team. First, we've invested heavily in **automation**—every one of our die cast cells and many of our machining cells are equipped with multiple robots to ensure consistent quality and efficiency. Second, our **engineering team leverages cutting-edge tools**, including flow simulation and precision multi cavity tool design, to optimize productivity and reduce cycle times. Most importantly, we have an **outstanding team of employees** who live our Cascade values every day. They're hardworking, accountable, passionate, safety-focused, and true team players. With their involvement we have developed a strong **culture** that is key to our success. It's this combination of technology, innovation, people and culture that drives our global competitiveness.

NADCA Welcomes Its Newest Corporate Members

Craft Die Casting

1831 N. Lorel Avenue
Chicago, IL 60639
P: 312.415.6060
E: contact@cdiecasting.com
W: www.cdiecasting.com

As a leading provider of casting, molding, and machining services with over 70 years of industry experience, Craft Die Casting prides itself on delivering high-quality products and exceptional customer service. Their skilled technicians and engineers are committed to excellence, specializing in both small and large-scale projects. Equipped with state-of-the-art facilities, they are ready to tackle even the most complex manufacturing challenges, ensuring your needs are met with precision and efficiency. Celebrating 70 years in business is a milestone that reflects a commitment to quality, innovation, and service. Over the decades, the company has grown, adapted, and thrived, thanks to the support of their customers and the dedication of their team. Craft Die Casting is proud of its legacy and continues to produce 100% Made in USA products, supporting American manufacturing and innovation.

General Die & Engineering Inc., an ArtiFlex Family Company

6500 Clay Ave SW
Grand Rapids, MI 49548-7832
P: 616.698.6961
E: ckukulis@gendie.com
W: www.gendie.com

General Die & Engineering specializes in large-scale, Class A dies, complex die cast dies, straightening dies, and trim dies, with over 50 years of experience supporting automotive and industrial customers. Powered by The ArtiFlex Edge—with a commitment to innovation, collaboration, and execution— General Die & Engineering delivers fully integrated, customer-focused manufacturing solutions from concept through launch. ArtiFlex Manufacturing is a fully integrated Tier 1 Automotive Supplier that possesses the knowledge and capabilities needed for a "start-to-finish" approach to automotive manufacturing. It is these capabilities that gives ArtiFlex its edge in the industry and provide value for customers.

Hyundai WIA Mexico

Carretera Pesquería-Los Ramones
Kms 13 al 15, Interior 18, C.P. 66679
Pesquería, Nuevo León, México.
W: https://en.hyundai-wia.com/main/main.asp

Hyundai WIA is one of South Korea's leading industrial companies, recognized globally for its cutting edge technology and manufacturing excellence. Established in 1976, Hyundai WIA has earned a strong reputation in the automotive industry through its wide product portfolio, advanced engineering, and uncompromising quality standards.

The company began operations in Pesquería, Nuevo León, Mexico, in 2016. At its main plant, the company manufactures engines and constant velocity joints (CVJs) for key automotive partners. The second facility known as the Die Casting Plant, produces case transmission components such as the block engine.

The name WIA stands for World-best, Innovative, Advanced manufacturer, reflecting our commitment to being a global leader in manufacturing and innovation.

SIR Robotics

8351 Luzon Ave
Sacramento, CA 95828
P: 682.269.1459
E: sir.nam@sir-robotics.com
W: www.sir-robotics.com

SIR Robotics is a global leader in advanced robotic automation solutions, with over 3,900 systems installed worldwide since its founding in Italy in 1984. Specializing in highly customized systems for automotive, aerospace, plastics, composites, and foundry applications, SIR designs and delivers turnkey robotic cells for operations such as cutting, grinding, plasma trimming, welding, handling, and complex assembly.

With U.S. operations based in California and regional support centers across North America, SIR Robotics, Inc. ensures local project management, engineering, and after-sales service. Leveraging a global network and partnerships with leading robot brands, SIR's solutions integrate 2D/3D vision, AI, and offline programming to meet demanding cycle times and precision requirements. SIR is focused on delivering innovation-driven productivity across the factory floor— from giga casting to EV powertrain components and beyond.

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Committed to quality and innovation, Oilgear helps its customers in the die casting sector achieve greater productivity, efficiency, and safety. Learn more at www.oilgear.com.

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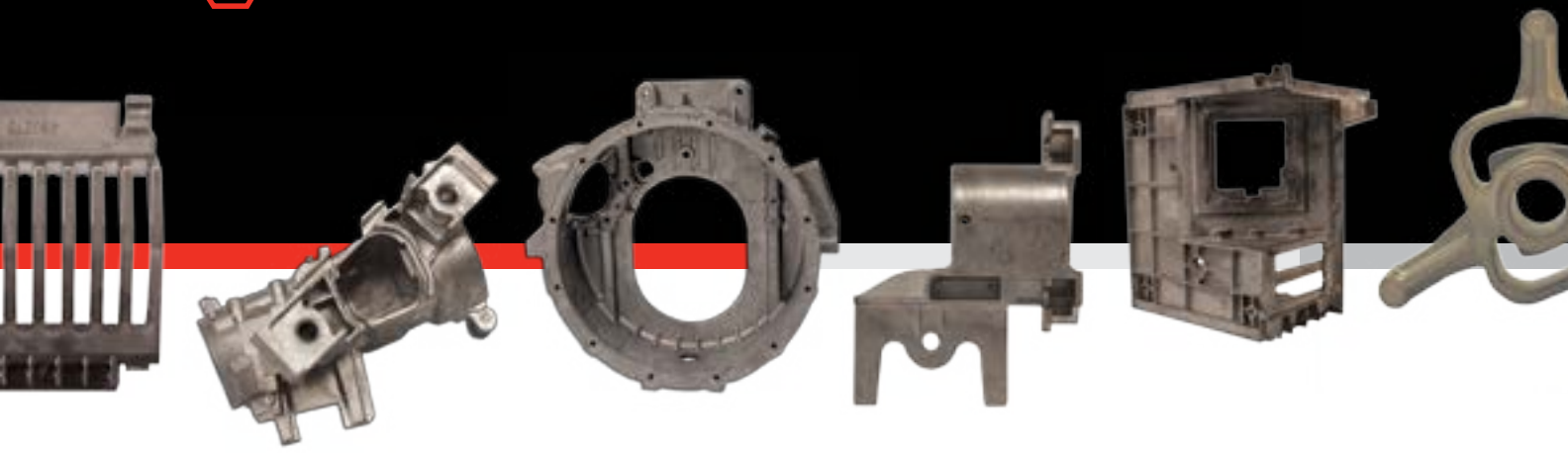

NORTH AMERICAN DIE CASTING ASSOCIATION

Corporate Membership

The North American Die Casting Association (NADCA) is the sole trade and professional society of the die casting industry. Membership consists of both corporate and individual members from over 1000 companies located in every geographic region of the United States, Canada and Mexico.

Why do so many companies invest in NADCA Corporate Membership?

- To Stay Current on News/Technology
- Training/Education
- Networking Opportunities
- Retain Competitive Edge
- Visibility to OEMs
- Inclusion in R&D Projects
- Access Member-only Information
- Recognition
- Source Staff
- Save Money on Conferences/ Shows/Advertising/Training

NADCA
North American Die Casting Association
P: 847.279.0001 F: 847.279.0002
www.diecasting.org

NADCA

NORTH AMERICAN DIE CASTING ASSOCIATION

CORPORATE DIE CASTER MEMBERSHIP APPLICATION

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CITY STATE OR PROVINCE ZIP OR POSTAL CODE & COUNTRY

COMPANY'S BUSINESS PHONE (WITH AREA OR COUNTRY CODE) COMPANY'S BUSINESS FAX (WITH AREA OR COUNTRY CODE)

COMPANY WEBSITE COMPANY'S EMAIL ADDRESS

CORPORATE DIE CASTER DUES CALCULATION

Base Membership:			$1,200
Machines 65 tons or less:	_____ x $50	=	+
Machines 66 tons -399 tons:	_____ x $100	=	+
Machines 400 tons or more:	_____ x $200	=	+
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Cardholder's Signature (required)

Please complete and return this application, along with your remittance to:

North American Die Casting Association
3250 N. Arlington Heights Rd., Ste. 101
Arlington Heights, IL 60004

P: 847.279.0001
F: 847.279.0002
E: corporate@diecasting.org
W: www.diecasting.org

NOTE: *NADCA dues are not deductible as charitable contributions for federal income tax purposes, but may be deductible as a business expense.*

**Credit Card Convenience Fee = 3% of invoice amount*

Chapter News & New Members

Chapter 3 - Michigan

Chapter 3 holds October Education Class at Cascade Die Casting – Sparta Plant

Chapter 3's theme for 2025 is DRIVING CHANGE and we were able to continue the tradition of "Free" Education classes for members. One thing for sure is we know that change is inevitable and Casting Defects continue to change. On April 17, Paul Brancleon of NADCA taught the "EC-515 Die Casting Defects" class to 17 Chapter 3 members at Cascade Die Cast's state of the art training facility in Sparta, Michigan.

The Class provided the skills and techniques to those individuals charged with the responsibility for handling castings & identifying casting defects. It also included some clarity in correcting these defects. It was organized into four categories; process factors that control many defects - especially those concerning surface finish - cold flow and non-fills, metallurgy issues associated with defects, identifying defects and diagnosing root causes and corrective actions, troubleshooting the type of defect in order to swiftly take the appropriate action.

The students reported that the instruction was very detailed and that they can immediately start using the training that was presented. Paul reported that this group of students posed a lot of questions and inquired about other classes. Keeping with the Chapter 3 tradition there will be one more class scheduled in 2025.

***Chapter 3** – Paul discusses the details of Die Casting Defects.*

Chapter 3 would like to thank Cascade Die Casting for offering their world class training facility, it is with the help of companies like Cascade Die Cast that make it possible for the chapter to offer these classes. Funding for these classes is generated by our annual golf outing and the annual chapter directory.

***Chapter 3** – Paul's happy students!*

Chapter 3 will continue to offer free education classes for members. Mark your calendars for our classes in the Fall and for next year, they will be in March and October and the Chapter 3 golf outing is scheduled for August 15th at the beautiful Saskatoon Golf Club in Alto, Michigan. Refer to the chapter's web site www.nadcachapter3.org for other chapter information.

Western Michigan University - Metal Casting Short Course for High School Students - June 23 to 27, 2025

For one week during each of the last over twenty-five summers, Dr. Sam Ramrattan, has been offering hands-on metal casting workshops for tenth-through-twelfth-grade high school students at WMU in Kalamazoo, Michigan. During the five-day visit, Dr. Sam, Professor in the Department of Engineering Design and Manufacturing, College of Engineering and Applied Sciences at Western Michigan University and a Key Professor for the Foundry Educational Foundation., directs activities in the College of Engineering, Metal Casting Laboratory.

***Chapter 3** – Dr. Sam oversees students as they pour molten metal into a mold.*

As in previous years Chapter 3 supported the WMU program by sponsoring 4 students. The students were ex-

posed to many topics. The workshop topics included; metal casting history and trends, and the relationship of casting (gravity, investment, low / high pressure die) processes, manufacturing engineering (molding, melting, filling, and finishing) and quality of castings. They explore the use of computers, math and science in the metal casting industry. In addition to their lab and course work, the students met with WMU administrators to discuss university entrance requirements and expectations and met with professionals from the metal casting industry to review career opportunities in metal casting.

***Chapter 3** – Students: Taylor Williams, Jaden Eaton, and Amateo Deeb, all from Ferndale High School were joined by Chapter 3 representatives Bob "Dr. DieCast" McClintic, Mike Martin (Hauzer USA), Steve Quirk (Cascade Die Casting Group, Inc.). Pictured with the students and Chapter 3 representatives, are Mike Meyer, NADCA President, and Paxton Banks, WMU Student Chaperone.*

***Chapter 3** – Students during the "Meet with Foundry Industry Professionals" night.*

The purpose of the "Meet with Foundry Industry Professionals" night, is to expose students to real world experiences. Industry professionals gathered at the event to answer questions about our industry and share their experiences in the industry.

***Chapter 3** – Dr. Sam having a conversation with NADCA President Mike Meyer.*

The "Meet with Foundry Industry Professionals" night, was MCed by Dr. Sam. WMU has had a casting metal program in various engineering curricula since the college opened over 113 years ago. Today casting students at WMU can gain hands-on experiences in gravity, high pressure and solidification simulation of metal casting processes. Field trips to metal casting industries provide students with opportunities to see real-world technology and to meet with professionals.

***Chapter 3** – Steve Quirk shares his vast experiences in the die cast industry with many of the worthy students.*

Students are selected on the basis of an aptitude for math and science and there is no cost to the students who stay in WMU dormitories and enjoy campus life. The student/industry session included a pizza dinner and gave the students the opportunity to seek advice from the professionals in attendance. Chapter 3 would like to thank Mr. Mike Meyer, President of NADCA for his attendance and his support of all student activities. We know that education is the key to the future of our industry and support of activities like this one goes a long way in providing students with the tools they need to make sound career choices.

NADCA Chapter 3 Scholarships Awarded

NADCA Chapter 3 is proud to announce the awarding of $15,000 in scholarships to six outstanding students for the 2024/2025 academic year. These scholarships reflect our continued commitment to fostering the next generation of talent in the high pressure die casting industry.

Over the last 3 years, we've had the opportunity to award 21 scholarships, totaling approximately $45,000 in financial assistance. While many recipients have pursued engineering degrees, our support is not limited to that field - we're proud to assist students from a variety of disciplines who are interested in contributing to the future of die casting.

This continued support would not be possible without the generosity of our sponsors and the success of our key fundraising efforts, including the Chapter Directory and annual Golf Outing. We extend our sincere thanks to all who help make these programs possible.

In addition to the scholarships, we are continuing our support of the NADCA Chapter 3 Endowment at Western Michigan University, which is focused on assisting students with a demonstrated interest in high pressure die casting. We are also pleased to sponsor four high school students from our chapter to attend the WMU Die Casting Short Course - an initiative that introduces younger students to opportunities within our field.

Together, these efforts reflect NADCA Chapter 3's ongoing dedication to education, innovation, and the future of high pressure die casting.

***Chapter 3** – Some of our happy recipients: Demitrios Cortez – Western Michigan University, Haley Hamstra – Davenport University, Sam Riggs – Grand Valley State University.*

Stay tuned to future Die Cast Engineer publications for more updates.

New Members: *Brandon Combs, Henkel Corporation; Matt Gray, Honda Development Manufacturing of America ; Mark Lucchese, Centracore LLC; Robert Mackay, NEMAK USA; Matthew A. Prabhu, University of Michigan - Ann Arbor; David Spiegel, Huron Valley Steel Corporation*

Chapter 5 - Chicago

Please visit www.diecasting.org and click on Chapters under the Become a Member tab for details on upcoming events.

New Members: *Betsi Burns, Slide Products; Mario De Jesus Garcia Pineda, University of Northern Iowa; Cody Groesser, Ashley Powell, both with RCM Industries Inc. - Corporate Headquarters; Silvia Lopez, Larry Rushing, Jr., both with RCM Industries Inc. - Aallied Die Casting Company of Illinois; Trey Vogel, DeCardy Diecasting Company*

Chapter 6 - Cleveland

NADCA Chapter 6 held its annual Golf outing on June 19th at Coppertop Golf Course in Valley City, OH. We had a wonderful turnout and the weather cooperated to make for an enjoyable day in the fairways. After a 18 hole four man scramble on the course, we all gathered for dinner and the presentation of awards for the individual hole challenges.

***Chapter 6** – Tim Lidderdale (left) and Derek Lidderdale (right) of Omni Die Casting, Inc.*

NADCA Chapter 6 would like to extend its deepest appreciation to General Die Casters, Inc for, once again, being our Beverage Sponsor and also to Todd Jackovitz for organizing this event for our chapter and its associates to enjoy.

As we close out the Summer months, Chapter 6 and its members are looking forward to Fall and a new year of challenges and successes. We wish all in our shared industry the best of luck and look forward to seeing everyone soon.

New Members: *Marc Baumann, Fremar Industries*

Chapter 7 - New York

Please visit www.diecasting.org and click on Chapters under the Become a Member tab for details on upcoming events.

New Members: *Nicholas Forger; Shrey Patel; Ethan G. Thatcher, TCI Supply*

Chapter 10 - Ontario

Please visit www.diecasting.org and click on Chapters under the Become a Member tab for details on upcoming events.

New Members: *Ricardo B. Bowen, FCA Canada Inc. - Etobicoke Casting Plant; Jiping Qian, Ruige Hot Runner Canada Inc.*

Chapter 12 - Wisconsin

Please visit www.diecasting.org and click on Chapters under the Become a Member tab for details on upcoming events.

New Members: *Guillermo Arellano, Madison-Kipp Corp.; Tom Braun, DMS; Brandon Goke, Cory Jansa, Zach Jensen, all with STRATTEC Component Solutions; James Haarsma, Shakespeare Machine Stamping of Wisconsin, Inc.; Aiden M. Hendrikse; Robert Kaderabek, Tim Kaderabek, both with Die-Pro LLC; Rod Taylor, Madison-Kipp Corp.*

Chapter 14 - S. Ohio

Please visit www.diecasting.org and click on Chapters under the Become a Member tab for details on upcoming events.

New Members: *Jim F. Doughman, Matt G. Parish, Chris Speakman, all with Ahresty Wilmington Corporation*

Chapter 15 - Southeastern

Please visit www.diecasting.org and click on Chapters under the Become a Member tab for details on upcoming events.

New Members: *Thomas Lawson, Nissan Powertrain Decherd; Conor McLaughlin, Theissen Training*

Chapter 16 - Minnesota

Minnesota Chapter 16 attended the Saint Paul Saints minor league baseball game in June. Those in attendance represented the following companies: ABC LLC, Arrow Finishing Inc., EGA Spectro Alloys, Frech USA, and Twin City Die Castings.

Chapter 16 *– Enjoying the Saint Paul Saints minor league baseball game.*

It was a great night for a game, and the Saints won 6-1 vs. the Louisville Bats. Andrea Mudrey (Twin City Die Castings), Mindi Pagel (EGA Spectro Alloys), Mindi's son Cooper, and Autumn Vargas (Twin City Die Castings) were invited to participate in an on-field experience during the game, which made the night even more exciting!

In July, Chapter 16 brought NADCA's two-day Process Control and Monitoring training course to Minnesota. Paul Brancaleon presented the material for the group, which included individuals from Kurt Manufacturing, RCM Industries, and Twin City Die Castings. In addition to learning about the importance of process control in die casting, it was a fantastic opportunity to exchange insights, and explore best practices.

Chapter 16 *– Paul Branceleon teaches his course.*

Chapter 16 held its Annual Golf Outing in August. Thank you to all who attended the fun event, and a special thank you to our event sponsors who included Allied Metal Co., Arrow Finishing, BuhlerPrince, MORESCO USA (Cross Technologies NA), EGA Spectro Alloys, Frech USA, Integrated Technology, Metal Mechanics, Mo-Tech Corporation, Quaker Houghton, Swiss Steel USA Inc., and Twin City Die Castings.

New Members: *Arron Merchlewitz, Technical Die-Casting Inc.*

Chapter 17 - St. Louis

Chapter 17 will kick off the 2025-2026 calendar with the Alan Loeffelman Memorial Golf Outing on Friday, September 12 at Birch Creek Golf Club in Union, MO. On October 14/15, NADCA National's Paul Brancaleon will present Education Seminar EC-506: Engineering Die Cast Dies. There will be a general membership meeting featuring Swiss Steel the evening of Oct 14. All activities on October 14/15 will take place in Washington, MO. Please check our Chapter website for further details and sign-up information at www.nadcachapter17.org.

The Board is excited by what awaits in the Fall so please plan to join us.

New Members: *Olivia Kovar, Gates*

Chapter 25 - Indiana

Please visit www.diecasting.org and click on Chapters under the Become a Member tab for details on upcoming events.

New Members: *Enrique Elias Troy, Nemak Kentucky; Andrea Hill, Kamtek Casting, Inc. - a Division of Magna International; Gloria Reimer, Aludyne - Pierceton Plant*

Chapter 30 - Los Angeles

Please visit www.diecasting.org and click on Chapters under the Become a Member tab for details on upcoming events.

New Members: *David Esparza, Centracore De Mexico; Brad Hicks, Dynacast International, LLC - Lake Forest Plant*

International Members: *Sergio Schmidt, Industrias Fymsa Sa De Cv*

Industry News

DART CASTING & GENERAL DIE CASTERS FORM THE GD CASTING GROUP

Alsip, IL - Dart Casting in Alsip, IL and General Die Casters in Twinsburg, OH will begin operating as the GD Casting Group. (GDC) "Since our merger in 2023, Dart and GDC have operated as two separate companies, but we've integrated core functions and shared best practices. We have grown into one family and the time feels right to begin operating under one umbrella. The change streamlines our new business development process by centralizing quoting through the GD Casting Group. We'll decide which plant is the best fit for each request and provide the most competitive quote to the customer," Brian Lennon GD Casting Group CEO.

Matt Proske has joined the GD Casting Group as Chief Operating Officer. "I have known Matt for nearly 25 years", says Lennon "We first met at the NADCA Plant Managers Conference in Nashville in 2003. We connected over our passion for process engineering and our alma mater, Kent State University. Matt has an impressive resume and tremendous experience in both engineering and business. He shares our philosophy of pursuing engineering excellence with an engaged and hands on management style."

Matt started his career at Magmasoft teaching users (including GDC) to optimize their simulations as well as their casting processes. He was promoted to Vice President of Sigma Engineering, Magmasoft's newly formed plastic simulation branch. After years in Chicago, he moved home to Northeast Ohio to start a family and worked as Visi-Trak's Executive Vice President. He led General Aluminum's Engineering group as the Corporate Director for the last five years.

George Nijmeh, Vice President of Operations at Dart Casting will take on a dual role in our organization. George is our new VP of Marketing for GD Casting Group. George has shown his talent and creativity in developing a strong social media presence for Dart Casting as well as performing website development, providing sales presentations and even developing the new GD Casting Group name and logo. George's creativity combined with his casting experience and outgoing personality make him a perfect fit for this important role.

"I am fortunate to be leading such a talented team, and I am excited to see what we can accomplish together," Brian Lennon.

Learn more at https://www.gdcasting.com/.

STELLANTIS CELEBRATES 60 YEARS OF EXCELLENCE AT KOKOMO CASTING PLANT

Kokomo, IN -Stellantis' Kokomo Casting Plant (KCP) marks a major milestone – 60 years of manufacturing excellence, innovation and community partnership. To celebrate the occasion, the plant welcomed nearly 2,300 employees, retirees and their families to a Family Day event, including Kokomo Mayor Tyler Moore.

As part of the festivities, the plant – recognized as the largest diecast facility in the world – opened for guided tours, including table displays showcasing a variety of casted parts to offer families and visitors a behind-the-scenes look at the innovations that make the plant so unique. In addition, guests enjoyed interactive games, music, a photo booth and the opportunity to leave their mark on a 60th anniversary signature plaque.

"Today is about honoring and celebrating the people of KCP," said Jeremy Agnew, vice president and Kokomo Casting Plant manager. "Their skill, dedication and pride have made this plant a benchmark for excellence for 60 years. This workforce has played an important role in advancing our manufacturing capabilities and supporting Stellantis' continued success in a fast-changing industry."

Since opening its doors in 1965, KCP has served as a pillar of Stellantis' North America manufacturing operations. Over the past six decades, the plant has produced millions of aluminum castings that serve as key structural components in engines, transmissions and driveline systems for a wide range of Stellantis vehicles.

At the hands of more than 900 highly skilled UAW-represented employees, the plant currently manufactures 46 different aluminum castings and is the only die cast facility within Stellantis' global footprint that produces parts for both engine and transmission operations. From traditional combustion powertrains to future-ready electrified components, KCP continues to evolve to meet consumers' changing needs.

Mayor Moore recognized the plant's long-standing role in supporting the city and strengthening the ties between Stellantis and the Kokomo community.

"On behalf of a grateful city, I join those in our community to recognize and commend the Stellantis Kokomo Casting Plant on the occasion of its 60th anniversary, and extend the city's heartfelt gratitude for their continued investment in Kokomo's prosperity, innovation and identity," said Mayor Moore.

As KCP celebrates six decades of achievements, its legacy of precision, innovation and skilled craftsmanship remains a source of pride for Stellantis and the Kokomo community. The plant's continued success is a testament to the people who power it – past, present and future.

GENERAL DIE & ENGINEERING AND FALCON LAKESIDE MANUFACTURING JOIN ARTIFLEX

Grand Rapids, MI - ArtiFlex, is proud to welcome General Die & Engineering and Falcon Lakeside Manufacturing as fully integrated ArtiFlex Family Companies—together offering a complete, seamless solution for our customers across the manufacturing lifecycle.

General Die & Engineering specializes in large-scale, Class A dies, complex die cast dies,straightening dies, and trim dies, with over 50 years of experience supporting automotive and industrial customers.

Falcon Lakeside Manufacturing brings advanced high-pressure vacuum and squeeze casting, along with precision machining, finishing, and simulation capabilities.

Powered by The ArtiFlex Edge—our commitment to innovation, collaboration, and execution—we deliver fully integrated, customer-focused manufacturing solutions from concept through launch.

BÜHLER MOURNS THE PASSING OF URS BÜHLER

Uzwil, Switzerland - Entrepreneur Urs Bühler has passed away at the age of 82 on August 1, 2025. With his passing, Bühler loses a figure who significantly shaped the company as an owner, Chairman of the Executive Board, and Chairman of the Board of Directors since 1970, overseeing more than five decades of its successful development. In 2014, Urs Bühler proactively ensured the succession and continuation of Bühler as a family business by transferring the company shares to his daughters Karin, Maya, and Jeannine Bühler.

Born in 1943 in Uzwil, Urs Bühler spent his youth there. He attended the Kantonsschule am Burggraben in St. Gallen and later studied mechanical engineering at ETH Zurich. Joining Bühler in 1970, he held various positions both domestically and internationally, until being appointed CEO in 1986. In 1994, he also took over as Chairman of the Board of Directors. From 1990, Urs Bühler was the sole owner of the company. Throughout his career, he held numerous external mandates, including the boards of the Swiss Bank Corporation, Sulzer Group, and Winterthur Insurance, and was on the board of Swissmem for 30 years, significantly contributing to Swiss industrial history.

Urs Bühler was always forward-thinking and innovative. With gratitude and the utmost respect, we bid farewell to Urs Bühler. He remains an inspiring role model to us as a visionary entrepreneur, innovator, and above all, a remarkable human being.

HUMANSCALE BOOSTS NORTH AMERICAN PRODUCTION WITH HIGH-TECH DIE CASTING PLANT

Nogales, Mexico - Humanscale has expanded its operations in Nogales, Mexico with the addition of a state-of-the-art die-casting facility, a manufacturing process that uses high-pressure molds to create complex metal components with extreme precision and durability.

The facility can now produce over one million parts per month, meeting demand for their product range with unmatched speed and quality. This increased capacity allows for faster delivery, lower environmental impact, and the fulfillment of large, custom orders on demand, virtually eliminating out-of-stock conditions.

These are the first and only ergonomic workspace products not just for home office and monitor arm categories to be cast and assembled in Mexico. Humanscale selected Mexico for its proximity to the North American market, cost efficiencies, and a reliable, dedicated workforce. Producing the same volume in the United States would not only be far more costly but also significantly more challenging in terms of recruiting qualified, long-term workers. Leveraging the strengths of a close regional partner creates efficiencies that make the company stronger and more competitive, benefiting both nations economically.

NEMAK BUYING GF LIGHT METAL PLANTS

Nuevo León, Mexico - Metalcasting group Nemak S.A.B. de C.V. has a definitive agreement to acquire nine GF Casting Solutions' lightweight foundry operations. The availability of the GF assets was revealed in connection to the separate sell-off of the group's machine tool business.

No value has been reported for the private transaction, which Nemak stated should be complete later this year.

Nemak emphasized its interest in GF's strengths in manufacturing automotive and e-vehicle structural and chassis components, as well as its high-pressure diecasting (HPDC) capabilities. Chairman Álvaro Fernández stated the deal "expands our global reach and long-term perspective."

In its announcement, Nemak added that the purchase "will represent a key milestone in Nemak's efforts to accelerate its transformation beyond ICE powertrain components and broaden its global footprint. The transaction will allow Nemak to further diversify its customer base, enhance its technological capabilities, and strengthen its position in the transition towards sustainable mobility."

People in Die Casting

NADCA Remembers

Alan Anthony Koch
1948-2025

Alan Koch, 77, passed away peacefully at his home ir Columbia, Missouri, on July 25, 2025. Born on July 20, 1948, in Highland, Illinois, Alan lived a life filled with curiosity, dedication, and deep love for his family and passions.

Alan graduated with a degree in Physics from the University of Missouri-Rolla (now Missouri S&T), laying the foundation for a long and accomplished career in aluminum die casting. His work not only advanced the field, including multiple patents, but also gave him the opportunity to travel abroad - an experience he cherished.

Outside of his professional life, Alan found great joy in the outdoors. He loved fishing trips with family, scenic bike rides, and quiet moments spent enjoying nature. His sense of adventure and calm presence will be deeply missed by all who knew him.

Alan is survived by his beloved wife, Beth Koch, and their children: Mandy Gasich (Lorne Jackman), Greg Koch, and Corey Koch (Kerry Fishel). He was a proud grandfather to Peyton, Kendall, John-Emery, and Josie. He is also survived by his sister, Debbie Fernandez, along with extended family and dear friends.

A celebration of Alan's life will be held at a later date. Details will be shared with family and friends when available.

In lieu of flowers, the family welcomes memories and stories of Alan's life to be shared in his honor.

Alan was a long-time NADCA member & die casting enthusiast, he will be greatly missed.

Wayne J. Alofs
1948-2025

Wayne J. Alofs, age 89, passed away on August 3, 2025. He was the son of parents Warner and Johanna Alofs.

Wayne has lived in the Holland area his whole life with the exception of two years in the United States Army. He was employed at Buss Machine from 1959 to 1965 and then at Prince Machine until retirement in 1988. He received several service awards from the die cast industry and taught many classes to those learning the trade.

One of Wayne's retirement hobbies was restoring and using antique tractors, being especially fond of his 1937A John Deere tractor. He enjoyed the annual tractor crossing of the Mackinac Bridge during September in which he participated in 2010, 2011 and 2012. Wayne and Virginia enjoyed traveling throughout their retirement years and also spent time in Florida during the winter months. When he was in Florida, Wayne joined a group of harmonica players and enjoyed playing in their jam sessions.

Wayne was a member of Graafshap, Hamilton, Maranatha and currently Niekerk Christian Reformed Churches. He served many times as elder and deacon.

Wayne's Christian commitment was always evident to others and he enjoyed Bible studies and gospel programs. He loved the Lord, his family, children, grandchildren and great grandchildren. Memorial contributions may be made to World Renew or Hospice of Holland.

To leave condolences online, please visit www.langelandsterenberg.com.

New Products, Services & Solutions

Polaris® Sets New Standard for Confidence in Compression

Connections with UL-Listed Tool Compatibility

Polaris®, the trusted name in power connectors and grounding solutions, announces a major advancement for electrical contractors and inspectors with its line of compression connectors UL-listed across a broad range of crimp tools electricians already own and trust. Polaris will highlight this groundbreaking approach during the 2025 NECA Convention and Trade Show, held Sept. 12-15 at the McCormick Place West Convention Center in Chicago, booth # 5214.

"Being UL-listed eliminates the uncertainty of tool compatibility, reduces costly inspection failures, and empowers contractors to work faster, safer, and with total confidence," said Nathan Sapp, Senior Director, Polaris Connectivity. "In an industry where performance and compliance are non-negotiable, Polaris compression connectors provide UL 486A/B listed assurance with a wide variety of dieless and standard crimp tools, allowing electricians to make code-compliant connections without guessing whether the tool in their truck meets the listing requirements."

Too often, jobs are delayed or rejected because connectors were crimped with tools that don't meet UL-listed requirements. Unlike others that limit their connectors to a narrow set of tools, Polaris is changing the game, giving contractors maximum flexibility while maintaining UL compliance and inspector approval.

Industrial Innovations Launches New eCommerce Website for 24/7 Parts Ordering

Industrial Innovations, a leading provider of lubrication equipment and robotic integration solutions for manufacturing industries, is proud to announce the launch of its new eCommerce website, designed to provide customers with 24/7 access to replacement and consumable parts.

This launch is part of Industrial Innovations' continued commitment to being easy to do business with and delivering a streamlined, efficient customer experience. Whether it's 1st, 2nd, or 3rd shift, customers can now place orders exactly when the need arises — no need to wait for the office to open.

"Our customers asked for easier, anytime access to parts — and we listened," said Troy Turnbull, CEO at Industrial Innovations. "With this new online store, customers can order Advance, Pro-Mix and Spra-Rite parts when they need it. We're making it faster and easier to keep their operations running."

The decision to launch this online store reflects Industrial Innovations' broader mission: to remove friction, increase responsiveness, and give customers full control over how and when they do business.

From urgent replacement parts to routine consumables, the buying process is now simpler, faster, and always available.

The new eCommerce site is live now at: www.industrial-innovations.myshopify.com and is accessible to all current and new customers.

Don't See Your Company's Products in DCE?

All NADCA Corporate Members are allowed one complimentary listing per issue and NADCA Individual Members may submit one free listing per year. For all others, there is a small fee. Don't delay, submit today! Visit www.diecasting.org/dce/products to learn how to put your company's new products, services and solutions in print.

DIE CASTING ENGINEER

CLASSIFIEDS

Classified advertisements are accepted for publication in *DIE CASTING ENGINEER* for sale of equipment and notice of services and employment available or wanted. The net rate is $60 per inch or fraction thereof (for NADCA members, individual and corporate) and $70 per inch for all others, in the $2^1/_8$ in. wide column, payable with order. Please make remittance payable to *DIE CASTING ENGINEER*, and send with copy to: NADCA, 3250 N. Arlington Heights Rd., Ste. 101, Arlington Heights, IL 60004. Contact Athena Catlett at 847.808.3153 or email catlett@diecasting.org.

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