Cast Materials | Die Materials | MAY 2024



Structural Strength **Unleashed:** The Power of **Advanced Die Casting Techniques** 

> **ALSO INSIDE:** Laine Scholarship Winners!







**FRECH USA** 

the state

W 80

6000 OHIO ST. MICHIGAN CITY, IN 46360 WWW.FRECHUSA.COM (219) 874-2812





NORTH AMERICAN DIE CASTING ASSOCIATION

NADCA<sup>\*</sup> and the NADCA logo above are both registered trademarks of the North American Die Casting Association.

#### **FEATURES**

- 8 Significant Extension of Die Life from a PVD Coating Applied to the Die – D. Bell, E. Kessenich, S. Midson
- **14** New Al-Mg Alloys for Structural Castings – M. Hartlieb, H. Fehrmann, R. Franke, M. Reddy
- 20 NADCA Grants Over \$34,500 in Laine Scholarships to 14 Applicants!

#### DEPARTMENTS

- 02 Chairman's Letter 03 Letter From the President
- 04 NADCA Reports
- 05 Government Affairs
- 26 Exhibitor Spotlight
- 36 Corporate Member List
- 42 Chapter News & New Members
- 49 New Corporate Members
- 50 Industry News & Information
- 52 People in Die Casting
- 54 New Products & Services
- 56 Classified Advertising
- 56 Advertising Index

#### PUBLISHER

Mike Meyer EDITOR Andrew Ryzner

ADVERTISING & PROMOTIONS MANAGER Athena Catlett, DES

EDUCATION & MEETINGS MANAGER Melisa Ryzner, CMP, CMM

**EXECUTIVE OFFICES** 3250 N. Arlington Heights Rd., Suite 101 Arlington Heights, Illinois 60004

Phone: Fax: Email: Web site: 847.279.0001 847.279.0002 dce@diecasting.org www.diecasting.org/dce

Die Casting Engineer (ISSN 012-253X) is published bimonthly, six times per year, by the North American Die Casting Association, 3250 N. Arlington Heights Rd., Suite 101, Arlington Heights, Illinois 60004. Periodicals postage paid at Arlington Heights, Illinois 60004 and at additional mailing office. POSTMASTER: Send address changes to address listed above.

Non-member subscription rates: \$80 one year U.S., Canada & Mexico; \$150 one year other countries (international airmail). Single copies \$15 each, except for Suppliers Directory, \$35 (Single issues available in North America only).

All material copyright 2024 by the North American Die Casting Association. All rights reserved.

Nothing in this magazine may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, recording or by any information storage and retrieval system, without permission in writing from the publisher. NADCA is not responsible for any material published in this magazine unless it has been explicitly approved by the NADCA Board of Governors.



## Industry 4.0 - Game Changer or Fad?

In February, NADCA held the executive conference in beautiful Scottsdale, Arizona. Over 120 industry executives and presenters were able to spend 4 days discussing a variety of topics including a Washington, D.C. government affairs update, NADCA R&D projects overview, navigating property and casualty insurance markets, investment strategies for fixed income, leadership development, Industry 4.0, and more. It was a great opportunity to share personal views on issues that our industry faces, learn from presenters and peers, and develop long-lasting relationships with others who are involved in the die casting industry and beyond.

It also served as the kickoff for a new NADCA group - Young Professionals Organization (YPO). This YPO group will continue to meet, with a goal of providing development opportunities for future industry leadership. Check out the NADCA website for information on upcoming YPO events.

One of the highlights from the conference was the excellent presentation on Industry 4.0: *Die Casting in the Digital Age - Harnessing Industry 4.0 to Build a Connected Foundry* - presented by Dr. David Blondheim of Mercury Marine.

Dr. Blondheim discussed the history of industrial connectivity and then provided an overview of the details regarding how to connect the wide variety of machine types/ages into a digital environment. This is not a plug and play solution, but an individually engineered communication strategy mapped out to meet the demands of older devices and a wide variety of manufacturers products.

The main takeaway for me from this presentation was less about the technology side of Industry 4.0 and more about the "why". Will Industry 4.0 really be a game changer for manufacturing or just the latest industrial sales fad?

Dr. Blondheim stated, "The purpose of Industry 4.0 technologies is to maximize the decision making of the people involved in manufacturing". Faster collection and feedback of information results in faster decision making, resulting in faster issue resolution, raising productivity.

People are still needed to make the critical decisions and implement change based on the data delivered from the Industry 4.0 network. Having the right people in the right place seems obvious but can be difficult to manage.

Staffing will continue to be a major challenge for all in the manufacturing industry. Will Industry 4.0 be part of the draw for potential employees to engage with manufacturing?

Increased automation and data driven manufacturing systems will make die casting a more desirable career choice, in addition to making casters more productive, profitable, and sustainable.

Dr. Blondheim shared statistics showing that there could be over 2.1 million unfilled manufacturing jobs by 2030. By 2050 25% of the population will be 65 years old or older. Compare this to 9% in 2019.

The implementation of more automated data communication and real time rapid issue resolution, coupled with increased automation will provide manufacturers to maximize the output for every hour worked and potentially reduce the required number for people to support manufacturing activities.

This step change in manufacturing efficiency should help to keep North American manufacturing competitive on a global basis.

Thank you, Dr. Blondheim, for the challenging and educational presentation! Thanks to all of those who attended and orchestrated this memorable industry experience!

Next year's executive conference will return to Marco Island, Florida. I hope you will consider attending this highly beneficial event.

"Industry is the soul of business and the keystone of prosperity." Charles Dickens



Mark Los, Key Account Executive BuhlerPrince, Inc. NADCA Chairman mark.los@buhlergroup.com

"The purpose of Industry 4.0 technologies is to maximize the decision making of the people involved in manufacturing."

Mark



Andrew Ryzner Editor North American Die Casting Association

"NADCA staff has been making an increased effort in 2024 to visit every single NADCA chapter."

andre Rype

## From the Editor's Desk 🏹



Greetings and salutations to all our readers and happy spring, soon turning into summer. At the time of this writing, we have already started to notice the weather heating up here and it's been nice to be able to have the windows open and get some fresh air in the house.

NADCA staff has been making an increased effort in 2024 to go above and beyond with chapter visits around the United States, and we appreciate the warm welcomes and the attendance of the chapter events so far! As editor of this magazine, I seem to have noticed an increase in reports from our various chapters on the events for our chapter news section.

In 2024 already, NADCA has been to:

- Chapter 5 (Chicago) on March 3, 2024
- Chapter 12 (Wisconsin) on February 1, 2024
- Chapter 14 (Dayton) on March 12, 2024
- Chapter 16 (Minnesota) on January 9, 2024
- Chapter 17 (St. Louis) on February 6, 2024

This leaves the following Chapters to be visited, exact dates coming unless noted:

- Chapter 3 (Michigan)
- Chapter 6 (Cleveland)
- Chapter 7 (New Jersey)
- Chapter 10 (Canada) Tentatively May 2024
- Chapter 15 (South East)
- Chapter 25 (Indianapolis)
- Chapter 30 (California) October 19, 2024

From having keynote speakers, to having NADCA staff coming to either teach a course/a discussion, or give a presentation on something such as the State of the Die Casting Industry, keep an eye on these chapters for when we make our visits. We would love to see you and hear your thoughts and comments to better server our NADCA members.

Thanks for reading and have a great spring and start to your summer.



#### NADCA NEWS

#### Cast Your Company's Future by Hiring an Intern

Arlington Heights, IL - NADCA has a resume database of engineering students looking for summer internships on its Web site. Please consider hiring an intern and introduce that student to the world of die casting! Students from universities across North American are currently looking for opportunities and many are willing to re-locate for the summer.

The database is password protected, so you will need to login to your MyNADCA account for access. Once logged in, to review the available candidates, visit:

www.diecasting.org/scholarship/resumes.

Students may be contacted directly, and if you hire a student, let us know, (intern@diecasting.org) so we can limit their contact information.

Students that complete an internship in the die casting industry are eligible to apply for the David Laine Scholarship Program. That program opens for applications August 1. For additional information, visit:

www.diecasting.org/scholarship.

#### UPCOMING EVENTS

#### Registration Now Open for NADCA's Government Affairs Briefing

Arlington Heights, IL - NADCA's annual Government Affairs Briefing will take place in June 11-12 in Washington, D.C.. Every year, NADCA provides a unique opportunity for some of its members to travel to Washington for meetings with their U.S. Senators and Representatives. This is a chance for manufacturers to tell their government officials directly how their policies affect millions of businesses and their employees.

NADCA encourages its members to attend this summit and discuss the top issues of the day including:

- Requirement to Capitalize as an Asset and Amortize R&D Expenses
- Trade, Tariff, and Supply Chain Resiliency Policies
- Availability of Globally Priced and Available Raw Materials
- Job Training and Recruitment Incentives and Support
- OSHA Workplace Rules (Indoor Heat Regulation)
- New/Pending EPA regulations
- To register visit: www.diecasting.org/ga.

## NADCA is Heading Back to Indy for the 2024 Die Casting Congress & Exposition

Arlington Heights, IL - The Die Casting Congress & Exposition will be held September 30 - October 2, 2024, at the Indiana Convention Center in Indianapolis, IN. This event will include three days of Congress sessions given by experts from around the world.

In addition to the Congress sessions, this exposition show will feature more than 120 exhibitors, the International Die Casting Design Competition and the Die Casting Industry Awards Luncheon. Attendee registration will open in the summer of 2024.

Save the date! We hope to see you there! For more information please visit: www.diecasting.org/congress.

#### NADCA MARKETPLACE

#### What is the Marketplace?

The Marketplace is NADCA's online store. You can purchase the items below. Trying to register for someone else? No problem! This is also an option in the new Marketplace.

- Purchase Publications
- Register for Conferences
- Register for Courses
- Register for Webinars
- Sign Up & Renew Membership
- Purchase Online Course Access

#### How to Buy?

Simply add the item or items to your shopping cart and proceed to checkout! To view more details on items available in the Marketplace visit: www.diecasting.org/store.





#### FHWA Proposes Update to Buy American Requirements for Manufactured Products

The Federal Highway Administration (FHWA) under the Department of Transportation has put forth a proposed rule to cease the utilization of the general waiver regarding Buy America requirements for manufactured products. In their notice of proposed rulemaking (NPRM), the FHWA revokes the waiver, which has been operational since 1983, permitting manufactured products used in highway projects, excluding those predominantly made of iron or steel, to be sourced from outside the United States. The NPRM also updates the FHWA's standards for manufactured products under the Buy America requirements.

The NPRM outlines the FHWA's intention to terminate the general waiver of Buy America requirements and revise the standards to align with the "Build America, Buy America" Act (BABA) enacted in 2021. The BABA mandates that all federally assisted infrastructure projects utilize domestically produced iron, steel, manufactured products, and construction materials.

In addition to discontinuing the waiver, the FHWA proposes updating standards to define a manufactured product, aligning them with BABA's definition, which stipulates that "a manufactured product must be produced in the United States and that the cost of components mined, produced, or manufactured in the United States must exceed 55 percent of the total cost of all components of the manufactured product."

FHWA will accept comments on the proposed changes until May 13, 2024.

#### **EPA Tightens PM2.5 Limit**

The Environmental Protection Agency (EPA) has released a final rule tightening the National Ambient Air Quality Standards (NAAQS) for fine particulate matter (PM2.5), or soot. In the regulation, unveiled on February 7, 2024, EPA lowered the primary (health-based) annual limit to 9 micrograms per cubic meter (ug/m3), down from the previous standard of 12 ug/m3. The rule, however, does retain all other PM standards, including the primary and secondary (welfare-based) 24-hour PM2.5 standard at the level of 35 µg/m3, the secondary annual PM2.5 standard at the level of 15 µg/m3 and the primary and secondary 24-hour PM10 standards at the level of 150 µg/m3.

EPA first established NAAQS for particulate matter in 1971 and has since set and revised standards numerous times for fine particles (PM2.5) and coarse particles (PM10). PM2.5 is a fine inhalable particle resulting from chemical reactions emitted from manufacturing facilities, power plants, and automobiles that are generally 2.5 micrometers and smaller – typically thirty times smaller than a human hair, while coarse particles have diameters between 2.5 and 10 micrometers. NADCA has long pushed for the EPA to retain the standards set in 2012. Along with signing coalition letters this past fall, NADCA submitted formal comments on the rule in March 2023, arguing that the current standards are working as PM2.5 air quality has continued to improve since 2000 and changing the levels at a time when the current standards are proving effective will only lead to a reduction in economic activity. "Lowering the standard will punish die casting manufacturers located in nonattainment or unclassifiable zones, while not addressing the Agency's underlying goals," the comments stated.

The final rule will be effective 60 days after being formally published in the Federal Register.

#### Court Remands EPA Ozone Standard

A federal appeals court has agreed to the Environmental Protection Agency's (EPA) request to send back the ozone standards established during the Trump administration, allowing for a new statutory review of the National Ambient Air Quality Standards (NAAQS) concerning groundlevel ozone (O3).

The EPA had been reevaluating the Trump administration's 2020 decision to maintain the 70 parts per billion (ppb) limit averaged over eight hours, which was set in 2015. However, the EPA stopped this reconsideration in August and opted for a new statutory review. This shift came after the Clean Air Scientific Advisory Committee (CASAC) expressed concerns about the EPA's analysis supporting the recommendation to keep the existing ozone standards without changes.

The U.S. Court of Appeals for the District of Columbia Circuit granting the EPA's request for voluntary remand enables the Agency to concentrate its resources on a thorough review of the Ozone NAAQS. EPA's Assistant Administrator for Office of Air and Radiation (OAR) Joe Goffman noted that this decision allows them to avoid dividing resources between litigation over the 2020 Ozone NAAQS Decision and addressing issues raised by the Advisory Committee during the reconsideration.

Various environmental and public health groups have advocated for stricter ozone standards. CASAC proposed tightening both the "primary" health-based ozone standard and the "secondary" standard for environmental protection. The majority of CASAC members suggested a significantly stricter primary limit, ranging from 55 to 60 parts per billion (ppb), and endorsed a more stringent secondary limit based on the W126 index, recommending a limit ranging from 7 to 9 parts per million-hours (ppm-hours) measured annually across multiple growing seasons.

Now, with the 2020 ozone NAAQS decision remanded, the EPA will proceed with a fresh evaluation, including a new integrated science assessment (ISA). This comprehensive, time-consuming process will push the issuance of a final rule well beyond the end of 2024.



#### EPA to Release Proposed Secondary NAAQS

The Environmental Protection Agency (EPA) is preparing to introduce a proposed regulation that will enhance "secondary" air quality standards concerning nitrogen oxides (NOx), sulfur oxides (SOx), and particulate matter (PM).

The White House Office of Management and Budget (OMB) completed its final review of the proposed rule on February 5, 2024, paving the way for EPA's release of the rule. EPA faced a February 9, 2024, consent decree deadline to propose secondary national ambient air quality standards (NAAQS). The EPA must then finalize the comprehensive rule by December 10, 2024. The Clean Air Act mandates primary NAAQS to safeguard public health, while secondary standards aim to protect the environment.

Currently, the secondary standard for NOx remains at 53 parts per billion (ppb) of nitrogen dioxide (NO2) annually, a level set since 1971. The SOx secondary standard stands at 500 parts per billion (ppb) of sulfur dioxide (SO2) over a three-hour period, also established in 1971. As for particulate matter, the secondary annual PM2.5 standard is at 15 micrograms per cubic meter (ug/m3), with a secondary daily PM2.5 standard of 35 ug/m3. The secondary daily limit for larger PM10 particles is set at 150 ug/m3.

In a final policy assessment (PA), EPA staff outline options for tighter standards. These include a potential range of 5 ppb to 15 ppb for SO2, utilizing an annual averaging time for SOx; potentially lowering NOx standards to as low as 40-35 ppb; considering a decrease in the annual limit from 15 ug/m3 to as low as 12 ug/m3 for PM2.5; and maintaining the secondary standard for PM10.

New secondary standards for SOx and NOx were due in 2017, while new secondary standards for PM were due in 2018.

#### Final NEPA Phase 2 Rule Under Review

The Council on Environmental Quality (CEQ) at the White House has submitted the final phase 2 plan for revising the National Environmental Policy Act (NEPA) implementing rules during the Trump administration to the White House for review. The Office of Information and Regulatory Affairs (OIRA) at the White House Office of Management and Budget (OMB) received the Phase 2 NEPA rule on January 23. CEQ anticipates releasing the final Phase 2 rule in April 2024.

This second rule builds upon the Phase 1 regulation, completed in April 2022. Phase 1 brought about three fundamental changes to NEPA. It reinstated the requirement for agencies to evaluate direct, indirect, and cumulative effects. Additionally, it reverted to the original definition of a project's "purpose and need," emphasizing that it's not solely determined by the applicant. Moreover, it clarified that the CEQ rule sets the minimum standard, not the maximum, for how agencies carry out NEPA reviews of major federal actions.

The Phase 2 rule, proposed on July 31, 2023, was expected to significantly amend the 2020 rule by addressing issues omitted in Phase 1. However, the debt ceiling legislation, passed in June 2023, incorporated certain aspects of the previous rule, including defining a "major federal action" and expanding categorical exclusions, which outline the types of projects and actions necessitating NEPA evaluation. The debt ceiling bill also mandates a lead agency to conduct environmental reviews and sets time limits: one year for environmental assessments and two years for full environmental impact statements.

The proposed Phase 2 rule introduces a provision exempting projects with only "significant, enduring positive impacts" from requiring an environmental impact statement. Furthermore, the rule instructs agencies to consider, assess, and mitigate impacts on communities with environmental justice concerns.

#### **Final Overtime Rule Under Review**

The Department of Labor submitted its final overtime rule to the White House for review. On March 1, 2024, the White House Office of Management and Budget's Office of Information and Regulatory Affairs (OIRA) received the regulation titled "Defining and Delimiting the Exemptions for Executive, Administrative, Professional, Outside Sales, and Computer Employees."

The proposed rule, published on September 8, 2023, states that DOL would increase the Fair Labor Standards Act's (FLSA's) annual salary-level threshold to \$55,068 from \$35,568 for white-collar exemptions to overtime requirements. It would also raise the total annual compensation requirement for "highly compensated employees" (HCE) from the current level of \$107,432 to \$143,988 per year. Eligible employees below those new thresholds would be eligible for pay at time and a half.

However, the final rule might set a higher salary-level threshold. A footnote in the Notice of Proposed Rulemaking (NPRM) mentioned that the DOL's Wage and Hour Division would use the most recent data available to calculate the salary threshold. While the NPRM based the \$55,068 salary-level threshold figure on 2022 data, the DOL projects that using the most recent data could increase the salary threshold to over \$60,000 per year.

In addition to raising the salary threshold of the overtime test, the NPRM would mandate that the threshold automatically update every three years by "adjusting it to remain at the 35th percentile of weekly earnings of full-time nonhourly workers in the lowest-wage Census Region (currently the South)." The NPRM would also permit DOL to postpone an automatic update if unforeseen "economic or other conditions" warrant it.

Although OIRA's review could last up to 90 days, DOL has expressed its hope to release the final rule sometime in April 2024.

#### **SEC Pauses Climate Disclosure Rule**

The Securities and Exchange Commission (SEC) has halted the enforcement of the recent corporate climate risk regulation due to legal challenges. On April 4, 2024, the



SEC declared a pause in implementing the final rule. This temporary halt comes after the U.S. Court of Appeals for the 5th Circuit granted an "administrative stay" on March 15, 2024.

The new rule, approved by the Commission on March 6, 2024, mandates that publicly traded companies disclose information concerning the oversight and management of climate risks, the ramifications of climate-related risks, and data on greenhouse gas (GHG) emissions, both direct and indirect, both present and historical.

Compared to the initial proposal from 2022, the final rule reduces the GHG reporting obligations by eliminating the need to report Scope 3 emissions (which span a company's value chain, including downstream suppliers). It also confines reporting of Scope 1 (direct) and Scope 2 (indirect, via purchased energy like electricity) emissions to those a company deems "material." Additionally, the final rule only applies emissions reporting requirements to larger filers.

#### OSHA Releases Final Worker Walkaround Rule

The Occupational Safety and Health Administration's (OSHA) final rule to allow third-party employee representatives, including a union official at a non-organized facility, to be present during OSHA inspections has been officially published. The final rule marks a departure from OSHA's longstanding policy that only employees could serve as "walkaround representatives" designated by workers.

Specifically, the agency's text says "representative(s) authorized by employees may be an employee of the employer or a third party." It would allow non-employee representatives to participate in a walkaround "if, in the judgment of the Compliance Safety and Health Officer [CSHO], good cause has been shown why their participation is reasonably necessary to the conduct of an effective and thorough physical inspection of the workplace (e.g., because of their relevant knowledge, skills, or experience with hazards or conditions in the workplace or similar workplaces, or language skills)."

The rule codifies a 2013 Obama-era OSHA guidance, the "Fairfax Memo," which broadly interpreted the Occupational and Safety Health (OSH) Act of 1970 to allow union officials or community organizers on walkaround inspections. This guideline faced legal challenges and was revoked by the Trump administration in 2017.

The final rule takes effect on May 31, 2024.

#### Final Car, Truck GHG Emissions Standards Issued

The Environmental Protection Agency (EPA) has introduced regulations aimed at reducing emissions from both passenger vehicles and heavy trucks.

For passenger cars, light trucks, and certain medium-duty vehicles, the rule establishes a new set of multi-pollutant

standards for model years 2027 to 2032. Concurrently, the heavy-duty sector will see the implementation of stricter "Phase 3" greenhouse gas (GHG) emissions standards, affecting trucks like delivery vehicles, school buses, dump trucks, and tractor trailers. The implementation begins with revisions to specific MY27 standards and introduces fresh standards for MY28-32.

Announced by the EPA on March 20, 2024, the final multi-pollutant rule for passenger vehicles relaxes shortterm GHG limits and provides automakers with extended timelines to meet fine particle standards, diverging from the proposed rule issued in April 2023. Furthermore, these new standards are performance-based and technology agnostic, meaning manufacturers must achieve a fleet-wide average standard using various emissions control technologies.

Similarly, the final "Phase 3" heavy-duty truck GHG rule also softens the near-term limits initially proposed by the EPA in April 2023. The finalized rule establishes less stringent top-line standards than originally proposed for all vehicle categories spanning MY27-30. Nonetheless, the standards set for MY31 align with the proposal for light- and medium-duty vocational vehicles and day cab tractors, while the MY32 standards are even stricter for "light and medium heavy-duty vocational vehicles and day cab tractors," as per the rule announced by the EPA on March 29, 2024.

#### Changes to Trade Remedy Regulations Finalized

The Department of Commerce has introduced comprehensive revisions to the International Trade Administration's (ITA) management of antidumping (AD) and countervailing duty (CVD) laws. These updated regulations, formally announced in the Federal Register on March 25, 2024, aim to enhance and fortify the AD and CVD frameworks through significant policy adjustments. Antidumping is the mechanism by which domestic producers seek projection against goods sold into the U.S. below fair market value, while domestic manufacturers use countervailing duties to protect against foreign government subsidies.

The final rule removes the existing transnational subsidy regulation, allowing Commerce to address cross-border subsidies like those associated with China's Belt and Road Initiative within CVD proceedings. Additionally, the regulations introduce a new framework for determining a "particular market situation" in antidumping inquiries.

Additionally, the new regulation allows Commerce to factor in foreign governments' shortcomings in property, intellectual property, human rights, labor, and environmental protections during AD and CVD investigations. This includes a provision to consider situations where foreign governments' inaction benefits foreign producers. Under this updated rule, Commerce will not only consider direct subsidies but also subsidies resulting from government inaction—such as when a government fails to enforce regulations, collect fees, fines, or penalties as required.

The final rule is effective April 24, 2024.

## Significant Extension of Die Life From a PVD Coating Applied to the Die

**David Bell** Phygen Coatings Minneapolis, Minnesota

#### Eric Kessenich Mercury Marine Fond du Lac, Wisconsin

Stephen Midson Colorado School of Mines Golden, Colorado

#### **Executive Summary**

The objective of this paper is to document a significant extension of die life achieved through the application of a permanent thin-film PVD coating to the entire surface of a die casting die. The complete die was covered with a high-quality AlCrN thin-film coating produced by physical vapor deposition (PVD). The application of this coating allowed the amount of die spray to be reduced by about 90%, which has substantially reduced the amount of heat checking observed in the die. While an earlier un-coated version of the die failed due to excessive heat checking after the production of only 97,000 shots, the current PVD coated version has just produced 200,000 castings, and the amount of heat checking is still relatively low. Casting production continues in this die, and it is expected that the eventual life of the die will be 250,000 shots or more. Cost savings tied to this longer die life have been estimated, and are equivalent to the fabrication costs of more than 11/2 sets of die inserts.

#### Introduction

This casting trial is taking place at Mercury Marine's die casting plant in Fond du Lac, WI. Initiated in 2016, the trial is still ongoing. Details of the component and die chosen for this trial has been described in detail in a number of previous NADCA publications<sup>1-4</sup> and so will just be briefly summarized here. The component is a balance shaft housing (Figure 1), weighing about 1.75-lbs. It is being manufactured using a single cavity die on a 700-ton die casting machine. A model of the die is shown in Figure 2, and all portions of the die that are contacted by the liquid aluminum were covered with an AlCrN PVD coating.



Figure 1 - Model of the balance shaft housing.



**Figure 2** - Model of the balance shaft housing die. All surfaces contacted by the liquid aluminum were PVD coated.

The original objective of this trial was to produce the die casting without the use of any die lubricant (run in the "lube-free" condition). Die spray time for an older uncoated version of this die was 12 seconds. The initial process changes for the PVD-coated trial consisted of reducing the spray time initially to two seconds, then to one second, and eventually lube-free. The trial achieved success until the point at which zero lubricant spray was attempted, resulting in the casting soldering to the die. As illustrated in Figure 3, the casting bent upon ejection, with the probable cause of soldering being the two core pins situated directly in front of one of the gates (highlighted by the red circle in Figure 4). In hindsight, it is conceivable that intensive cooling of these two pins might have averted the soldering issue by maintaining the temperature of the core pins' surfaces below the point at which soldering typically occurs (estimated to be around 500°C or 930°F). This may have allowed the die to function without lubrication. However, to-date this aggressive cooling approach has not been attempted. Instead, during the 2016 trial, the bent and soldered core pins were simply replaced. Subsequently, the die has been in operation for the past seven years with a 1-2 second die spray, representing approximately a 90% reduction compared to the previous un-coated die



Figure 3 - First lube-free casting stuck and bent on ejection.



Figure 4 - Entire shot, showing that the casting is gated directly onto two core pins.

However, as shown in Figure 5, this 1-2 second die spray was not uniformly distributed across the face of the die, but was focused primarily in the vicinity of the gate, where the soldering had occurred. The remainder of the die was operated without the direct application of spray. This reinforces the concept addressed above, that it was the excessive heating of the core pins position in front of the gate that caused the soldering when the component was run under lube-free conditions.



**Figure 5** - Schematic showing the distribution of the one second spray.

#### **Current Status of the Die**

While the trial with this balance shaft housing die started in 2016, the die is still running in production, and Mercury recently produced more than 200,000 castings with the PVD coated die (remember that the older un-coated die lasted only 97,000 shots before being replaced). The application of the AlCrN PVD coating has enabled the production of castings with a substantial reduction in die spray duration (1-2 seconds compared to the previous 12-second for the un-coated die). This has significantly extended the die's operational life.

Figure 6 shows images of both the fixed and moving sides of the die after the 200,000 castings have been produced. While some heat checking is present on the die's surface, its extent is much lower than might be expected after the production of 200,000 castings. Figure 7 shows photographs of one of the castings produced after 200,000 shots, and Figure 8 offers a close-up view to illustrate the level of heat checking. Reducing the amount of spray applied to the die through the use of the PVD coating has significantly reduced the level of heat checking in the die. Previous research conducted by Schwam and colleagues at Case Western Reserve University has demonstrated the impact of reducing spray in optimizing die life<sup>5</sup>, a topic discussed in detail in Reference 4, and so will not be reproduced here.



*Figure 6 – Photographs of the die after the production of 200,000 shots, showing the level of heat checking.* 

a) Overview of the moving side.

b) Close-up of the barrel region of the moving side, showing the low level of heat checking.

c) Fixed side, showing heat checking in the region between the barrels and light checking on the left-hand barrel.



Figure 7 - Photographs of the die cast balance shaft housing after 200,000 shots have been produced.



Figure 8 - Close up view of heat checking on the interior of the circular regions on the moving side of the casting (same casting as shown in Figure 7).

#### **Estimate of Cost Savings**

In Reference 3, an estimate was developed to gauge the cost savings resulting from the PVD coating of the entire balance shaft housing die and its operation with significantly less lubrication. However, that analysis was conducted after the production of only 70,000 castings using the PVD-coated die. It is now worthwhile to revisit this analysis since a considerably larger number of castings have been produced. The outcome of this revised analysis is presented in Table 1.

Mercury did not want to share their actual costs, and so the data in Table 1 is expressed as a function of the original production costs for the cavity set. The assumptions used to develop the data in Table 1 are summarized below.

- <u>Reduce die repair</u> The original un-coated die received its first weld repair at 37,000 shots. After the initial weld repair, further welding was performed on this un-coated die roughly every 10,000 shots. This includes multiple weld repairs in the machine that directly affected production output. The original un-coated die was retired at 97,000 shots when the heat checking was too bad to justify further repair. The PVD coated die received its first weld repair at 65,000 shots, which was its only weld repair prior to the 97,000 shot life of the original die. Between 65,000 and 200,000 shots the die was weld repaired four times, all welding was performed during preventative maintenance periods. No cracks or pieces out were severe enough to halt production for repair.
- <u>Reduced die lubricant</u> As the lubricant spray time has been reduced from 12 seconds to 1-2 seconds, this results in a substantial reduction in the volume of lubricant applied each shot. This reduction leads to lower expenses for lubricant procurement, and this reduction amounts to roughly 5% of the initial cost of the die inserts.
- <u>Faster cycle</u> As noted in Reference 3, the reduced spray time allowed Mercury to decrease cycle time by 12%. Mercury has estimated that cost savings associated this faster cycle time is equivalent to 5% of the cost of the die inserts.
- <u>Extended die life</u> Since the PVD coated inserts are still in operation and seem to be in relatively good condition even after producing over 200,000 castings, it is challenging to precisely calculate the eventual cost savings resulting from the extended die life. However, considering the current state of heat checking on the PVD-coated inserts, it is anticipated that this set of PVD coated inserts will produce at least 250,000 shots. Therefore, the cost savings indicated in Table 1 are represented as 150% of the original cost of the die inserts.
- <u>Cost of PVD coating</u> The cost of coating the entire fixed and moving side of the die has been estimated as 20% of the fabrication cost for the die inserts.

Overall Cost Savings – As outlined in Table 1, although the expense associated with applying the AlCrN PVD coating to the die surfaces is relatively high (amounting to 20% of the original die insert cost), this cost been recouped through reduced die repair, diminished die lubricant procurement, and a more efficient cycle rate. Therefore, any extension in die life represents an additional cost-saving benefit for Mercury, directly contributing to profitability. The data presented in Table 1 illustrates that, based on the assumptions outlined here, Mercury has achieved substantial overall cost savings, equivalent to the cost of acquiring more than 1½ sets of die inserts.

ltem	Saving Over 200,000 Shots (as a percentage of original tool cost)
Reduced die repair	25%
Reduced die lubricant	5%
Faster cycle	5%
Estimate of extension of die life	150%
Cost of coating	(20%)
TOTAL SAVING	165%

<b>Table 1 -</b> Estimated cost	savings for	a producing	castings	in d	a
die coated with AlCrN.			0		

#### **Conclusions**

The plant trial at Mercury Marine to examine the effect of covering an entire die with a PVD coating on lubricant spray and die life is still ongoing. The die has recently surpassed 200,000 shots, marking a more than 100% improvement compared to an older, un-coated die. Photographs show that the level of heat checking on the die's surface remains relatively low, and so the die is expected to produce considerably more castings. A revised analysis now estimates that the overall cost savings for Mercury, achieved by using PVD coating on the entire die, are substantial, equivalent to the cost of acquiring more than 1½ sets of die inserts.

#### References

- 1. B. Wang, G.R. Bourne, A.L. Korenyi-Both, S.P. Midson and M.J. Kaufman, "An investigation of the use of PVD die coatings to minimize or eliminate lubrication during high pressure die casting", Trans. 2016 NADCA Congress, paper no. T16-061
- B. Wang, J. Song, A. Monroe, A.L. Korenyi-Both, S.P. Midson and M.J. Kaufman, "Results from a Series of Plant Trials to Evaluate the Impact of PVD Processed AlCrN Thin-Film Die Coatings to Minimize Die Lubrication", Trans. 2017 NADCA Congress, paper no. T17-083
- David Bell, Viktor Khominich, Steve Midson, Steve Knickel, Eric Kessenich & Alex Monroe, "Minimizing Soldering Using High Quality PVD Coatings - Part 2: Performance of PVD Coatings in Casting Plants", Die Casting Engineer, September 2019, p 12

- 4. Eric Kessenich, Steve Knickel, Alex Monroe, David Bell, Viktor Khominich & Steve Midson, "Update on Performance of PVD Coated Dies at Mercury Castings", Die Casting Engineering, November 2020, page 24
- 5. Y. Zhu, D. Schwam, X. Zhu & J.F. Wallace, "Factors that Affect the Die Casting Die Life", Transactions of 2007 NADCA Congress, paper no. T07-053



# MAXIMUM PRECISION

TWIN-SPINDLE MACHINES

NOC

LICON MT

WITH i<sup>3</sup>

2 SPINDLES INDIVIDUALLY ADJUSTABLE IN ALL 3 LINEAR AXES

- Spindle distances from 400 to 1,500 mm
- High spindle stiffness
- Highest positioning accuracy through compensation of temperature influences
- Correction options as simple as with a single-spindle machine



Experience i<sup>3</sup> now MACHINING CENTERS AUTOMATION PROCESS TECHNOLOGY DIAGNOSTICS / SERVICE

www.licon.com



LIFLEX II 776

Æ

#### **New AI-Mg Alloys for Structural Castings**

Martin Hartlieb Viami International Inc. Montreal, Canada Henning Fehrmann, Rüdiger Franke, Mahendran Reddy Fehrmann Materials GmbH & Co KG Hamburg, Germany

#### Abstract

The market for structural die castings is rapidly expanding and we quickly see more applications with different and higher requirements on the castings and the alloys they are made from. Most of the current structural alloys are currently in the Al-Si-Mg alloy (300 series) family, and new inventions in other alloy families have shown various problems that prevented larger penetration of this market so far. A new binary Al-Mg alloy with Mg contents of 11-14% has now been developed (also known as AlMgty 90 C) that does not require an alternative eutectic (like Fe in some of the other Al-Mg type alloys developed in recent years for structural die casting). The alloy also does not require Mn or exotic elements that would increase the price in order to be castable and avoid die soldering. It overcomes both the typical castability issues of most common 500 series alloys (e.g. hot tear susceptibility) and die soldering and reduced die life issues, while allowing for very high mechanical properties both in the F and Ho (homogenized) temper. The Ho temper properties (>170MPa YS, >300MPa UTS and 15-25% El) are achieved without rapid quenching of the castings, which helps minimize distortion, especially in larger structural parts. It was also discovered that - contrary to other Al-Mg-Si type alloys - the properties are basically not sensitive to freezing rate and therefore to wall thickness in the casting, which allows the production of structural castings of varying wall thicknesses with homogeneous mechanical properties. It also allows relatively representative production of prototypes in sand casting or even with 3D printing of a powder in the same chemistry. Castability in die casting is very similar to traditional Al-Si structural alloys like 365/A365 and e.g. shock towers were produced in the same die using the same gating system. Process parameters need to be adjusted but in a very positive way, as these adjustments actually allow reducing the cycle time. As the alloy does not have any other eutectic it should also be suitable for Rheocasting, which is included in future work in this project.

#### Introduction

Al-Mg (500 series) alloys have traditionally been used in corrosive outdoor and especially marine environments as well as in applications requiring bright finish or are anodized. They also offer very attractive mechanical properties.<sup>1, 2</sup> In wrought

(5000 series) alloys the Mg content rarely exceeds 5.6 % due to the risk of Stress Corrosion Cracking (SCC) and intergranular cracking. This is due to Al3Mg2 or Al8Mg5 precipitates along grain boundaries, which forms at concentrations higher than 3.5%. This makes them unsuitable for use at higher than room temperature applications.<sup>3</sup> In casting alloys the Mg concentrations found are typically higher, but the alloys are often considered "hard to cast" (due to insufficient fluidity and tendency to hot cracking, which actually decreases with increasing Mg content). If the Mg content is above 7% the alloy becomes heat treatable to improve mechanical properties. In fact, as these alloys are self-hardening, i.e. room temperature ageing, heat treatment is also done to achieve long term stability right away.<sup>2</sup> The most prominent commercially used casting alloy examples are the 511 and 514 alloy with 3.5 – 4.5% Mg, the 518 with 7.5-8.5% Mg and the 535 with 6.2 - 7.5% Mg. The so far highest Mg content can be found in the 520 alloy with 9.5 – 10.6%. Mg has a solubility in Al of about 2% (wt) at room temperature as shown in Figure 1 - and 17.4% (wt) at 450°C (842°F).<sup>4</sup>



Figure 1 - Al-Mg binary Phase diagram.<sup>5</sup>

In binary alloys of the Al-Mg (500) series small additions of Ti, Zr and B are used for grain refinement and additions in the ppm range of Be is used to prevent (or minimize) oxidation during melting, melt treatment and transfer, casting, as well as heat treatment at high temperatures (Hotemper - homogenizing at 450°C / 842°F). The Ho temper is done to improve mechanical properties, but at the same time it also improves dimensional and physical stability and significantly reduces residual stresses in the casting.<sup>2</sup> The effects of grain refinement on Al-Mg alloys have been quite extensively studied and reported, and Ti or TiB2 is an efficient and economical grain refiner commonly used. Amerioon et al. showed that grain refining (with an Al-5Ti-1B master alloy) a binary Al alloy with 8% Mg changed the mechanical properties through a morphology change of the of  $\alpha$ -Al phase and from purely dendritic to rosette-like morphology, enhancing number of grain boundaries and therefore creating a more homogeneous distribution of intermetallic precipitates.<sup>5</sup>

#### **Design of Experiments**

The mechanical properties of existing Al-Mg alloys overall improve with increasing Mg content, YS and UTS increase significantly while elongation only decreases slightly (and starting from a very high level).<sup>6</sup> Above 7% Mg the alloy's properties can additionally be improved with heat treatment. The 520 alloy (around 10% Mg) is therfore in fact often used in heat treated condition. It was therefore decided to increase the Mg content further (but staying below the solubility limit), and the chosen range was from 11 to 14%. The alloy used in all trials was within the following specification (Table 1):

Table 1 -	Chemical	composition	of the	AlMoTv	90 C	l allov
100001	ansemment	20111203121011	0,000	210101819	/ U U	crivey

#### Casting Trial with a (3 Plate) Shock Tower Die

Casting trials were conducted at Gusstechnikum Kassel on a 1.400t Bühler Die Casting Machine in a 3-plate shock tower die. The die is a single cavity prototype die (with the cavity identical to the 2-cavity series production die) and designed for the highly castable, near-eutectic AlSi10MnMg alloy, which would normally make it basically impossible to cast more exotic alloys (that don't require solution heat treatment) like the AlMg5Si2Mn (without cracks). Figure 2 shows the full shot of the casting.

After some adjustments to the casting parameters, the alloy cast very well and no cracks were observed. The parts ejected very well from the die, and no die soldering was observed - despite the low Fe and Mn level, typically required in die casting alloys. After casting the parts were homogenized at 450°C (842°F). The average mechanical properties obtained from coupons excised at different locations in the casting (see Figure 3) are shown in the following Table 2 (3rd line, in italics) and compared to typical properties obtained from the test plate (first and second line). The Ho temper properties are after a heat treatment at 450°C (842°F) for 3 hours. This heat treatment will be optimized in future work but as no quenching is required, the distortion is much less than in normal T6 or T7 and can very easily be controlled with proper racks and supports.

Si	Fe	Cu	Mn	Mg	Zn	Ti	Andere/ others	AI
< 0.1%	< 0.1%	< 0.05%	< 0.05%	11-14%	< 0.05%	0.011 - 0.5%	Be	Rest/ Balance

The alloy is truly a binary Al-Mg with a typical Mg content of about 12%, and a controlled small Ti addition allowing for grain refinement. All other elements have only a maximum and impurities are kept at a relatively low level, but still allowing the use of a significant recycling content from 5000 series scrap that is readily available. As typical in this alloy family, a small (ppm level) addition of Be is done to avoid oxidation. The chemistry does not contain any exotic ingredients, and neither are any special / exotic melt treatments required. The alloy has excellent corrosion resistance (even enhanced if in Ho-temper). Extensive testing of the alloy was done on a plate die of 4mm wall thickness. The heat-treated parts were tested for weldability, which showed no problems in both MIG and TIG with AlMgSi1 or AlMgSi0.5 wrought alloys using an AlMg4.5Mn filler material. Riveting tests were also performed and there was no problem found (not surprising with the high elongation). Mechanical properties were tested in F and Ho temper and are shown below in Table 2. One of the target applications are car body structure and closure parts. The targe mechanical properties should therefore match or (ideally) exceed the typical alloys used in these applications: AlSi10MnMg-T7, AlMg5Si2Mn, AlSi9MnZr, etc.



Figure 2 - Full shot of shock tower cast in AlMgTy 90 C in a single cavity 3 plate die, designed for AlSi10MnMg alloy.

**Table 2** - Average Mechanical Properties (with standard deviation) achieved with the AlMgTy 90 C alloy from coupons cut from a test die and from shock tower.

	YS [MPa]	UTS [MPa]	Elongation [%]
F temper (test plate)	175 (± 5)	280 (± 8)	5 (± 0.5)
Ho temper (test plate)	186 (± 5)	370 (± 13)	25 (± 4)
Ho temper shock tower	190	310	16

line) compare extremely well with the most commonly used structural die casting alloys. In Ho-temper they meet and exceed all strength values while by far exceeding the elongation values.

#### **Casting Trial with an Impact Bracket**

Another set of casting trials were conducted at G.A. Röders on a 500 t Die Casting Machine in a 2 cavity die for impact brackets for Porsche. They are part of the front crash management system as shown in Figure 5 on the left.



Figure 3 - Locations of tensile bars excised from the shock towers cast in AlMgTy 90 C.

The properties achieved in the first casting trial from the shock tower die trial showed that there is clear potential to achieve the same properties as in the test plate casting, if further optimization of the process and heat treatment is done.

The properties in the different locations were all within a very narrow range and wall thickness and distance from in-gate do not play any major role.



*Figure 4 – Comparison of mechanical properties of AlMgTy 90 C with typical structural die casting alloys (plate die).* 

The mechanical properties of the AlMgTy 90 C alloy as shown in Figure 4 (taken from the test plate die, second



Figure 5 - Impact bracket. Location in the vehicle on left, component before and after impact test on right.

In this case the critical test is an impact test, in which the part needs to bend but not crack under a certain impact load. In this component high strength and ductility is required (the surface under the stress-strain curve is proportional to the absorbed crash energy). The following figure 6 shows the comparison of the impact tests between current series production parts and castings made with the AlMgTy 90 C alloy in Ho temper. They clearly show that the crash performance of the series production castings was exceeded, which would actually open the opportunity for part optimization and weight reduction.

#### Part Optimization with 3D Printed Prototypes Made from AIMgTy 90 C

The fact that the AlMgTy 90 C alloy can be 3D printed and (with optimized parameters) give basically the same mechanical properties as die cast components helps significantly to optimize and test a design with prototypes in a very short timeframe and without investing immediately in a die casting (prototype) die.



Figure 6 - Impact bracket. Test results (maximum force and displacement) comparison between current series production (AIMg-5Si2Mn-F) and AIMgTy 90 C in Ho temper.

The part is currently already rather over-designed (high safety factor) and the customer wanted to test if an improved design could render a weight reduction with equal or ideally even better crash behavior if using the AlMgTy 90 C alloy. The achieved crash performance of the 3D printed prototypes in AlMgTy 90 C allowed a geometry optimization that helped reduce the weight by 21 % as shown in Figure 7 and 8.



Figure 7 - Impact bracket design optimization with 3D printed prototypes in AlMgTy 90 C.



Figure 8 - Impact bracket properties with 3D printed prototypes in AlMgTy 90 C - ho (left two are cast, right two are 3D printed).

#### **Sustainability**

Sustainability is a big driver of aluminum usage. There is a big pressure to reduce carbon footprint of castings and the metal used for casting is typically the main driver of the carbon footprint. Al-Mg (5000 series) scrap is readily available in form of sheet metal scrap from car companies and their Tier 1 suppliers (mostly from inner body/door panels) and the AlMgTy 90 C alloy can be made partly from high percentage of this type of aluminum scrap. The second biggest contributor to a casting's carbon footprint is the melting step. Al-Si (300 and 400 series) alloys have a significantly higher required heat of fusion, which means they also need a higher temperature for melting than the Al-Mg (500 series) alloys.<sup>7</sup>





*Figure 9 -* Comparison of heat of fusion of different casting alloy families.<sup>7</sup>

#### Conclusions

Structural castings show very strong growth and are becoming larger and more sophisticated. The most common alloys currently used for structural die casting are in the Al-Si-Mg (300 series) family. Reaching mechanical property and at the same time dimensional stability, while still obtaining sufficient castability (especially flow length) and die life is a growing issue. In large, and especially in Giga/Mega-castings alloys are used, which don't require solution heat treatment with rapid quenching, as this is the main cause of distortion. Alternative alloy families for structural die casting have had limited commercial success due to issues like reduced die life, castability issues and very wall-thickness dependent properties. The binary Al-Mg alloy family could offer an attractive alternative, and the tested AlMg11-14 (AlMgTy 90C) shows extremely interesting mechanical properties both in F-temper (175 MPa YS, 280 MPa UTS, 5% El) as well as in Ho-temper (that does not require rapid quenching, 186 MPa YS, 370 MPa UTS, 25% El). The properties are very homogeneous and do not depend much on solidification rate, which makes them not only more homogeneous in a die casting of different wall thickness, but also in sand castings and 3D printed parts. This opens interesting opportunities to produce (rapid) prototypes with (near) series production HPDC properties. With adjusted casting parameters, castability of the alloy was proven to be excellent and very comparable to near-eutectic Al-Si-Mg type alloys, with no soldering / ejection problems from the die - despite the low levels of Fe and Mn. The castings have excellent surface finish, can be riveted, welded, bonded and surface treated (including anodization). Future work will include optimization of heat treatment and tests in Rheocasting.

#### **Acknowledgments**

We would like to thank the Gusstechnikum Kassel (University of Kassel, Germany) and the G.A. Röders foundry in Soltau, Germany, for conducting the casting trials.

#### References

- 1. Zolotorevsky, V. S., Belov, N. A., Glazoff, M.V., Casting Aluminum Alloys, vol. I, UK, 2007.
- 2. Major, F, Aluminum and Aluminum Alloy Castings, ASM Handbook, Volume 15: Casting, 2008
- 3. Hatch, J. E., Aluminum: Properties and Physical Metallurgy. American Society for Metals (ASM), Ohio, 1984.
- 4. Mondolfo, L. F., Aluminum Alloys: Structure and Properties. Butterworth, London. 1976.
- Amerioon, A, Emamy, M., Ashuri, Gh., Investigating the Effect of Al-5Ti-1B Grain Refiner and T6 Heat Treatment on Tensile Properties of Al-8%Mg, Procedia Materials Science 11 (2015), 32-37
- Fasoyinu, F.A, Thomson, J.P., Sullivan, L., Sagoo, M., Characterization of Microstructures and Mechanical Properties of Aluminum Aloys 206.0 and 535.0 Poured in Metal Moulds, Paper 08-115(02), pages 265–279, AFS Transactions 2008
- Jafors, A, Jansson, P., Selecting Cast Ally Alloying Elements Suitable for a Circular Society, Sustainability 2022, 14, 6584, https://doi.org/10.3390/su14116584

North American Die Casting Association's

# Technical **Archive**

Search NADCA's published information on any industry topic, available in the Technical Archive. This library of information includes Congress Transactions and technical papers, as well as articles published in Die Casting Engineer and LINKS magazine.

#### **Archive Includes:**

- Congress Transactions since 1960
  - DCE articles from 1988
  - LINKS articles from 2001
    - Research reports
    - Technical papers

## **FREE TO MEMBERS!**



www.diecasting.org/technology/archive

Today's engineering students have many paths they can take, so one of the Laine Scholarship goals is to encourage them to follow the one that directs them to the die casting industry. NADCA reaches out to over 250 professors each year, hoping they will share information about our program and industry, as well as the scholarship program. Laine applicants must include school and work recommendations as well as a summary of experiences learned during the student's internship in the die casting industry.

"The scholarship committee is composed of many business owners and executives, and is under the leadership of Lenard Cordaro," said NADCA President Michael Meyer. "This group volunteers their time to review each student submission, and then collectively rank them and award scholarships. My sincere appreciation to this group."

The scholarship program was established in 1975 as a tribute to David Laine, who served for 29 years as secretary of the American Die Casting Institute (ADCI), a forerunner of NADCA. Laine was instrumental in many advancements for the benefit of the die casting industry, including the development of a safety program, which was adopted by the institute in 1945. He also helped develop the Die Casting Research Foundation. Laine 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. His leadership and service to the industry were widely recognized. Among the many honors awarded him were ADCI's Doehler Award in 1952, a special citation from the institute in 1969 marking 25 years of dedicated service, and an Honorary Life Membership in the Society of Die Casting Engineers.

For more than 45 years, NADCA through the David Laine Memorial Scholarship program has encouraged college students to pursue studies in the many disciplines related to die casting. The main objectives of the scholarship program are:

- To provide financial assistance and encouragement to students who are interested in careers in the die casting industry.
- To foster and improve engineering education in die casting technology.
- To stimulate awareness of and interest in the die casting process.

To be considered for a David Laine Scholarship, applicants must meet specific criteria, one of which is having worked at a die casting company or supplier to the die casting industry for at least three months within the past 12 months. Receiving a Laine Scholarship award encourages early undergraduate college students to continue to work in our industry (often with the same company) and consider die casting as a career path.

"Thank you to all of our businesses who support interns in their facilities. These interns learn just how important manufacturing is in North America," Meyer stated. "If your business is considering hiring an intern or two, I urge you to do so. Our youth in manufacturing is our future."

Helping retain students in the die casting industry is one of the cornerstones of the Laine Scholarship program, which is why the applicants must have worked an internship or co-op experience before applying. The hope is that the work experience spurs interest in the die casting industry and leads to full-time positions for recipients. The program is important to the die casting industry because it introduces, engages, and ultimately, leads good talent to the die casting industry.

The Laine Scholarship applicants highlight the outstanding skills, energy and initiative of the next generation of die casting engineers. Our most recent Laine winners worked internships where they were able to gain die casting experience in the following areas: process engineering, quality control, die design and maintenance, machine maintenance, part design, automation, scrap reduction and research & development (and more!). "NADCA was pleased to award 14 full-time undergraduate students across North America nearly \$35,000 worth of Laine Scholarships in 2023," Meyer said. "These scholarships are a fitting reward for the hard work of the students." NADCA is proud to introduce the recipients of the 2023 David Laine Memorial Scholarships.



#### **Brett Callow**

Case Western Reserve University Internship at American Axle & Manufacturing, Inc.\*

Brett Callow is a fourthyear undergraduate at Case Western Reserve University where he is majoring in Mechanical Engineering with a minor in Civil Struc-

tural Engineering. Callow interned with American Axle & Manufacturing as a manufacturing engineer at one of their die casting plants. One of his projects included assisting in creating an automated scrap program for an existing machine. During the internship, his supervisors and coworkers were impressed with his knowledge, work ethic, and desire to learn. "Brett was a great student and teammate in Design of Fluid and Thermal Elements. I am impressed with his ability to apply what he learned so immediately during his internship," stated one of his professors. Callow has been offered a full-time position to join American Axle upon graduation.



**Dakota Carter** Trine University Internship at Aludyne

Dakota Carter is a student at Trine University, majoring in Mechanical Engineering. Carter worked as an intern for Auburn Manufacturing Plant where he gained lots of skills, and knowledge. The project he spent the major-

ity of his time on was a cooling jacket for some of Aludyne's shot sleeves. The tests during his internship proved that the cooling jacket helped cool the shot sleeves and increased cold chamber lifetime. Whereas uncooled shot sleeves typically lasted about 10,000 shots, the cooled shot sleeve last over 17,000 shots. "Some of the things that I enjoyed the most at Aludyne were my process engineering experiences. Solving equipment problems and improving efficiency are two things that I am especially interested in when it comes to engineering," Carter said.



#### Trace Edmondson

Bethany Lutheran College Internship at Le Sueur Inc.\*

Trace Edmondson is majoring in Mechanical Engineering and during this past summer he worked in the aluminum plant, specifically in the die casting department. The first half of the sum-

mer was dedicated mostly to work on instruction templates. When a machine needs to be switched from one job to another, the set-up crew removes the previous job from the machine and sets a new job up onto that same machine. These setups can make or break the efficiency of a running machine and the quality of the parts. The old work instructions were severely outdated and hard to understand. For these reasons, Edmondson made a new template for the work instructions for each machine. Edmondson is grateful for the experience which taught him what an engineer is and what an engineer does.



#### Joshua Fett

Miami University Internship at Fort Recovery Industries Inc.\*

Joshua Fett attends Miami University, working toward a degree in Electro-mechanical Engineering. Fett interned at Fort Recovery Industries and has the distinction of being a two-time Laine Scholar-

ship recipient. As part of his position, he helped in the development of quality control efforts. He also worked on a detection gauge designed to identify whether products meet specifications. This innovative tool will play a crucial role in distinguishing between good and bad quality parts, and help to consistently deliver high-quality products. "His assignments demonstrated not only outstanding research skills but also a remarkable degree of creativity," Fett's professor stated. "Josh consistently displayed traits of meticulousness, punctuality, and organizational prowess, all underpinned by a strong sense of responsibility towards his work."



#### **Andrew Findley**

Drury University Internship at Production Castings, Inc.

Andrew Findley is currently attending Drury University studying Leadership and Organizational Communications. Findley's internship provided him the chance to work on many

different projects every day including maintenance. His tasks often provided the opportunity to work on National, Techmire, B&T, and Avnet machines. "A large majority of my job was focused on the company's zinc hot chamber die cast machines, working on anything from goosenecks to hydraulics systems," Findley said. In his internship he learned how to clean out the underground scrap pits and helped set-up two new Shibaura 350 ton cold chamber die cast machines. His manager praised Findley's willingness to step up and participate and said he demonstrates a passion to his commitment.





Edison State Community College Internship at Fort Recovery Industries, Inc.

Chloey Grisez attends Edison State Community College and is working toward a degree in marketing. Her internship was at Fort Recovery Industries, where

she was focused on trying to get the world to see that die casting is crucial to the functionality of our world. "As a human resources intern, I love to express what we do here in the industry," Grisez said. She learned the importance of die casting in our world and continues to try and teach many of the importance it holds around us in many ways by advertising it on social media. Grisez created posts on multiple social media outlets to bring awareness to the die casting industry. She also helped celebrate both her company and colleagues' accomplishments. Prior to her internship, Grisez worked a summer on the plant floor as a production associate where she worked on tasks such as quality control.



#### Ethan Hearty

University of Akron Internship at Honda Development Manufacturing of America\*

A Mechanical Engineering student at University of Akron, Ethan Hearty is appreciative of his colleagues at Honda for introducing him to the world of die casting

through the aluminum casting department. He learned the art of die building. He found the importance of trials to perfect the finished product through his work in transitioning dies from the research and design stage into mass production. Through his experience he also learned about how every setting on a machine affects the outcome of the quality of the part. "Finalizing the design, ordering parts, machining the face and assembling the die myself helped further my understanding," Hearty said. "While I'm only just getting started in the die cast industry, I'm excited to see where the journey will take me!"



#### **Tim Highum**

University of Wisconsin – Platteville Internship at Mercury Castings Division of Mercury Marine\*

Tim Highum is currently majoring in Industrial Technology Management. He is also working on Minors in Drafting and Production Development Technology

and Metals Processing Technology. One of his biggest projects through his co-op was reverse engineering and improvement of a unit die. Highum learned how to use Magma simulations and even got to present about his work experience at a Magma conference. "I understand that there is still a wide variety of knowledge of diecasting for me to learn about, but I look forward to continuing to explore the die casting world and create an impact within the industry as I move towards and past graduation from college," Highum said.



#### **Alexander Loeffelman**

University of Missouri Internship at Production Castings, Inc.\*

Alexander Loeffelman, a Mechanical Engineering student, found that working at Production Castings in the maintenance department taught him not only engineering roles and daily

routines but also allowed him to learn the about how the machines worked. Projects spanned from curing excessive flash, learning SolidWorks and even extensive research in a quest to lower utility bills and emissions. He also helped to work on a grant to purchase more efficient technology. He found that there isn't a clear answer to what a day in the life of the engineer is like, that there is a range of projects and people that one works with every day. "Getting to intern at Production Castings and work in the die casting industry is truly an experience that will help me succeed no matter where my career ends up taking me," Loeffelman said.



#### Logan Manross Penn State Internship at PHB Inc., Die Casting Division\*

Logan Manross is pursuing a degree in finance and says that he was immersed in a compelling project focused on analyzing metal consumption in the die casting industry, including daily consumption,

material transportation, material weight, unit cost, and final shipment costs. The goal was to be able to project metal requirements on an annual basis. "I am eager to apply my analytical skills and knowledge to help optimize processes, reduce costs, and enhance overall performance in this dynamic field," Manross said. "The potential for innovation and improvement in die casting is promising, and I look forward to being a part of the positive change that lies ahead."



#### Brennan Neitzel

Grand Valley State University Internship at BuhlerPrince, Inc.\*

Brennan Neitzel is an Electrical Engineering student, and the first part of his internship was learning about the BuhlerPrince's machines, their components , how they work and how to use the

programs that make the schematics and software for the machines. His major project for the summer was to build a portable C5 simulator. This was to be modelled after similar machine made in Switzerland. The purpose of the machine was to test new software developments, provide customer trainings, and test peripheral interfaces with suppliers prior to machine installation. Neitzel learned about the Laine scholarship through two of his colleagues who went through the same co-op program and went on to win Laine scholarships themselves. He hopes to continue his co-op at BuhlerPrince this summer.



#### Gabe Riska

University of Wisconsin -Madison Internship at New Age Chemical

Gabe Riska, a chemical engineering student, spent his last two summers as a lab intern at New Age Chemical. Initially, his work consisted of quality control testing and

working on routine processes. Once he gained a proficient knowledge, he moved into more special projects including new technology. Riska focused on evaluating new oils, esters and polymers to see if any of these new materials aided in metal flow, improved release properties, increased heat dissipation, or die lubrication. Much of my time was spent doing research on these release agents. "This endeavor was both engrossing and enlightening, as it revealed the remarkable impact that altering surfactants or oil types could have on blend stability," Riska said. "I am eager to carry this commitment to improvement into my future roles, with the aspiration of further enhancing the die casting industry."



#### **Garret Starkman**

University of Wisconsin-Platteville Internship at Mercury Castings Division of Mercury Marine\*

Garret Starkman studies Industrial Technology Management at school, and for his Co-Op, assumed the role of a Foundry Manufacturing Engineer in the tooling area.

His responsibilities included assisting the tooling groups, improving team functionality, and actively participating in learning programs such as Creo and AutoCAD. He also learned about casting defect identification and attended daily meetings to address production complications. He found his minor in Metal Processing Technology to give him a solid foundation of industry-specific knowledge and terminology. "Upon graduation I look forward to perusing a career in the die casting industry," Starkman said. "Collaborating with Mercury Marine staff who are University of Wisconsin-Platteville alumni provided a glimpse into the future. Every day presented a new challenge, and I am looking forward to learning more about die casting and sharing my knowledge gained with my peers." Starkman is a second-time Laine scholarship recipient.

#### Luke Tangeman



The Ohio State University Internship at Fort Recovery Industries, Inc.\*

Luke Tangeman studies Mechanical Engineering and is the third student to have qualified for a second Laine Scholarship award this year. He also returned to Fort Recovery for his second summer,

and with the base knowledge from his previous internship, he was able to hit the ground running. Tangeman worked on serval projects including robot cable management mounting, automated trimming cell layouts and various fixture modifications. One of his longer projects included automating a work cell, which incorporated establishing borders, layouts, and current equipment as well as working with other plant personnel to be sure any model would still be adaptable to other products, staying compact, allowing room for a changeover, and more. Tangeman is grateful for the experience he gained through his internship and knows it will be applicable wherever his path leads him. Scholarships provided by the Laine Scholarship Fund are supported entirely by contributions and pledges from the die casting community. Donations may be sent to NADCA at:

3250 N. Arlington Heights Rd - Ste 101 Arlington Heights, IL 60004, ATT: Laine Scholarship Donations.

The Laine Scholarship accepts applications for 2024 from August 1 - October 1. For more information on how to apply, please visit: www.diecasting.org/scholarship.

\*NADCA Corporate Member Company

#### Help Shape Our Industry's Future.

#### Show students a great career path in die casting by hiring interns at your company.

Your support for the Laine Die Casting Internship & Scholarship Program is a great partnership that benefits everyone. You can add short-term resources with students who are technologically savvy, while they gain insights to focus on their careers. Plus, when students complete their internship, they can apply for a Laine Die Casting Scholarship to help them complete their studies.

Visit www.diecasting.org/intern or e-mail intern@diecasting.org



Your support is an investment in our industry's future.

Start the process today to secure a high quality intern student for your facility this coming summer!

# DIE CASTING CONGRESS 2024 & EXPOSITION

SEPTEMBER 30-OCTOBER 2 | INDIANAPOLIS, IN

# SAVE THE DATE





## Exhibitor Spotlight

#### AarKel Tool & Die Inc.

17 Elm Drive South Wallaceburg, ON N8A 5E8 Canada P: (519) 360-7702 www.aarkel.com



🔨 AarKel

AarKel Tool and Die Inc. specializes in engineering, designing and manufacturing of die-cast dies, including GIGA dies ranging from 600T to 9000T. Our additive manufacturing group offers innovative solutions such as conformal cooled Inserts. Process development and sampling are provided through AarKel Technologies in Indiana. Trim Dies are available via AarKel-NovaTrim, and Mangas-AarKel Tool & Engineering Inc. serves our southern clients in Alabama. For global clientele in Mexico, we

operate AarKel-Platinum de Mexico.

Absolute Haitian Die Casting Systems	909
33 Southgate Street	
Worcester, MA 01610	
United States	
D (FOO) FOO (00F	

P: (508) 792.4305 www.absolutehaitian.com

#### **Allied Metal Company**

708

724

4528 West Division Street Chicago, IL 60651-1605 United States P: (312) 225-2800 www.alliedmetalcompany.com



#### Automation System & Design Inc.

3540 Vance Road Dayton, OH 45439 United States P: (419) 467-5727 www.asddayton.com

#### **B&L Information Systems Inc**

4707 Rambo Rd Bridgman, MI 49106-9723 United States P: (269) 465-6207 www.blinfo.com



806

B&L Information Systems is the global leader in cloudbased Enterprise Resource Planning (ERP) software for foundries, die casters and investment casters. Since 1976, B&L has implemented their unique ERP solutions at over 500 metalcasting operations, making their cloudbased Odyssey ERP match how metalcasters operate. With Odyssey, metalcasters maximize their resources, minimize costs, and make better decisions faster.

#### Bedford Machine & Tool Inc.

2103 John Williams Blvd. Bedford, IN 47421-2447 United States P: (812) 275-1948 www.bedfordmachine.com



1118

Serving the die cast industry since 1988. • Die replacement components. • Die repair & refurbish-

ment. · Trim dies / trim presses / trim tooling. · Automation. · End of arm robot tooling. · Air decay leak testers.

- $\cdot$  Dunk leak testers.  $\cdot$  New Cavity Inserts.  $\cdot$  New Die Mfg.
- · Assembly stations. · Dot peen marking stations. · Ma-
- chining fixtures. · Tooling / machined components.
- $\cdot$  Mechanical & electrical engineering.

#### BOHLER 1050 Remington Road Schaumburg, IL 60173 United States P: (888) 368-3376 www.us.bohler.com

BÖHLER

834

When the job is tough, customers turn to BÖHLER Steels – exclusively represented by EDRO in the USA. Böhler prides itself on providing complete solutions with industry leading grades W360 (highest thermal stability and wear-resistance), W350 (large deep cavities), W403 (heat checking resistance), and W302 (premium H-13). Additionally, we offer full additive manufacturing services from design to part, and superior eifeler coatings that include Crosal-plus and Duplex-Tigral. No matter what the situation calls for, BÖHLER is here.



#### **Brach Machine**

367 Paul Road Rochester, NY 14624 United States P: (585) 343-9134 www.brachmachine.com



402

Brach Machine is a full-service machine shop manufacturing parts for the die casting industry. We offer a variety of machined shot-end components for all makes and models of zinc and aluminum casting machines. Goosenecks, nozzles, noses, plungers, plunger couplings, shot rods, and shot couplings can be made to your specifications. We specialize in replacement parts for use in Techmire<sup>®</sup> and other miniature machines. Other services include refurbishing and re-sleeving goosenecks and deep hole gun drilling.

#### **Brondolin North America**

918

BRONDOLIN

1055 N Shore Drive Benton Harbor, MI 49022 United States P: (269) 208-3867 www.brondolin-na.com

World leader in HPDC injection tools since 1968, enthusiastically opened Brondolin NA division in 2021 to better support NA customers and share the best solutions for injection systems necessary to produce complex aluminum castings

#### **BuhlerPrince**, Inc.

524

670 Windcrest Dr Holland, MI 49423-5410 United States P: (616) 394-8248 www.buhlerprince.com



Die Casting Machines and systems made by Buhler-Prince are ideal for the most varied processes. Whether you are interested in aluminum, magnesium, zinc, vacuum, structural or engine block processes – BuhlerPrince has the right solution. BuhlerPrince supports customers throughout the life-cycle of their equipment with global services including process optimization, flow simulations, remanufacturing, retrofits and upgrades.

#### **Castec Corporation**

7640 Moller Road Indianapolis, IN 46268 United States P: (317) 872-3882 www.castec-inc.com



CASTEC manufactures high-quality products to meet customer needs using the latest equipment and advanced technology.

We have a track record of transactions in over 20 countries around the world, so please leave your overseas support to us.

Castool Tooling Systems/ Exco Engineering		512
2 Parratt Road Uxbridge, ON L9P 1R1 Canada P: (905) 852-0121		
	1.	

Die casting is a complex and demanding process that requires precision, efficiency, and quality. No single component of the die cast production process should be examined or evaluated individually. Each interacts with at least one other complementary element of the process. If the interacting elements are equally efficient, they will reinforce and enhance the function of each other.

Castool is a global leader in providing innovative and customized solutions for the die cast industry. Castool offers a range of products and services that can optimize your die cast production process and improve your product quality, productivity, and profitability.

Chem-Trend, LP	602
1445 McPherson Park Dr Howell, MI 48843-3947 United States P: (517) 302-2962 www.chemtrend.com	Chem Trend

Chem-Trend provides specialized solutions and expertise in release agents and lubricants for the die cast industry. We offer a comprehensive portfolio of die cast solutions and services. Products include die lubricants, plunger lubricants, hydraulic fluids, ladle coatings, die maintenance products, technical support and expertise. Chem-Trend aims to help customers improve operational efficiency, productivity, and part quality while ensuring the longevity and performance of dies and equipment.



#### **COLOSIO SRL**

Via Caduti Piazza Loggia 33 25082 Botticino (BS) Italy P: 390302692181 www.colosiopresse.com

#### **Conticast Hormesa LLC**

OS Y METALES S.A

418

307

9340 Queens Blvd 2J Flushing, NY 11374 United States P: (954) 600-7379 www.conticast.com



Conticast Hormesa LLC offers advanced die casting solutions designed for efficiency and precision in metal processing. Their systems feature state-of-the-art technology, including automated controls, high-performance molds, and energy-efficient furnaces, ensuring consistent quality and productivity. With a focus on sustainability, their solutions reduce waste and energy consumption, making them a preferred choice for industries seeking reliable and environmentally responsible casting operations.

#### **Diehl Tool Steel**

1013

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



Diehl Tool Steel is a fully integrated distributor of specialty tool steels, powder metals, aluminum, carbon and stainless alloys. Diehl Tool Steel is the largest distributor of Yasugi® Specialy Steel proprietary grades in North America and a wholly owned division of Proterial Business Group. Diehl Tool Steel processes orders to exact customer specifications.

#### **Dynamo Inc**

1018

7-107 Kyoei Street Seto, Aichi 489-0984 Japan P: +81 561 88 1071 www.dynamoinc.us/



We are a top Japanese manufacturer specializing in jetcooled core pins and mold components for high-pressure die-casting. We serve users globally. Our die-cast die components include jet-cooled core pins, cascades, inserts, bore cores, and water jackets. We also offer complete molds and additive manufacturing products made from HTC45 die steel powder, providing benefits like SKD61 equivalence, high thermal conductivity, low expansion, and improved component life through conformal cooling.

#### **Eastern Alloys Inc**

11 Henry Hennig Dr. Maybrook, NY 12543-0316 United States P: (845) 427-2151 www.eazall.com



311

Eastern Alloys manufactures world-class zinc alloys for the die casting industry using state-of-the-art processing technologies. Zinc alloys are manufactured in Eastern's 100,000-square-foot plant in Maybrook, New York, and as well as our Henderson, Kentucky plant. Eastern Alloys' competitive advantage is our combination of exceptional quality products and unique customer service programs (including defect analysis consultation, training and marketing) to ensure our customers have all the tools needed to manufacture high quality products.

#### EKK, Inc.

37682 Enterprise Court Farmington Hills, MI 48331-3440 United States P: (248) 624-9957 www.ekkinc.com

513

**EKK**.inc.

EKK Inc. is a global supplier of Casting Simulation Software and Consulting Services. The EKKcapcast software suite provides the ability to seamlessly setup and simulate a comprehensive set of casting processes. Finite Element Method (FEM) meshes of your part and mold are automatically created for you for the simulation of the entire process. EKK Inc. also provides engineering consulting services using EKKcapcast. Our experienced engineers help identify problems before they arise and optimize existing processes.

#### **Ellwood Specialty Steel**

499 Honey Bee Ln New Castle, PA 16105 United States P: (800) 932-2188 www.ess.elwd.com

#### Fisa North America Inc.

260 Stanley St. Elk Grove Village, IL 60007 United States P: (847) 299-8400 www.fisa.com

814

EXHIBITOR SPOTLIGHT

#### Flow Science

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

FLOW-3D CAST is a state-of-the-art metal casting simulation modeling platform that combines extraordinarily accurate modeling with versatility, ease of use, and high-performance cloud computing capabilities. For every metal casting process, FLOW-3D CAST has a workspace ready to put you on a quick, intuitive path to modeling success. With 11 process workspaces, powerful post-processing, pioneering filling, and solidification and defect analysis, FLOW-3D CAST delivers both the tools and roadmap for designing optimal casting solutions.

#### **Fondarex USA**

Route Industrielle 13 St-Legier Vaud, 1806 Switzerland P: (269) 679-7164 www.fondarex.com



With the increasing demand of high quality diecast parts for E-mobility and MEGA / GIGA- Castings, Fondarex created a complete solution for an integrated system, consisting of; Vacuum unit, Squeeze Unit and Jet Cooling System to enhance the quality, reduce costs and expand the range of processable alloys.

The devices are controlled by a Central Periphery Management System to enhance energy efficiency, process optimization and simplifying maintenance and operation.

Please come and visit Fondarex at the booth 511 during the Die Casting Congress & Exhibition in Indianapolis!

Frech USA Inc.	132
6000 Ohio St Michigan City, IN 46360-7757	U.S.A.
United States	

United States P: (616) 930-1762 www.frechusa.com

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

#### Godfrey & Wing

508

FLOW-3D CAST

220 Campus Drive Aurora, OH 44202 United States P: (330) 562-1440 www.godfreywing.com



1002

Established in 1948, Godfrey & Wing is the longest-serving and largest vacuum impregnation equipment provider in the world. We manufacture and supply equipment, sealants, and services to seal casting porosity. Our systems are engineered to maximize productivity, economize sealant usage, and conserve resources. Godfrey & Wing maintains an extensive network of vacuum impregnation service centers and strategic partners. Global automotive, aerospace, defense, medical, and industrial companies trust Godfrey & Wing to seal their castings.

#### Hanson International

3500 Hollywood Road Saint Joseph, MI 49085-9581 United States P: (269) 429-5555 www.hansoninternational.com



401

807

Hanson International excels in precision mold and highpressure die cast die design, build, sampling, and inspection, primarily serving the automotive industry. Situated in Saint Joseph, Michigan, Hanson's campus features an office/engineering group, a manufacturing facility, and a die testing facility. Using modern equipment and engineering software, Hanson's experienced workforce ensures top-quality tooling. Hanson's rigorous inspections follow ISO 9001:2015 standards, ensuring excellence from design to delivery with a single-source, single-point-ofcontact approach.

#### Henkel Corporation

32100 Stephenson Highway Madison Heights, MI 48071 United States P: (866) 332-7024



#### HERCO, LLC

1377 Atlantic Blvd Auburn Hills, MI 48326 United States P: (248) 656-5900 www. hercogroup.com 518 H**ERCO** 

Founded in 2007, HERCO provides service and equipment to the aluminum/magnesium high-pressure die casting industry. HERCO is one of the leading providers for custom capital equipment and services in Tooling, Spray Systems, and Air Filtration. HERCO manufactures a multi-channel MoldFlush Unit, Die Release Mixing Unit, and performs maintenance service, repair, and rebuild to all major-brand TCUs (Temperature Control Units). Stop by booth #518.

#### High Temperature Systems Inc

16755 Park Circle Dr Chagrin Falls, OH 44023-4562 United States P: (440) 543-8271 www.hitemp.com



With over 50 years of industry experience, High Temperature Systems, Inc. is a world leader in the innovative design of molten metal circulation, transfer, treatment, and chip submergence solutions. Our standard solutions target the aluminum, zinc, tin, and lead industries while our R&D resources develop unique solutions for specialty high-temperature liquid metal and mineral applications. We take the time to understand your unique challenges and design a solution that provides maximum value.

#### Hildreth Manufacturing LLC

1657 Cascade Drive Marion, OH 43302 United States P: (740) 375-5832 www.hildrethmfg.com

#### Hill and Griffith Company

618

1126

1085 Summer St Cincinnati, OH 45204-2037 United States P: (800) 543-0425 www.hillandgriffith.com



Die lubricants, Dry powder die lubricants, Die coatings, Die spraying equipment, Plunger lubricants, Quench compounds, Rust and oxidation corrosion preventers, Ladle coatings, Fluxes, Refractories, Tool coatings, Antisolder paste, Hot spot Greases, Pin lubricants, Assembly Lubricants, Cleaning compounds, Toggle lubricants, Heat treating services, Hydraulic fluids, Machining coolants, Automation equipment, Lubrication central proportioning systems, Parts cleaners, Floor cleaners

#### HTS International Corporation

123 Center Park Dr Ste 233 Knoxville, TN 37922 United States P: (865) 382-5601 htsintl.com

#### **IECI SRL**

IECI C/o SR Mechanical Llc 3631 Washington Ave Bedford, IN 47421 United States P: 00390306850370 www.iecionline.com

#### Inductotherm Corp.

10 Indel Ave Po Box 157 Rancocas, NJ 08073 United States P: (609) 267-9000 www.inductotherm.com 606

428

913

Induction can heat and melt aluminum at very high efficiency rates with very low metal losses as compared to gas or oil-fueled furnaces, which can emit a tremendous amount of carbon dioxide. As we go green, we help our customers meet their decarbonization initiatives through our induction furnaces. With over 70 years of experience, we can be your answer to reducing your carbon footprint. Visit Inductotherm.com to learn more.

Industrial Innovations Inc	536
2936 Dormax St SW Grandville, MI 49418	
United States	
P: (616) 249-1525	
www.industrialinnovations.com	

Industrial Innovations provides sustainable lubrication and automation products. Like our PRO-MIX<sup>™</sup> proportional mixers ideal for graphite/synthetics, SPRA-RITE<sup>™</sup> application such as automated reciprocator sprayers, and RECLAIM-PRO<sup>™</sup> recycling systems. We are a FANUC Authorized System Integrator and produce EOAT items like custom manifolds and spray nozzles. Our Advance <sup>™</sup> equipment include automatic ladlers, shot-sleeve reconditioning, tip lubers, and cooling conveyors. Also, consumable products such as shot sleeves, die clamps, ladle cups, hand spray wands, plunger rods/tips.



#### International Mold Steel

603

802

1155 Victory Place Hebron, KY 41048 United States P: (859) 342-6000 www.imsteel.com

#### J&S Chemical Corp

170 N Industrial Way Canton, GA 30115-8217 United States P: (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<sup>®</sup> (die release agents and liquid plunger lubricants), ShotBeads<sup>®</sup> (solid plunger lubricants) and TurboTrim<sup>™</sup> (trimming fluids).

#### Lethiguel USA

14800 James Rd Rogers, MN 55374-9361 United States P: (763) 428-4229 www.lethiguelusa.com

#### LK World

600 S Kyle Street Edinburgh, IN 46124 United States P: (616) 796-0777 www.lkadvantage.com

#### M & I Machine

PO Box 1243 Benton Harbor, MI 49023-1243 United States P: (269) 849-3624 www.shotendtooling.com



M&I Machine is a supplier of quality shot-end components for the aluminum and magnesium die casting industry. Originally founded in 1980, M&I Machine has experienced significant growth in the North American market through a dedicated approach to service, quality, and on-time delivery. Whether it is new shot sleeves, reconditioned shot sleeves, shot rods, or any other shot end tooling you may need, we guarantee you will not be disappointed with our products and service!

#### MAGMA Foundry Technologies Inc.

10 N Martingale Rd Suite 425 Schaumburg, IL 60173 United States P: (847) 252-1668 magmasoft.com



1101

403

817

318

MAGMA's product and service portfolio includes the powerful, modular software MAGMASOFT<sup>®</sup>, with the newest release MAGMASOFT<sup>®</sup>, as well as engineering services for casting design and optimization. Today, MAG-MASOFT<sup>®</sup> is used throughout the metal casting industry, especially for the robust design and optimization of cast components in automotive and heavy industry applications.

#### MORESCO USA Inc.

PO BOX 446 Fountain Inn, SC 29644 United States P: (864) 770-0430 www.morescousa.com

#### Nexthermal Corporation

1045 Harts Lake Road Battle Creek, MI 49015 United States P: (269) 964-0271 www.nexthermal.com

#### NovaCast USA Inc.

1952 McDowell RD Naperville, IL 60563 United States P: (630) 450-1647 www.novacastusa.com

#### **OEE Companies**

855 Village Center Drive #336 Saint Paul, MN 55127 United States P: (612) 440-5714 www.oeecompanies.com



OEE Companies supplies custom inserts, tooling and advanced simulations to high pressure die casters including: custom core pins, chill vents, vacuum systems, jet cool systems, sub-inserts, ejection pins, parting line locks, guide pins and bushings, jet cooled pins and cascades, electric furnaces, multi-slide dies and open close dies.

332

517

www. diecasting.org/dce



#### **Phygen Coatings Inc**

1400 Marshall St NE Minneapolis, MN 55413-1040 United States P: (612) 767-3242

Phygen is the exclusive provider of FortiPhy XVD, a revolutionary surface enhancement process that far exceeds the performance characteristics of even the best conventional PVD coatings. Tool life and productivity can be increased 3x to 80x due to FortiPhy XVD's nanoperfection process, which eliminates up to 90% of the macro particle defects found in PVD coatings. Benefits include dramatic reductions in soldering, erosive wear, and heat checking. Phygen offers tailored ultra-endurance solutions to meet your most demanding needs and is a proven leader in research and advances in die casting.

#### **Progressive Components**

919

420

PROGRESSIVE

601

**PHY**GEN

BEYOND BETTER

235 Industrial Drive Wauconda, IL 60084 United States P: (800) 269-6653 www.procomps.com

Progressive Components is a leading source of high-performing standard products for the die-cast industry. With today's plant managers working to reduce unscheduled production stoppages, Pro has engineered our die-cast line to maximize performance and longevity, and our Black Nitride products are proven to outperform others exponentially. Unlike standard additive process treatments, Pro's Black Nitride is a high-hardness diffusion that won't wear like DLC and other surface coatings and is available on our Pins, Sleeves, Bushings, and more.

#### **Prolong Surface Technologies**

3840 Ohio Ave Saint Charles, IL 60174 United States P: (630) 762-6500 www.prolongtool.com

#### **Pyrotek Inc**

705 West 1st Ave Spokane, WA 99201 United States P: (866) 797-6835 www.pyrotek.com

Pyrotek's foundry team offers process and product solutions designed to increase metal and casting quality, improve process efficiency, reduce energy and replacement costs and optimize performance.

224

202

503

**REGLOPLAS**<sup>®</sup>

**Pyrotek** 

- Pyrotek's fully engineered systems include:
- Melt circulation and recovery systems
- Molten metal pumps
- Transport ladles and launders
- Rotary degassing and flux-injection equipment
- Degassing consumables
- Holding furnace refractory relining
- Underheated immersion furnaces

Backed by global research and development, Pyrotek is equipped to provide die casters with comprehensive and customized solutions.

#### QuakerHoughton

901 Hector Street Conshohocken, PA 19428-2380 United States P: (610) 832-4000 www.quakerhoughton.com

#### Regloplas Corp

4063 Tabor Rd. Sodus, MI 49126 United States P: (269) 769-6441 www.regloplasusa.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.

317

TECHMIRE

#### Ryoei USA Inc.

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



1124

Ryoei is a full-service industrial automation provider specializing in die-casting that supplies state-of-the-art products and services for OEMs. We provide our customers with die spray systems, inspection systems, sorting equipment, pallet changers, material handling systems, and much more.

Our customer-first policy is what guides our innovation and service. We anticipate and respond to customer needs and develop better, faster, and more cost-effective solutions for OEMs.

SAPP Inc.		

600 S Kyle St Edinburgh, IN 46124 United States P: 00393348108947 www.sappgroup.com

-

#### Spectro Alloys Corp

1107

1017

501

414

13220 Doyle Path East Rosemount, MN 55068-2510 United States P: (612) 480-6124 www.spectroalloys.com

#### STOTEK, Inc.

W233 N2800 Roundy Circle West Suite 200 Pewaukee, WI 53072 United States P: (262) 347-0845

#### Swiss Steel USA, Inc.

365 Village Dr Carol Stream, IL 60188-1828 United States P: (800) 323-1233 www.swisssteel-international.us



www.swisssteel-international.us Swiss Steel USA / Canada, part of Swiss Steel Group, is a

leading distributor of quality tooling materials for the Die Casting tooling industry with a wide range of specialty tool, die and mold steels. Hot Work Die Steels include Thermodur<sup>®</sup> 2344, 2367, E40K, and DC Superior all remelted materials manufactured to the latest Die Casting specifications. Value added services include Vacuum Heat Treatment, full Lab services, CNC machining, and Custom saw cutting at six service centers in North America.

#### Techmire

185 Voyageur Pointe-Claire, QC H9R6B2 Canada P: (514) 694-4110 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 :

- design, manufacture and testing of die-casting machines and tooling

- training of customers' operators and maintenance personnel
- full after-sales service
- machine retrofitting and refurbishing

- annual maintenance & support program Techmire provides cost-effective solutions to manufac-

turers of die cast components to cast complex parts with faster cycle speed, higher material utilization and superior part quality.

#### The Schaefer Group Inc

1300 Grange Hall Road Dayton, OH 45430 United States P: (937) 253-3342 www.theschaefergroup.com



728

Frank W. Schaefer, Inc (FWS) started business as a refractory contractor in 1930, and began designing and manufacturing industrial furnaces in 1945. In the early 1970's, FWS's aluminum furnace business grew large enough that it became necessary to form two divisions within the company: A Refractory Sales and Service Division and an Industrial Furnace Division. In 1998, the Industrial Furnace Division was separated from FWS, Inc to form a new company, Schaefer Furnaces, Inc (SFI). A combining of these two related companies took place in late 2002, forming The Schaefer Group, Inc. Two strong traditions are recombined, with the FWS Division providing exceptional refractory sales and service work and the SFI Division providing the best aluminum furnaces and molten metal delivery systems available.

#### Uddeholm USA

2505 Millennium Drive Elgin, IL 60124 United States www.uddeholm.com/us 834

**UDDEHOLM** 

Uddeholm specializes in innovative die-casting solutions, prioritizing our clients' productivity. Our flagship product, Uddeholm Dievar, is now available as AM powder or a fully 3D printed insert, boasting exceptional toughness and ductility. Our comprehensive offerings encompass tool and die Steels, PVD coatings, Powders for AM, and 3D Printing, coupled with trusted Technical and Engineering Support. Focal steel options include Uddeholm Dievar<sup>®</sup> (≥18.4 ft-lbs. toughness value) and Uddeholm Orvar Supreme<sup>®</sup> (≥12 ft-lbs. toughness value), complemented by advanced PVD Coatings (Duplex-TIGRAL<sup>®</sup>) and innovative Additive Manufacturing solutions.



#### Valor Renewables

11280 Charles Road Houston, TX 77041 United States P: (248) 231-6737 www.valorrenewables.com



Valor Alloys, LLC is a secondary smelter located in Houston Texas producing prime equivalent alloys and secondary alloys that meet or exceed customer specifications for the die casting industry. Valor possesses a rotary furnace and reverb furnace and is capable of making ingots and SOWs. Valor Is ISO 9001 Certified and a Tier 1 Automotive Supplier. Address 11280 Charles Rd. Houston, TX 77041: sales@valorerenewables.com 713-896-8585

#### **VERSEVO Inc**

612

Versevo

1055 Cottonwood Ave Hartland, WI 53029 United States P: (262) 369-8210 www.versevo.com

VERSEVO is a provider to the cast metals industry, with a focus on product diversity, and mission to become the premier supplier to the metal casting and cast products industries. Offerings include process development engineering, part design, tool design, prototype & production tooling, low pressure aluminum castings, production machining, and foam molding, for High Pressure & Low-Pressure Casting, Trimming, Lost Foam Casting, Permanent & Semi-Permanent Mold Casting, and Vertical & Horizontally parted Sand Casting.

#### Visi-Trak Worldwide LLC

8400 Sweet Valley Dr Ste 406 Valley View, OH 44125-4244 United States P: (216) 524-2363 www.visi-trak.com 827

#### voestalpine Additive Manufacturing 8 Centers – North America 11869 Cutten Road voestalpine

Houston, TX 77066 United States P: (800) 638-2520 www.voestalpine.com/highperformancemetals/ canada/en/services/additive-manufacturing

voestalpine Additive Manufacturing Centers (vAMC) are your premier destination for comprehensive Additive Manufacturing (AM) services specializing in die-cast tooling. We collaborate closely with clients to deliver personalized solutions, employing our optimized design, powder, and printing methods complemented by enhanced services like heat treatment and coating. Merging cutting-edge AM expertise with a wealth of die-casting experience, we offer the optimal tooling solution. Our services encompass conformal cooling design, process simulation & consultation, turn-key tooling manufacturing, and efficient spare management.

#### voestalpine eifeler Coatings LLC

voestalpine

834

834

2505 Millennium Drive Elgin, IL 60124 United States P: (800) 638-2520 www.eifeler.com/northamerica

voestalpine eifeler Coatings offer PVD coating Services to the North American Die Casting Industry. Our Duplex-TIGRAL<sup>®</sup> coating, with its high hot hardness characteristics, is a great solution for wear protection, as well as, both chemical resistance and oxidation. Additionally, when subjected to shear loads, the nanostructure properties help to prevent crack propagation, resulting in more production and less downtime. Visit us at www. eifeler.com/northamerica. PVD Coatings: SUBLIME<sup>®</sup>, Duplex-TIGRAL<sup>®</sup>, Duplex-VARIANTIC<sup>®</sup>

voestalpine High Performance Metals	834
2505 Millennium Drive	voestalpine
Elgin, IL 60124	one step ahead.
United States P: (800) 638-2520 www.voestalpine.com/highperfor- mancemetals/usa	
voestalpine High Performance Metals is p	oart of voes-
talpine AG, a leading steel and technology	y group. Based

talpine AG, a leading steel and technology group. Based in Linz Austria, voestalpine is a global partner to the automotive, white goods, and energy industries. Through our various brands, we service the North American Die Casting Industry and global OEM's with tool steel, PVD Coatings, Heat Treatment and Additive Manufacturing. Brands and business units: Uddeholm, BOHLER, eifeler, voestalpine Additive Manufacturing Centers



#### YIZUMI-HPM Corporation

3424 State Rt 309 PO Box 210 Iberia, OH 43325 United States P: (740) 382-5600 www.yizumi-hpm.com

#### Zitai USA - Die Casting Equipment Group

1024

824

1191 Hilary Lane Highland Park, IL 60035 United States P: (847) 441-8500 www.zitai.com





#### **CORPORATE DIE CASTERS**

#### A

A & B Die Casting, a division of Benda Tool & Model Works, Inc. Hercules, CA

AAM - American Axle & Manufacturing Detroit, MI

ABCO Die Casters Inc. Newark, NJ

ACE Precision International, LLC Marshalltown, IA

Acme Alliance LLC Northbrook, IL

**ADC Aerospace** Buena Park, CA

Advance Die Cast LLC Milwaukee, WI

Ahresty Wilmington Corp. Wilmington, OH

Aludyne - Clarksville Plant Clarksville, TN

Alupress LLC Laurens, SC

Anderson Die Casting Co. Englewood, CO

Anderton Castings De Monterrey Apodaca NL

Anderton Castings LLC Troy, TX

Apex Aluminum Die Casting Co. Piqua, OH

Astronics PECO Inc. Clackamas, OR

Auto Cast Inc. Grandville, MI

#### B

Blue Ridge Pressure Castings Lehighton, PA Bocar US, Inc. Huntsville, AL

Boyd Allenton, LLC Allenton, WI

Bridgeport Fittings, LLC a Division of NSI Industries\* Stratford, CT

#### C

C Palmer Die Casting Inc. Oakland, MD

Caldwell Casting Company\* Cambridge, MD

California Die Casting Inc. Ontario, CA

Canimex Incorporated Drummondville, QC, Canada

Cascade Die Casting Group - Atlantic High Point, NC Cascade Die Casting Group - Great Lakes Sparta, MI

Cascade Die Casting Group - Group Services/ Corp. HQ Grand Rapids, MI

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

**Cast Products Inc.** Norridge, IL

**Cast Specialties Inc.** Warrensville Heights, OH

**Centracore de Mexico** Guanjuato, Mexico

Centrifugal Castings\* Milwaukee, WI

**Chicago White Metal Casting Inc.** Bensenville, IL

**CMP Group Ltd.** Delta, BC, Canada

CompX Security Products Grayslake, IL

**Consolidated Metco Inc.** Clackamas, OR

Cosma Casting Michigan, Cosma International, Magna International Battle Creek, MI

#### D

Dalite\* Troy, MI Dart Casting, Inc.\* Alsip, IL **DeCardy Diecasting Co.** Chicago, IL Deco Products Co. Decorah, IA **DyCast Specialties Corp.** Starbuck, MN **Dyersville Die Cast** Dyersville, IA Dynacast International, LLC - Elgin Plant Elgin, IL **Dynacast International, LLC - Germantown** Plant Germantown, WI Dynacast International, LLC - Global Headquarters Charlotte, NC Dynacast International, LLC - Lake Forest PÍant Lake Forest, CA Dynacast Limited Peterborough, ON, Canada Dynacast Mexico SA De CV Obispo, Cuautitlan, Mexico

#### E

Empire Die Casting Macedonia, OH

#### F

Falcon Lakeside Manufacturing Eau Claire, MI FCA Canada, Inc. - Etobicoke Casting Plant Toronto, ON, Canada Fielding Mfg.-Zinc Diecasting Inc. Cranston, RI

Fort Recovery Industries Inc. Fort Recovery, OH FT Precision

Fredericktown, OH

#### 6

G & M Die Casting Co. Inc. Wood Dale, IL

**General Die Casters Inc.** Twinsburg, OH

General Motors Corporation -Bedford Casting Operations Bedford, IN

General Motors Corporation -R&D Technical Center Warren, MI

**Gibbs Die Casting Corporation** Henderson, KY

**Greenfield Industries Inc.** Freeport, NY

#### H

Heritage Die Casting Co. Denver, CO Honda De Mexico - Celaya Engine Plant Celaya, Mexico Honda De Mexico - Transmissions Celaya, Mexico Honda Development Manufacturing of America - Alabama Auto Plant - ALDČ Lincoln, AL Honda Development Manufacturing of America - Anna Engine Plant: ALDC Anna, OH Honda Development Manufacturing of America - Auto Development Center: **Aluminum Division** Ravmond, OH Honda Development Manufacturing of America - Production Engineering Anna, OH Honda Development Manufacturing of America - TMPG: ALDC Tallapoosa, GA Honda Development Manufacturing of America - TMPO: ALDC **Russells Point, OH** Honda North America - Purchasing Marysville, OH Honda of Canada Mfg. Inc. -**Engine Plant: ALDC** Alliston, ON, Canada

Honda Power Equipment -Aluminum Die Cast Swepsonville, NC Hyatt Die Cast & Engineering Corporation

Cypress, CA

#### J&M Precision Die Casting Elyria, OH

JTEKT Automotive Tennessee-Morristown Inc. Morristown, TN

#### K

Kamtek Casting, Inc. - a Division of Magna International Birmingham, AL Kason Industries Inc.

Shenandoah, GA Kobelt Manufacturing Company Limited

Surrey, BC, Canada Kwikset Corporation\*

Denison, TX

#### L

Lakeside Casting Solutions Monroe City, MO Le Sueur Incorporated Le Sueur, MN Linamar Light Metals - Mills River (LLM-MR) Arden, NC Ljunghall Canada Ltd. Grand Bend, Canada

#### Μ

Madison Precision Products Madison, IN Madison-Kipp Corp. Madison, WI Madison-Kipp Corp. - Richmond Richmond, IN

Mag-Tec Casting Corp. Jackson, MI

Marchesi Light Alloy\* Jalisco, Mexico

Mercury Castings - Div. of Mercury Marine, WI Fond Du Lac, WI

Meridian Lightweight Technologies Corporate Head Office Plymouth, MI

Meridian Lightweight Technologies Inc. Strathroy, ON, Canada

Meridian Lightweight Technologies Inc. - GTC

Strathroy, ON, Canada

Meridian Technologies Inc. - Magnesium Products of America Eaton Rapids, MI

Meridian Technologies Mexico Ramos Arizpe, Coahuila, Mexico

Michigan Automotive Compressor, Inc. Parma, MI Michigan Die Casting LLC Dowagiac, MI Midwest Die Casting Corp. Milwaukee, WI Miniature Casting Corp. Cranston, RI Mumford Companies - Metal Casting Division Chicago, IL

#### Ν

Nebraska Aluminum Castings Inc. Hastings, NE Nemak Alabama Sylacauga, AL Nemak Kentucky\* Glasgow, KY Nemak Wisconsin Sheboygan, WI New GLDC LLC Muskegon, MI Northern Iowa Die Casting Inc. Lake Park, IA

#### 0

Omni Die Casting Inc. Massillon, OH Ozark Die Casting Co. Saint Clair, MO

#### P

Pace Industries, Cambridge North Billerica, MA Pace Industries, Chihuahua Chihuahua, Mexico Pace Industries, Corporate Headquarters Rochester, MI Pace Industries, Grafton Grafton, WI Pace Industries, Harrison Aluminum Harrison, AR Pace Industries, Harrison Zinc Harrison, AR Pace Industries, Jackson Jackson, TN Pace Industries, Latrobe Loyalhanna, PA Pace Industries, Maple Lake Maple Lake, MN Pace Industries, Port City Muskegon, MI Pace Industries, Saltillo Saltillo, Mexico **Pacific Die Casting Corporation** Commerce, CA **Pacific Die Casting Corporation** Vancouver, WA PHB - Die Casting Div. Fairview, PA Prestige Casting Inc.

Englewood, CO Production Castings Inc. Fenton, MO

#### 2024 CORPORATE MEMBERS



Promatek Research Center - a Division of Cosma Part of Magna Intl. Brampton, ON Canada R

#### RCM Industries Inc. - Aallied Die Casting Co. of Franklin Park Franklin Park, IL

RCM Industries Inc. - Aallied Die Casting Co. of NC Rutherfordton, NC

RCM Industries Inc. -Corporate Headquarters Franklin Park, IL

RCM Industries Inc. - Imperial Die Casting Co. Liberty, SC

RCM Industries Inc. - Inland Die Casting Co. Wheeling, IL

Rheocast Company, A Division of The Fall River Group, Inc. Germantown, WI

**Ryobi Die Casting Mexico** Irapuato, Guanajuato, Mexico

**Ryobi Die Casting USA Inc.** Shelbyville, IN

#### S

Schlage De Mexico Baja California, Mexico SDC Incorporated

Sullivan, MO Shawnee Specialties Incorporated

Eau Claire, MI Simalex Manufacturing Company Ltd. Langley, BC, Canada

**SKS Die Casting & Machining Inc.** Alameda, CA

Soldy Manufacturing Company Schiller Park, IL

**SpaceX** Hawthorne, CA

Spartan Light Metal Products Inc. Sparta, IL

Spartan Light Metal Products LLC Hannibal, MO

Spartan Light Metal Products -Corporate Office Hannibal, MO

Spartan Light Metal Products LLC Mexico. MO

Spartan Light Metal Products - LMP Plant Mexico, MO

Stellantis - Kokomo Casting Plant Yorktown, IN

STRATTEC Component Solutions Milwaukee, WI

Sundaram - Clayton Limited Deerfield, IN



#### 2024 CORPORATE MEMBERS

TAC Manufacturing Incorporated Jackson, MI

Team Industries - Detroit Lakes Detroit Lakes, MN

Technical Die-Casting Inc. Winona, MN

TESLA Motors Lathrop, CA

**Top Die Casting Company** South Beloit, IL

TRU Die Cast Corp. New Troy, MI TVT Die Casting Die Casting & Manufacturing Portland, OR

Twin City Die Castings Co. Minneapolis, MN

Twin City Die Castings Co. Monticello, MN

Twin City Die Castings Co. Watertown, SD

Twinsburg Manufacturing Facility, a Division of AAM Twinsburg, OH

#### W

Walker Die Casting Lewisburg, TN Whitehead Die Casting Inc.

Gainesville, GA Wilkast, Inc. Grand Rapids, MI

#### γ

Yamada North America South Charleston, OH

#### **CORPORATE SUPPLIERS**

A

AarKel Tool & Die Inc. Wallaceburg, ON, Canada Absolute Machinery Corporation Worcester, MA Alcoa USA Corp. Alcoa, TN Allied Metal Co. Chicago, IL American Metal Chemical Corp. Chicago, IL Anviloy By Astaras Inc. Largo, FL Audubon Metals LLC Henderson, KY Automation Systems & Design Dayton, OH

#### B

**B & L Information Systems Inc.** Bridgman, MI Badger Metal Tech Inc. Jackson, WI **Bedford Machine & Tool Inc.** Bedford, IN **Blue Ridge Community College** Flat Rock, NC **Bodycote Thermal Processing Inc.** Sturtevant, WI BOHLER Walnut, CA **Brach Machine** Batavia, NY **Brondolin North America** Benton Harbor, MI **BuhlerPrince Inc.** Holland, MI

#### C

Cal-Miser Aluminum Systems Inc. Rock Island, IL Canmet MATERIALS - Natural Resources Canada Hamilton, ON, Canada

Castec Corporation Indianapolis, IN

Castool Heat Treat\* Newmarket, ON, Canada

**Castool Tooling Systems** Uxbridge, ON, Canada

Chem-Trend Ltd. Partnership Howell, MI

Colosio Die-Casting Machines & Accessories Minneapolis, MN

Conticast Hormesa LLC Weston, FL

Cottingham & Butler Dubuque, IA

**Custom Alloy Sales, Inc.** City of Industry, CA

#### D

Daido Steel Co. Ltd. Hebron, KY Daiichi Jitsugyo (America) Inc. Wood Dale, IL

Die Cast Press Manufacturing Co. Paw Paw, MI

Diehl Tool Steel Cincinnati, OH

Die-Pro LLC

Sheboygan Falls, WI DieTech & Engineering Inc. Grand Rapids, MI

DISA Group LaGrange, GA DME Company Madison Heights, MI DTP Diecast Solutions LLC Florence, AL

Dynamo Inc. LaGrange, IL

#### E

Eastern Alloys Inc. Maybrook, NY EKK, Inc. Farmington Hills, MI Ellwood Specialty Steel

New Castle, PA

**Exco Engineering** Newmarket, ON, Canada

#### F

Finkl Steel\* Chicago, IL Finkl Steel - Sorel\* St-Joseph-De-Sorel, QC, Canada Fisa North America Inc.

Elk Grove Village, IL Flow Science

Santa Fe, NM FONDAREX USA

Schoolcraft, MI Frech USA Inc.

Michigan City, IN

Fremar Industries Brunswick, OH

#### G

Godfrey & Wing Inc. Aurora, OH

#### H

HA International, LLC Westmont, IL

Hanson International \* Saint Joseph, MI H Gerber Consulting

Evanston, IL Henkel Corporation

Madison Heights, MI

Herco, LLC Auburn Hills, MI High Temperature Systems Inc.

Chagrin Falls, OH Hildreth Mfg LLC

Marion, OH

Hill & Griffith Co. Cincinnati, OH

HTS International Corporation Knoxville, TN

IDRA North America Kokomo, IN IECI SrI Pine Brook, NJ

Imperial Zinc Corp. & Imperial Aluminum Corp. Chicago, IL

#### 2024 CORPORATE MEMBERS

Inductotherm Corp. Rancocas, NJ Industrial Innovations Grandville, MI

**Italpresse Gauss** Lagrange, GA

.

J&S Chemical Corp. Canton, GA

K

Kind Specialty Alloys LLC Youngstown, OH Kirby Metal Recycling\*

Clinton, MD

– LaFrance Manufacturing Co. Maryland Heights, MO LK World

Edinburgh, IN

Rogers, MN LiCON Mt LP

Dexter, MI

Lincoln Electric Automation Columbus, OH

**Lindberg MPH** Riverside, MI

Luke Engineering & Manufacturing Co. Wadsworth, OH

#### Μ

M & I Machine Benton Harbor, MI

MAGMA Foundry Technologies Inc. Schaumburg, IL

Mangas-AarKel Tool and Engineering Inc. Muscle Shoals, AL

Meitler Consulting Inc. Tonganoxie, KS

Metal Conversions Ltd. Mansfield, OH

Metal Mechanics Inc. Schoolcraft, MI

Metalworks Recycle-Reload, LLC Bowling Green, KY

**Mokon** Buffalo, NY

MORESCO USA Inc. Fountain Inn, SC

#### N

**New Brunswick Plating Inc.** New Brunswick, NJ

Nexthermal Corporation\* Battle Creek, MI

Norican Group LaGrange, GA

**Novacast Solutions USA Inc.** Naperville, IL

#### 0

OEE Companies North Oaks, MN Oerlikon Balzers Coating USA Rock Hill, SC

#### r

Pascal Engineering Arlington Heights, IL Patterson Mold & Tool Saint Charles, MO Paulo

Saint Louis, MO PCS Company

Fraser, MI

Phygen Coatings Inc. Minneapolis, MN Progressive Components Wauconda, IL

Prolong Surface Technologies West Chicago, IL

**Pyrotek Inc.** Columbia City, IN

#### Q

**Quaker Houghton** Dayton, OH

#### R

Regloplas Corporation Sodus, MI Rochester Aluminum Smelting Canada Ltd. Concord, ON, Canada Ryoei USA Inc. Indianapolis, IN

#### S

Sandvik Machining Solutions AB\* Mebane, NC Sanii Industries Celina, OH Sanyo Special Steel USA Inc. New York, NY SAPP Inc. Edinburgh, IN The Schaefer Group Inc. Dayton, OH Shibaura Machine Company, America Elk Grove Village, IL SIJ Metal Ravne - SIJ Americas Hazlet, NJ Sinto America Grand Ledge, MI Spectro Alloys Corp. Rosemount, MN Stotek Inc.\* Pewaukee, WI StrikoWestofen America Kalamazoo, MI Sun Metalon Cambridge, MA

Sun Steel Treating, Inc. South Lyon, MI Superior Aluminum Alloys New Haven, IN Swiss Steel Canada, Inc. Mississauga, ON, Canada

Swiss Steel USA, Inc. Carol Stream, IL T

Techmire Pointe-Claire, QC, Canada Therm-Tech of Waukesha Waukesha, WI

Transvalor Americas Corp.\* Chicago, IL

TOYO Machine America, LLC The Villages, FL

**Tvarit GmbH \*** Ottawa, IL

#### U

UBE Machinery Inc. Ann Arbor, MI Uddeholm USA Elgin, IL Ultraseal America Inc. Ann Arbor, MI

Valor Renewables Houston, TX VERSEVO Inc. Hartland, WI Visi-Trak Worldwide LLC Valley View, OH voestalpine Additive Manufacturing Centre Ltd. Mississauga, ON, Canada voestalpine Eifeler Coatings Technology Saint Charles, IL voestalpine High Performance Metals Corp. Elgin, IL

#### W

Wheelabrator Group LaGrange, GA Wollin USA Plymouth, MI

#### Υ

YIZUMI-HPM Corp. Iberia, OH Yushiro Manufacturing America, Inc. Shelbyville, IN

#### Z

Zitai USA - Die Casting Equipment Group Highland Park, IL

\*New Corporate Member Companies

## Align Your Company With The Best.



#### 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



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



#### **CORPORATE DIE CASTER** MEMBERSHIP APPLICATION

TODAY'S DATE

DEPARTMENT/DIVISION

ZIP OR POSTAL CODE & COUNTRY

COMPANY'S EMAIL ADDRESS

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

#### Please Type or Print All Information Below

KEY CONTACT'S NAME (FIRST NAME, MIDDLE INITIAL, LAST NAME)

TITLE

COMPANY'S NAME

COMPANY'S MAILING ADDRESS (INCLUDES P.O. BOXES AND/OR MAIL DROPS)

CITY

STATE OR PROVINCE

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

COMPANY WEBSITE

CORPORATE DIE CASTER DUES CALCULATIO         Base Membership:         Machines 65 tons or less:	\$1000 + +	<ul> <li>Complimentary members are allocated to your record based on you dues level. All corporate members receive 3 complimentary individual members plus one for each \$1000 of corporate dues over \$3000.</li> <li>The maximum yearly dues are</li> </ul>
Machines 400 tons or more: x \$200 = Total Yearly Dues:	+	<ul> <li>\$16,000.</li> <li>Count all machines operating in North America. Must have a North American location.</li> </ul>

#### Payment Information (U.S. Dollars Drawn on a U.S. Bank ONLY)

Check (payable to NADCA - US Dollars only)

ACH (Routing Number: 071000013 Account Number: 510019620)

□ Credit Card\* □ VISA<sup>®</sup> □ MASTERCARD<sup>®</sup> □ AMERICAN EXPRESS<sup>®</sup>

Payment using Check or ACH saves NADCA on credit card fees. Please consider paying via Check or ACH.



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

Cardholder's Name (as it appears on the card)



## **Chapter News & New Members**

#### Chapter 3 - Michigan

Chapter 3 is pleased to announce its first round of scholarships for 2024. Through our efforts and programs, we are able to provide 7 scholarships for the 2024 school worth and make a contribution to the NADCA Chapter 3 Endowment at Western Michigan University. In total, Chapter 3 was able to provide \$15,000 for the scholarships, and \$5,000 for the endowment program. We thank all our members who attend our Annual Golf Outing (Aug 16th 2024), and sponsor our yearly member directory as these activities fund the programs.



**Chapter 3 -** Matthew Purcell, Jason Los, Shantanu Phalke, Jitatman Gajaria.

On February 15th, Chapter 3 hosted its second dinner meeting of the year in fabulous Grand Rapids. The dinner was generously sponsored by Henkel and had over 50 members in attendance, that braved the weather. After great food, libations, and some networking at Peppino's Pizzeria and Sports Grille, the party moved next door to Western Michigan University's Applied Manufacturing Partnership (AMP) Lab. Brandon Combs from Henkel was the keynote speaker and provided an excellent presentation entitled "Best Practices for Process Optimization with Thermal Imaging". NADCA president Mike Meyer was in attendance and introduced himself to Chapter 3. During Mike's visit, Dr. Sam Ramrattan provided a tour of WMU's AMP Lab and showcased the collaboration that WMU is fostering with local companies and students. Chapter 3's next dinner meeting will be in April, so please visit our website (nadcachapter3.org) to register and view other upcoming events.



**Chapter 3 -** Brandon Combs from Henkel was the keynote speaker.



Chapter 3 - Attendees listen to Brandon's presentation.

#### **CHAPTER NEWS & NEW MEMBERS**





**Chapter 3 -** Dr. Sam Ramrattan provided a tour of WMU's AMP lab.

New Members: Candi Ewert, Cosma Casting Michigan, Cosma International, Magna International; Joy H. Forsmark, Larry Godlewski, both with Ford Motor Company; Steve Hunt, Angstrom Group; Nico Jordi, BuhlerPrince, Inc.; Lothar Koerner, Ned Lamontagne, Christopher Withers, all with LiCON MT LP; Todd R. Kraemer, Wanfeng Technology

#### **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: Jordon Maloni, Tempo Global Resources; Nicolas Poulain, TRANSVALOR AMERICAS Corp.; Mitch Rozen, Plibrico Company, LLC

#### **Chapter 6 - Cleveland**

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

#### **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: Iulian Bobe, Kazuhiko Nishioka, William Shambley, all with Sun Metalon

#### **Chapter 10 - Ontario**

On March 6, 2024, Paul Robbins and Yahia from Castool delivered a presentation at our local NADCA Chapter 10 meeting titled "Bigger Castings, Bigger Problems". This presentation concentrated on the uptime and life expectancy of shot sleeves and tips within the Giga Casting industry. The speakers highlighted the difficulties encountered when casting exceptionally large parts, including maintaining a consistent gap of less than 0.004 inches between the tip and sleeve. This required clearance, dictated by the cast alloy, remains constant, whereas thermal expansion increases with larger diameters. This issue is exacerbated as a larger volume of metal is poured into the same area of the shot sleeve, resulting in increased temperatures and thus, the challenges scale linearly with the size of the casting. Larger gaps lead to excessive wear, a problem they addressed by using high conductivity steel (ConDuct) along with conformally cooled shot tips. This material choice also aids in reducing cycle times.



**Chapter 10** - Different plunger tip designs (ARP = Alper Ring Plunger, CRP = Conformal Ring Plunger, AMP = Alper Modular Plunger, AM1 = Laser Powder Bed Additive Manufacturing, AM2 = Ultrasound Additive Manufacturing).



**Chapter 10** – Biscuit solidification (black layer), tip and coolant water temperature at the end of dwell time, with constant water pressure of  $\Delta P = 65$  kPa at the tip. The water flow rate is reported for each case.





**Chapter 10** – Paul and Yahia from Castool delivered a presentation entitled, "Bigger Castings, Bigger Problems".



**Chapter 10** - Attendees listen with great interest to the Castool presentation.

They demonstrated how Castool has surmounted these obstacles through an optimized cooling design that ensures uniform temperature distribution via precise thermal management. Additionally, Castool employs proper heat treating and coating technologies to further tackle these challenges.

New Members: Cyril Aulagnier; Paul Buchanan, Ljunghall Canada Ltd.; Kevin M. Colfer, 1 Source Design

#### **Chapter 12 - Wisconsin**

On March 6th, Chapter 12 hosted the Spring Education Seminar at Waukesha County Technical College in Pewaukee, WI. The focus of the seminar was on process design. The seminar had three separate speakers covering different areas. Mr. Pat LaDuke, a retired die casting expert, kicked off the meeting and talked on the start of the process from quoting to the teamwork needed to design and launch a successful die casting part. Next Mr. Sean Frank, Mercury Marine, covered many of the formulas and initial design work associated with designing gating and the shot process. Mr. Clay Rasmussen, Mercury Marine, closed the seminar with pulling all the information work together and talking through simulations that can be done throughout the process to help optimize the casting and tooling. The content and experience from the speakers made the seminar very informative!

The meeting was well attended with more than 40 people, including 7 college students from various schools in Wisconsin. Throughout the afternoon seminar there was good discussion and dialog among the active participants. It was another successful event for the chapter!



**Chapter 12 –** The room at Waukesha County Technical College was fill with those interested in learning about process design.



**Chapter 12** - The three speakers for the seminar (left to right): Sean Frank – Mercury Marine, Pat LaDuke – retired expert; Clay Rasmussen – Mercury Marine.

Future events for Chapter 12 include the 2024 Annual Dave Williams Classic golf outing that will be on Friday, June 14th. Registration for this event and details of all Chapter 12 events can be found at: www.nadca12.org.



New Members: Marissa Biese, Team, Inc.; JoAnne Bruning, Bodycote Thermal Processing Inc.; Tyler Kleinsasser, SD School of Mines and Technology; Noah M. Rabick, UW Platteville; Courtney J. Ryczek, Lindsay Schuh, both with Nemak Wisconsin; Jeremiah Tikusis, SINC Thermal

#### Chapter 14 - S. Ohio

Chapter 14 held a meeting on Tuesday, February 13th at Moeller Brew Barn in Troy, Ohio.

20 folks attended the HA International presentation the at Moeller Brew Barn. John kept the interest of the crowd by sharing his vast knowledge and experience in cleaning furnaces for use with molten non-ferrous alloys. He explained the benefits of new fluxes and the benefits. He closed with a review of different types of fluxes, their application methods, and best practices.



**Chapter 14** – John Reynolds delivered a great message "Cleaning furnaces and molten non-ferrous alloys with fluxes and the benefits. A review of types of fluxes, application methods, and best practices."



Chapter 14 - Attendees listen in on John's presentation.

On Tuesday, March 13th at Smith's Boathouse Restaurant in Troy, Ohio, Chapter 14 held a meeting with the main topic being the State of the Die Casting Industry.

Our fearless NADCA President Mike Meyer did a great

job of bringing us the latest and greatest news from his State of the Industry Address. A lot of good interaction took place with the audience. Great networking took place before and after the meeting.



**Chapter 14 -** NADCA's Mike Meyer presents the State of the Die Casting Industry to the crowd.



**Chapter 14 -** Attendees mingle over drinks after the presentation.

#### Chapter 14 NADCA 2024 Schedule

• June 6th - Golf Outing at Pipestone Golf Course Miamisburg, OH

Your Chapter 14 executive staff looks forward to working with our members as we head into the 2024 season and beyond. We look forward to seeing you at our 2024 Golf Outing. Please feel free to contact our executive team with your ideas on how we can become an even more effective chapter for you, your workmates, and your respective companies as we all move forward into this 2024 Die Casting Season.

Your Chapter 14 Executive Staff:

- Monte Swigart- RYOEI USA INC
- Scott Frens- Fort Recovery Industries
- Bryan Dahms- HA International



#### **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: Mary Kate Johnston, Sandvik Machining Solutions AB

#### Chapter 16 - Minnesota

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

New Members: Gabe Glovatsky, Polaris

#### Chapter 17 - St. Louis

March 26th was a wonderful day for Chapter 17!! We started the day with Educational Seminar Thermal Design and Control presented by National's Paul Brancaleon. We appreciate Paul's time and effort very much. In the evening we hosted our bi-annual Supplier's Night. Nearly 150 members, guests and suppliers convened to make this edition one of our best ever. The Chapter 17 Board is grateful for the wonderful turnout, and we especially thank the suppliers that set up product and service displays. It was nice to have National's Athena Catlett in attendance. Special congratulations to Chapter 17 Chairman Jeff Chism, Finkl Steel for his induction into the Chapter 17 Hall of Fame. Jeff has been the Chairman for several years and is spearheading our robust return after all the CoVid nonsense. Congratulations on a well-deserved honor Jeff and thank you for your efforts!



**Chapter 17 -** Jeff Chism was honored by being inducted into the Chapter 17 Hall of Fame.



**Chapter 17 -** Pete Schiavone was recognized as an outstanding member.

Please watch your email for invitations to upcoming events: Sporting Clays shoot on Friday, June 7th at Blackhawk in St. Charles County and the Alan Loeffelman Memorial Golf Outing on Friday, September 20th at Crescent Farms Golf Club in Eureka, MO.

New Members: Trey Fink, Paul K. Loeffelman, B Scott Pagel, all with Production Castings, Inc.; David Heslop, Toyota Motor Manufacturing Tennessee (TMMTN); Suhas Patel, Tvarit GmbH; Rick Spillman, Davis Tool & Die

#### 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: Marcello Inverardi, Andrea Scalvenzi, both with IECI S.r.l.; Rebecca Patenaude, Nemak Kentucky; Chris Ulerick, Toyota

#### **Chapter 30 - Los Angeles**

Once a year the members of the North American Die Casters Association (NADCA) meet for dinner and have a meeting to approve and vote for the existing NADCA 30 board members as well as nominate and approve new NADCA 30 board members. Each year, the NADCA 30 board members select an individual to receive an award. A very important part of the evening is to recognize the selected year's chosen die casting individual with the annual NADCA Chapter 30 "Distinguished Service Award".

The 2024 NADCA Chapter 30 Vendors Night was held at Rio Hondo Golf and Event Center (Downey, CA) on March 7th. Over 120 attendees participated in the successful event. The 2023 NADCA Chapter 30 Distinguished Service Award was bestowed upon Bob Thomas of Kinetic Die Casting (North Hollywood, CA). The evening also served as the annual election of officers. The Chapter elected two new Directors, Brian Kolsters of Lamar Tool and Die (Modesto, CA) and Kenny Zaucha of Kenwalt Die Casting Company (Sun Valley, CA). They joined the existing board of directors: Chapter President: Shane Leggett, Hyatt Die Casting (Cypress, CA), Vice President: William DiBacco, Cast Rite Corp. (Gardena, CA); Director: Steve Dathe, A&B Die Casting (Hercules, CA); Director: Jack Zhang, California Die Casting (Ontario, CA); Director: Larry Snoreen, Lamar Tool and Die (Modesto, CA); Secretary/Treasurer: James Simonelli, Capitol City Consulting (Sacramento, CA); Immediate Past President: Bob Thomas, Kinetic Die Casting Company (North Hollywood, CA). The event is co-hosted with the Southern California Chapter of AFS and funds raised at the event help local metal casting students.



**Chapter 30 -** Bob Thomas was awarded the Distinguished Service Award.



Chapter 30 - James Simonelli, Shane Leggett and Bob Thomas.





Chapter 30 - Shane Leggett at the podium.



Chapter 30 - Vendors night was a huge success!

New Members: Kentaro F. Lunn, University of California, Irvine





## NADCA Welcomes Its Newest Corporate Members

#### Caldwell Casting Co., Inc.

2 Washington St. Cambridge, MD 21613 P: 410.228.2400 E: sales@caldwellcasting.com W: CaldwellCasting.com



Caldwell Casting Co., Inc., is an aluminum and zinc die casting company which serves a variety of commercial and Department of Defense users. In business for 66 years, we have made millions of parts using all varieties of aluminum and zinc alloys. Based in Maryland's rural Eastern Shore and with a dedicated work force, we offer surprisingly low cost parts made to very close tolerances. For new projects we have extensive product engineering and tool design experience to help you make the product you want at a cost you need. We manufacture die castings complete to print, including secondary machining, finishing and assembly.

#### Rochester Aluminum Smelting Canada Ltd.

31-35 Freshway Drive Concord, Ontario L4K 1R9 P: 905.669.1222 E: info@rochesteraluminum.com W: rochesteraluminum.com



Rochester Aluminum Smelting Canada Ltd. is one of the oldest secondary aluminum smelters/refiners in North America, having established operations in Rochester, New York in 1895. The Golden family from Toronto, Canada acquired the Rochester facility in 1987. In 1995, a new plant in Toronto was purchased, formerly Aluminum Reduction Co. and the New York site was sold and all operations transferred to Canada. In 2023, Rochester began the production of secondary aluminum and zinc die casting alloys and are pleased to now be a member of NADCA and look forward to meeting the many die casting members at the Die Casting Congress & Exposition in September.

#### Støtek Inc.

W233 N2800 Roundy Circle West - Suite 200 Pewaukee, WI 53072 P: 262.347.0845 E: sales@stotek.com W: stotek.com



Støtek was established by Ivan Byskov in 1987, an already experienced player in the foundry industry. The organization was founded on three main principles: reliability, professionalism, and flexibility. These three principles constituted the foundation for the way that Støtek does business. At Støtek, innovation meets excellence in the realm of industrial machinery for the automotive industry. Our expertise lies in crafting cutting-edge furnaces, revolutionizing the manufacturing process across the globe. Our state-of-the-art furnaces are designed to ensure precision, efficiency, and reliability in the melting and casting of metals, elevating your production capabilities to unparalleled heights. We have a range of products for both melting, holding, and dosing and we strive to make solutions based on cooperation, fitted to your exact production needs. At Støtek, we not only provide industry-leading machinery but also prioritize unparalleled customer support and services. Our team is dedicated to assisting you at every stage, from installation to maintenance, ensuring uninterrupted operations and maximum efficiency.



#### ADC AEROSPACE ANNOUNCES ACQUISITION OF CAST-RITE CORPORATION

Buena Park, CA - ADC Aerospace ("ADC" or the "Company"), a leading manufacturer of complex, highlyengineered turnkey die-cast parts used in critical applications in the aerospace, defense, medical, automotive and specialty industrial markets, today announced that it has acquired Cast-Rite Corporation, a leading provider of advanced die casting and fabrication solutions.

Since being acquired in 2019 by GreyLion, an investment firm focused on high-growth businesses, ADC has continued to build on its long history of serving as a topperforming manufacturer and trusted business partner. This acquisition builds on ADC's commitment to enhancing the quality and scope of products available to its customers and will enable the Company to strategically increase its penetration into targeted markets while further leveraging existing manufacturing capacity.

John Schaefer, Chief Executive Officer of ADC, said, "We are excited about the opportunity to combine Cast-Rite's business with our existing capable and scalable platform, ADC Aerospace. While the manufacturing capabilities between our businesses are very similar, this acquisition provides a unique strategic opportunity and substantial acceleration of our growth plans. Over the next four months, we plan to transition the Cast-Rite business into our ADC Buena Park facilities and have an experienced project team in place to accomplish this goal."

David Ferguson, Managing Partner of GreyLion, said, "John and the entire ADC team have done a terrific job of successfully executing against the Company's strategic business objectives and ensuring that ADC continues to be a leading manufacturer of complex, highly engineered turnkey die-cast parts used in critical applications throughout the aerospace, defense, medical, automotive and specialty industrial markets. This transaction will enable the Company to enhance the depth and breadth of the solutions it provides its customers and will further position ADC for continued success over the long-term."

#### HOT WHEELS UNVEILS NEW DIE-CAST TO ENCOURAGE OPEN-ENDED PLAY AHEAD OF AUTISM ACCEPTANCE MONTH

El Segundo, CA - Today, Mattel, Inc. (NASDAQ: MAT) announced the Hot Wheels<sup>®</sup> Flippin Fast<sup>™</sup> die-cast, a new vehicle designed to encourage an open-ended play experience, ahead of Autism Acceptance Month in April. The Flippin Fast die-cast ignites the challenger spirit as one of the most versatile die-cast vehicles from Hot



- Operator Training (over 40 hours of training)
- Engineering (over 100 hours of training)
- Management (over 30 hours of training)

#### Individual Course Access

Individual courses are available for purchase through the Marketplace for individual and corporate members. Simply search by topic or title in the search bar or scroll through the different sections by viewing the block titles under category within the Marketplace. Each course is affordably priced at \$49. The NADCA Online Education System is available to North American members only.



Wheels. Its fidget toy-inspired design allows kids to enjoy the wide range of motion from a Hot Wheels car as they roll it forward, backward and flip it upside down.

Hot Wheels partnered with the Autistic Self Advocacy Network (ASAN), a nonprofit advocacy organization run by individuals on the autism spectrum, to validate the design and compatibility of the Flippin Fast die-cast to ensure it delivers an experience that meets the unique needs of all Hot Wheels fans, including those who may benefit from an open-ended, soothing, and sensory play experience.

"It's exciting that Mattel has taken the needs of autistic kids into consideration with this new toy. Too often, autistic children and their families are told that they are 'playing wrong,' but allowing kids to play in the way they choose can promote self-regulation and self-expression," said Zoe Gross, Director of Advocacy, Autistic Self Advocacy Network. "This car can be played with in any configuration, and whether kids prefer to play pretend with it or just spin the wheels, the design emphasizes that there's no wrong way to play."

While the Flippin Fast die-cast vehicle is intended for children ages three and up across all ability levels, ASAN's seal on the packaging indicates that it meets the unique play needs of the autism spectrum community.

"Hot Wheels is always listening to consumers and finding ways to implement their feedback into our new products to ensure we are meeting their differing needs through play," said Ted Wu, Vice President, Global Head of Design for Vehicles, Mattel. "In this case, we created a toy where there is truly no 'wrong' way to play with it. Flip it, spin it, or roll it forward, backward and even upside down – there are endless ways for everyone to play."

#### FICTIV EXPANDS GLOBAL MANUFACTURING NETWORK TO INCLUDE SHEET METAL, DIE CASTING, COMPRESSION MOLDING

San Francisco, CA - Fictiv announced a significant expansion of its production manufacturing capabilities, adding Sheet Metal, Die Casting, and Compression Molding to its global network and AI-powered quote-to-order platform. With these new capabilities, Fictiv offers engineering and supply chain teams a path to streamline sourcing for all metal and plastic parts in a product's bill of materials, from prototype to low-volume production, through a single global company.

In total, Fictiv now offers seven primary manufacturing technologies—Injection Molding, 3D Printing, CNC Machining, Urethane Casting, Compression Molding, Die Casting, and Sheet Metal—as well as hundreds of material and finishing options across four global regions, providing customers with an extensive range of custom manufacturing services and production capacity. As a result, customers can simplify their sourcing strategy for all types of mechanical parts, reducing risk and overhead on global supply chain management and accelerating go-to-market timelines.

"With the rollout of these new capabilities, we are

making it even easier for our customers to source the mechanical parts they need for an entire product, with the speed and quality they have come to trust and rely on from Fictiv," said Dave Evans, CEO and Co-Founder of Fictiv. "As manufacturing leaders seek to expand margin, decrease BOM costs, and reduce supply chain risk in 2024, Fictiv is fully-stacked and well-positioned as a strategic custom manufacturing partner to help them realize their goals."

"With Fictiv, we know our mechanical parts are with a safe pair of hands," said Michelle Kim, CEO of m'Chel, an innovative haircare product company. "We choose Fictiv because of their commitment to quality over everything. They are a true partner for us, and so the prospect of being able to source and produce a wide variety of the mechanical parts we need through Fictiv is reassuring."

To learn more about Fictiv's full range of manufacturing offerings, please visit Fictiv's website at www.fictiv.com.



People in Die Casting

#### **Matt Bailey**

Matt Bailey Joins Frech USA as Regional Sales Manager!

Matt comes to us with 30 years of experience in tooling and die casting. Matt is a

Journeyman Mold Maker who has been a part of many successful program launches

and has worked with various die casters over the years. Problem solving and customer service are two important principles that Frech and Matt both share. Matt has held roles as a Tool Maker, Supervisor and in Sales & Project Management.

"We are pleased to welcome Mr. Bailey to this key role within our North American business. With Matt we are pleased to have found an experienced professional with integrity and passion for customer service!" Jeff Walters, General Manager.

Matt, his wife, and three children live in St. Joseph, MI. During his time outside of work he enjoys boating near his home, working on his small-hobby farm in northern Michigan, fishing, and just about anything outdoors. Frech USA is the North American subsidiary of Oskar Frech, Schnordorf Germany.

Beyond die casting machines, the Frech Group companies also include important market Brands like Robamat, Meltec, VDS and Spesima. www.frechusa.com

#### **NADCA Remembers**

#### Henry A. Bakemeyer 1944-2024

Henry A. Bakemeyer passed away peacefully, on Tuesday, March 26, 2024, age



79. Devoted Husband of Lucia for 53 years. Proud Father of Enrique (Mary) and Karoline Bakemeyer.

Loving Opa of Riley and Kate. Dear Brother of Helga (Denis) Guequierre. Uncle of Nathan, Nora and Joseph. Henry was extremely active in the die casting community and with the North American Die Casting Association. He taught numerous courses, authored publications and sharing his knowledge with many students.

Henry was also the chairman of the NADCA Education Committee. His participation and guidance helped shape the NADCA education program. Henry will be greatly missed by the die casting community and NADCA. In lieu of flowers, memorials appreciated to Wauwatosa Presbyterian Church.

# A cive Example A sociation of the casting association of the casting associ



Courses can be **created to meet your organization's specific needs and taught live via webinar**. This means the education and training program can more directly improve your "bottom-line".



The **overall costs are lower** than sending students to offsite for training. When we deliver the training to you, the expenses associated with the program are the total cost of the actual education and training — no travel expense.



Timing of the program and scheduling can be **designed to fit your time schedule** and operational hours. This cuts down on time lost by having employees out for extended periods of time.



The program can **economically accommodate more people** and is taught by top-notch NADCA instructors. Custom courses can be delivered for as little as \$300!



Webinars can be **100% custom** from the length of the webinar to the content to the look and feel of the information presented.



The presentation material will be **branded with your company logo** and we can incorporate example castings from your production floor.



You own the material for future use.



Contact Melisa Ryzner, CMP today at 847.808.3161 or education@diecasting.org



## New Products, Services & Solutions

Start with StrikoMelter and Lower Your Aluminum Melting Costs



Over 95% of the total cost of furnace ownership is generated by energy consumption and metal loss. Choosing a furnace capable of using less energy to produce a higher yield of high-quality melt, is an investment worth making. With more than 1500 Global Installations, StrikoMelter is the proven industry standard to meet this task.

The shaft designed to slash energy consumption. The cleverly designed melting furnace from StrikoWestofen combines preheating, heating, and melting in one chamber, using waste gasses from the melting process to gradually heat new material being loaded.

This unique process results in significantly lower fuel consumption. All StrikoMelter furnaces employ this concept, with the StrikoMelter PurEfficiency model using it to particularly impressive effect. Consuming as little as 489 kWh/t (760 btu/lb), it is the most energy efficient melting furnace in the world!

Make your metal go further StrikoMelter also helps you waste less aluminum. With correct operation and charge density a metal yield of up to 99.75% is possible. While increasing your metal yield lowers your raw material costs, the StrikoMelter also offers a higher metal quality with less oxides to further reduce your scrap rates.

"The StrikoMelter is very energy efficient to operate and the metal quality is improved with less dross. Another significant benefit is our StrikoMelters take up less floorspace than our previous furnace equipment." Patrick Greene, CEO, Cascade Die Casting Group, US

Fast ROI + lasting performance = sound investment. Its ability to tackle these major cost drivers so effectively gives StrikoMelter an impressive ROI period. In fact, 90% of customers in North America realize ROI in less than 24 months.

Combined with low maintenance requirements, a lifespan of over 20 years, ongoing service support, and industry proven digital solutions to aid further process optimization, it is easy to see why StrikoMelter has such a strong reputation as your partner for life.

For more information, visit StrikoWestofen.com.

Revolutionizing Aluminum Castings: Unveiling the Power of Match Plate Molding for High-Speed, Low-Cost Production



Traditional permanent molds and die casting offer high-quality aluminum components. But in the pursuit of excel-

lence, innovation knows no bounds. Enter DISA Match plate molding, an extraordinary green-sand-based option that redefines the standards of efficiency, flexibility and cost-effectiveness that delivers excellent surface finish and dimensional accuracy.

DISA's match plate molding line, DISA MATCH, can produce up to 210 molds per hour with fast pattern changes – ideal for short runs Core handling is easy and quick too.

Low cost, flexible tooling - Compared to permanent molds, green sand tooling is over 90% cheaper and can have a lifespan up to six times longer. A low-alloy-steel MATCH plate creates up to 500,000 green sand molds outlasting permanent molds made from the same material that last for only 70,000 gravity die casting shots.

Tooling modifications are simple and quick, facilitating easier prototyping and eliminating the need for energy-intensive temperature control. Additionally, any existing match plates seamlessly integrate with DISA's adaptor.

DISA MATCH is already wellproven - DISA MATCH machines are winning new business by cutting scrap from 6% to 1.5% for the Illinois-based Aluminum Castings Company and from 4-5% to under 2% for Pennsylvania's BQC Foundry.

There are further cost and environmental benefits, with low scrap rates reducing energy use. With no chemical resins added, BQC instantly re-uses around 98% of its green diamond (nonsilica) molding sand. Today customers appreciate BQC's lower costs on complex castings.

With minimal manpower requirements, unparalleled reliability, and low maintenance demands, DISA MATCH is the gateway to ultra-competitive, high quality aluminum production. "We can really compete against permanent molds or die cast, even with extremely challenging products with deep pockets and complex geometries.

 $\bigcirc$ 

Since we can have the higher volumes at the same time, we're able to keep the cost down for customers."

— Brandon Boose, VP of Operations at BQC

Read the story at disagroup.com.

#### Produce More High-Quality Castings with IPG's Toggle Free Smart Series



Dimensional accuracy, repeatability, and high grain density for strength and durability. When aluminium components are becoming increasingly complex - through intricacy or sheer size due to part consolidation—processes that deliver these quality KPIs are vital.

NEW...

The Toggle Free Smart (TFs) series from ItalPresseGauss is built with this in mind, with features designed to support high pressure die casters in upping quality and minimizing scrap to meet market demand for high integrity castings.

A modular design means die casters can configure their machine to match closing unit size/force (between 1,400t and 11,000t) with the most suitable injection unit spec based on production requirements. These modules also hold the secret to high-quality castings.

**Optimal die closure by design** -Hardness tested platens—designed using structural analysis tools (FEM) carefully positioned opening/closing cylinders, and well equalized tie bars, come together with a four-cylinder hydraulic locking system to optimize force distribution, preventing die distortion and ensuring a tight seal.

The seal achieved optimizes heat transfer, while also preventing flash, porosity (through the entry of air/contaminants), and any gaps that could lead to inconsistent casting dimensions.

Injection system that automates accuracy - With a high dynamic force and increased hydraulic line pressure, the SC4 injection system fills the die incredibly fast, preventing defect causing turbulence, possible porosity, and delivering a quicker solidification process for improved mechanical properties in the final cast part.

Real time injection control also means that piston speeds automatically adjust to any deviation in aluminium flow for consistent quality.

Efficiency and environmental performance- With a raft of other features designed to optimize quality, increase uptime, shorten cycle time, and minimize energy consumption, the Toggle Free Smart Series are built to help die casters produce the best quality parts in the fastest time, using fewer resources.

"With the TF Smart Series we offer the optimum solution configured to the production needs, across a wide range of closing forces combined with multiple choice of injection units; this means the most efficient and effective sizing of the die casting machine," said Marco Gandini, Senior Vice President of Global Aluminum at Norican Group

For more information, visit www. italpressegauss.com.

## PRODUCTS, SERVICES & SOLUTIONS

### **Attention Corporate Members:**

Take advantage of being a NADCA Corporate Member! Have your new product highlighted in Die Casting Engineer.

As a NADCA Corporate Member, you are allowed one complimentary product listing per issue of DCE. This includes a short write-up and high-resolution photo. To learn how to put your company's new products, services and solutions in print contact Athena Catlett at **catlett@diecasting.org**.

NADCA Individual Members may submit one free listing per year, and for nonmembers there is a small fee.

## 

## CLASSIFIEDS

Classified advertisements are accepted for publication in *DIE CASTING ENGI-NEER* 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  $2^{1/}_{s}$  in. wide column, payable with order. Please make remittance payable to *DIE CASTING ENGI-NEER*, 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

SERVICES

PORTABLE MACHINING SERVICE KEEP DOWN TIME TO A MINIMUM

PLATEN REPAIR SHOT HOLE MODIFICATIONS T-SLOTTING MANY OTHER MACHINING APPLICATIONS PROVIDED IN YOUR

FACILITY CONTACT: MARK LAMBETH (989) 681-5958 onsitemach@earthlink.net www.onsitemachine.com

#### ADVERTISERS INDEX

WWW.DIECASTING.ORG/DCE/MEDIAKIT

BuhlerPrince Inc.	buhlerprince.com	OBC	
Castool Tooling System	castool.com IBC		
Frech USA	frechusa.com IFC		
LiCON MT LP	licon.com		
Onsite Machining	onsitemachine.com	51	
Swiss Steel USA, Inc.	swisssteel-group.com	12	
CONSULTING SERVICES	SERVICES		
Multi-slide to 1,200 ton zinc hot chamber, cold chamber to 4,000 ton. Process, tooling and machine training, process optimization and scrap reduction projects Project and program management Infrastructure review and optimization Bob McClintic, Die Casting Consultant 523 Lincoln Lawns Dr. NW Grand Rapids, MI 49534 Cell: 616.292.0454 E-mail: RMcClintic@DrDieCast.com Web: www.DrDieCast.com	Uncompromising Structural Analysis of Casting Dies Pressure Loads Slide Reactions Stress Cracking Interference Thermal Distortion Broken Bolts Uncompromising Structural Analysis of Stress Cracking Interference Thermal Distortion Bistortion Bistortion Store Lake When FEA is Not Just a Check Box Www.stonelakeanalytics.com 815-200-4FEA Look Inside the Machine		

## Ever Thought of Advertising in this Magazine?

DCE could be a **powerful marketing** tool for your company!



## Call 847.808.3153 or email ad@diecasting.org







sales@castool.com www.castool.com







Bühler is your reliable partner for all die casting needs, including cell solutions, technology support, rebuilds and retrofits.

With a strong global service network and manufacturing hubs in North America, Europe and Asia, Bühler provides local expertise wherever you are.

E-mail us at info@buhlerprince.com

## Die casting solutions -Shaping the future of mobility, globally.

