



APRIL 23-26, 2022

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APRIL 23-26, 2022

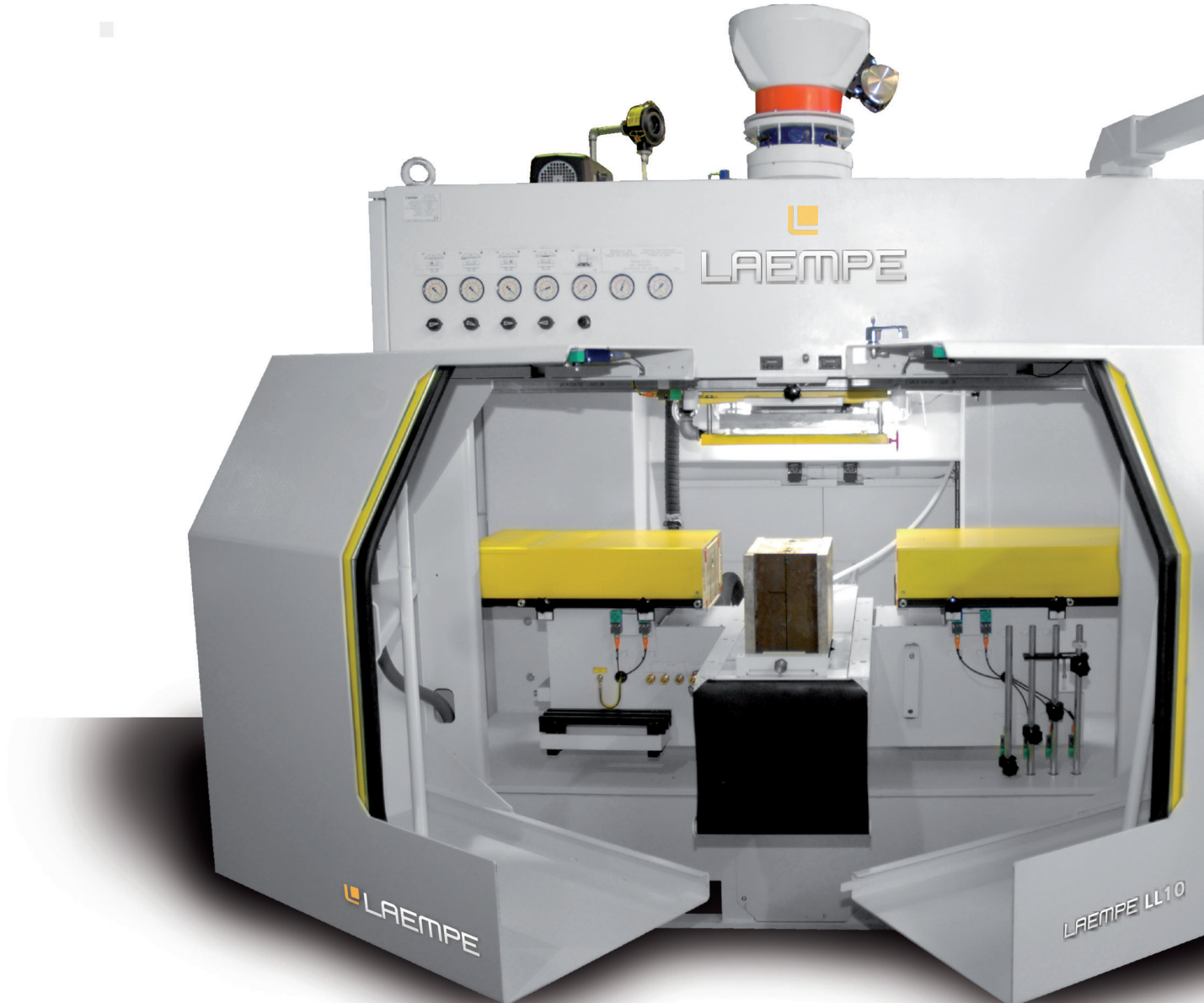
CastExpo Show Guide

At the core of great **foundries**SM

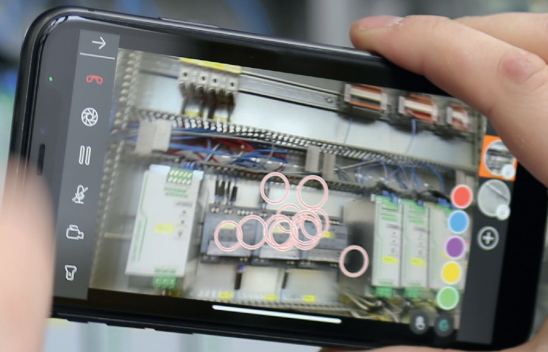




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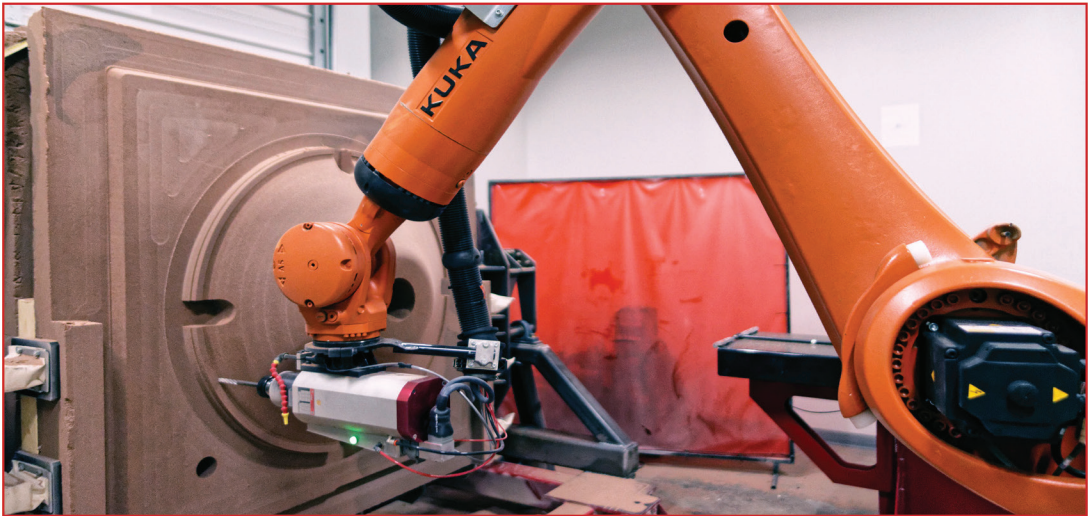
Table Of Contents

Welcome	5	Supplier Exhibitor Booth List: Category	77-86
General Information		Supplier Exhibitor Directory	87-126
General Information	6-8	Cast in North America Exhibitor Booth List: Alphabetical	127-128
Code of Conduct	11	Cast in North America Exhibitor Booth List: Category	129-131
Special Events	12-13	Cast in North America Exhibitor Directory	132-138
The AFS HUB	14	2022 Casting Technology Showcase	139-147
IJMC/FEF Student Research Contest	14		
Keynote Speakers and Hoyt Memorial Lecturer	17		
Schedules		AFS Information	
Schedule at a Glance	18-24	AFS and the Institute Board of Directors	148
Saturday, April 23 Schedule	27-37	AFS and the Institute National Officer and Director Nominees	149
Sunday, April 24 Schedule	38-51	2022 Awards	150
Monday, April 25 Schedule	52-64	AFS Technical and Management Division and Program Chairs	151-152
Tuesday, April 26 Schedule	67-69	AFS Corporate Members	153-162
CastExpo 2022 Sponsors & Exhibitors		AFS and the Institute Upcoming Events and Courses	164-167
Platinum, Gold, and Silver Sponsors	70-71	Show Floor and Conference Center Map	Inside Back Cover
Supplier Exhibitor Booth List: Alphabetical	73-76		

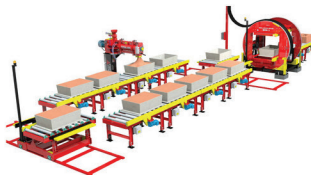
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Welcome!

On behalf of **CastExpo 2022** and the **126th Metalcasting Congress**, we are honored to have you as our guest.

Every three years, professionals from around the world gather for **CastExpo**, North America's largest metalcasting trade show and conference. But this year is especially meaningful. Following the pandemic-related cancelation of Metalcasting Congress in 2020 and a virtual Metalcasting Congress in 2021, CastExpo 2022 marks the return of live conventions from the American Foundry Society. We are so glad to see you again.

CastExpo 2022's theme, "Future Directions in Metalcasting," focuses on what's next for our industry: exciting technologies, pioneering research, and dynamic workforces coming together to shape tomorrow's metalcasting landscape. You'll see this theme in action everywhere you look at CastExpo: on the show floor, where new machinery, services, and highly engineered castings are in the spotlight; in technical and management sessions, where research breakthroughs and best practices are the order of the day; in the AFS Hub, where you can witness the next generation of metalcasters show off their projects; and so much more.

Columbus, known for its spirit of industry and entrepreneurship, is in the heart of the North American metalcasting supply chain. What better place to make new business connections, network with peers, learn from experts, and profit from new ideas? We encourage you to experience as much as possible at **CastExpo 2022**, including:

The **CastExpo** show floor, where suppliers, metalcasters, and buyers connect

- Educational tracks tailored by profession and interest, including the Casting Designers & Buyers Track
- Cast in North America, showcasing the capabilities of North America's top foundries
- Metalcasting classes from the AFS Institute
- Keynote addresses from D. Michael Abrashoff, Scott Rasmussen, and Hoyt Memorial Lecturer Jean Bye
- The AFS Hub, the focal point for meet-ups, AFS resources, and the AFS Store
- The Annual Banquet and Volunteer Leadership Awards Luncheon, where we recognize excellence in our industry.

We're grateful to the exhibitors and sponsors who make **CastExpo 2022** and the **126th Metalcasting Congress** possible; to our speakers, panelists, and presenters whose insights and expertise are invaluable to our programming; and to the thousands of attendees who support and enrich this event with their participation. We also recognize the work of AFS committee members and their supporting companies. Thanks also to the AFS professional staff for their work in making **CastExpo 2022** a success.

Once again, welcome – and welcome back! – to **CastExpo**. We trust you will find it beneficial and enjoyable.

Sincerely,



Doug Kurkul
Chief Executive Officer
American Foundry Society

General Information

Locations & Hours

Registration

Level One - Exhibit Hall B Entrance

Friday, April 22	9 a.m. – 6 p.m.
Saturday, April 23	7 a.m. – 6 p.m.
Sunday, April 24	7 a.m. – 5 p.m.
Monday, April 25	7 a.m. – 5 p.m.
Tuesday, April 26	8 a.m. – Noon

Exhibit Hall

Level One - Exhibit Hall A - D

Saturday, April 23	9 a.m. – 5 p.m.
Sunday, April 24	9 a.m. – 5 p.m.
Monday, April 25	9 a.m. – 5 p.m.
Tuesday, April 26	9 a.m. – Noon

Exhibit Service Center & Other Service Desks

Level One - Exhibit Hall A - D

Friday, April 22	6 a.m. – 6 p.m.
Saturday, April 23	6 a.m. – 6 p.m.
Sunday, April 24	6 a.m. – 6 p.m.
Monday, April 25	6 a.m. – 6 p.m.
Tuesday, April 26	6 a.m. – 6 p.m.

Keynote Presentations

Level Two - Short North Ballroom

Saturday, April 23	10:30 – 11:30 a.m.
Sunday, April 24	10:30 – 11:30 a.m.
Monday, April 25	10:30 – 11:30 a.m.

Technical and Management Sessions

*Level Two – B231-232, B233-234,
B235, B242-243, B244-245*

Saturday, April 23	8 a.m. – 4:45 p.m.
Sunday, April 24	8 a.m. – 4:45 p.m.
Monday, April 25	8 a.m. – 4:45 p.m.
Tuesday, April 26	8 – 10:15 a.m.

Casting Designers & Buyers Sessions

Level One – Exhibit Hall A - D – The HUB - 222

Saturday, April 23	1:30 – 2:30 p.m.
Sunday, April 24	1:30 – 3:45 p.m.
Monday, April 25	9:30 a.m. – 3:30 p.m.
Tuesday, April 26	9:15 – 10:30 a.m.

AFS Institute Courses

Level Two – B240-241

Saturday, April 23	1:30 – 4:45 p.m.
Sunday, April 24	1:30 – 4:45 p.m.
Monday, April 25	8 – 10:15 a.m.
Monday, April 25	1:30 – 4:45 p.m.

AFS Show Office

Level One – B130

Friday, April 22	Noon – 4:30 p.m.
Saturday, April 23	8 a.m. – 4:30 p.m.
Sunday, April 24	8 a.m. – 4:30 p.m.
Monday, April 25	8 a.m. – 4:30 p.m.
Tuesday, April 26	8 – 10 a.m.

Speaker Ready Room

Level Two – B230

Friday, April 22	7 a.m. – 5 p.m.
Saturday, April 23	7 a.m. – 5 p.m.
Sunday, April 24	7 a.m. – 5 p.m.
Monday, April 25	7 a.m. – 5 p.m.
Tuesday, April 26	7 a.m. – Noon

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General Information *Cont.*

Excellence in Service Registration

The traditional book for registering your years of volunteer service in the metalcasting industry is located in **The HUB - Booth 222**. AFS Members who have served the industry for five or more years are invited to register and receive the Volunteer Milestone Pin.

Policy on Audio and Video Recording

AFS reserves the right to any audio and video reproduction of any part of **CastExpo 2022**. Recordings (audio, video, still photography, etc.) intended for personal use, distribution, publication or copyright without the express written consent of the association and the individual authors or exhibitors is strictly prohibited.

Minimum Age Restriction

No one under the age of 16 is permitted on the exhibit floor at any time.

Antitrust Policy

The Antitrust Policy Statement of the American Foundry Society is available to anyone attending **CastExpo 2022**. Copies are available in the AFS Show Office.

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American Foundry Society Code of Conduct

The American Foundry Society invites attendees to participate in AFS conferences, courses, and other events in a spirit of collegiality, collaboration, professionalism, and respect, as we endeavor to advance AFS's mission—to provide members of the metalcasting supply chain with advocacy support, technical and management education, and access to innovative shared research and technology.

When you attend an AFS event, you agree to:

- Treat all attendees—including registrants, guests, speakers, volunteers, exhibitors, staff, service providers, and others in attendance—with respect and consideration.
- Respect the boundaries of others.
- Be collegial and collaborative in your discussions, communicating openly and with civil attitudes.
- Respect confidentiality requests from speakers and other attendees.
- Obey all applicable laws, rules and policies. These include rules and policies of the meeting venue, hotels, or any other site where your AFS affiliation is likely to be displayed.
- Look out for one another. Immediately alert emergency services, meeting or property security personnel, AFS staff, or AFS leadership if you notice someone in distress or see a dangerous or potentially dangerous situation.

Unacceptable behavior at an AFS event includes:

- Physical or verbal abuse of any attendee.
- Being disruptive, stalking, following, threatening, or intimidating anyone.
- Drinking excessively or becoming intoxicated.
- Harassment of any kind, including unwelcome sexual attention and inappropriate physical conduct.
- Making comments or engaging in conduct that is racist, sexist, ageist, or otherwise discriminates against or is offensive to a group or class of people.
- Audio or video recording, or taking images of another's presentation, posters, or materials without permission.
- Distribution of written materials or digital postings, whether as an exhibitor or attendee, that are offensive or include inappropriate references, metaphors, or images.

Contact us to report an incident

If, while at an AFS event, you are personally involved in an incident, or you witness an incident involving others, that violates this Code of Conduct, please let AFS staff know about it immediately. You can speak directly with a member of the AFS staff leadership concerning an incident, or you can use a name-optional reporting form located at the bottom of <https://www.afsinc.org/code-conduct>. You can also report an incident to AFSCodeofConduct@afsinc.org.

If you experience or witness behavior that is an imminent or serious threat to public safety or is a criminal act, you should take action to maintain your own personal safety and contact 911 emergency services immediately.

AFS's Commitment to Quality Member/Attendee Experiences

AFS is committed to providing our members and event attendees with a quality experience. We take any violation of the above standards extremely seriously. AFS reserves the right to bar any person who violates this Code of Conduct from further participation in the event without refund. AFS may also suspend or expel any person who violates this Code of Conduct from AFS membership or from attending or participating in future AFS events.

Special Events

Ribbon-Cutting Ceremony

Saturday, April 23 | 8:50 a.m. | Level One – Hall B Entrance

Celebrate the start of **CastExpo 2022** with a ceremonial ribbon-cutting with the AFS Executive Committee.

Copper Division Luncheon

Saturday, April 23 | 11:45 a.m. | Level One – C150 - 151 | Ticketed Event - \$65

The Copper Division will present its annual awards during this luncheon featuring speaker Mark Holbrook, the executive director for the Marion Area Convention and Visitors Bureau. This ticketed luncheon is open to everyone with an interest in copper alloys.

Welcome Reception

Saturday, April 23 | 5 p.m. | Level One – North Atrium | Ticketed Event - \$40

AFS welcomes all attendees to kick off **CastExpo 2022** with a reception in the convention lobby. The reception provides the opportunity to meet with customers, vendors, and other attendees. Cocktails and hors d'oeuvres will be served.

Women in Metalcasting Breakfast

Sunday, April 24 | 7:30 a.m. | Level One – C150 - 151 | Invitation Only

This event is open to members of the Women in Metalcasting group. It includes a continental breakfast and networking with people who work in all facets of the metalcasting industry.

Thank you to our sponsors:



Volunteer Leadership Awards Luncheon

Sunday, April 24 | 11:45 a.m. | Level One – C160 | Ticketed Event - \$65

Join us for a fun, fast-paced awards luncheon, which combines the former Division Luncheon and President's Business meeting. Catch up with friends while AFS officers welcome four new board members. The AFS Technical and Management Division chairs will also present key national and divisional awards. AFS Service Citation and AFS Scientific Merit winners will be honored during the luncheon.

Annual Reception and Banquet

Sunday, April 24 | Reception 6 p.m. | Banquet 7 p.m.

Hilton Columbus Downtown, George Bellows Ballroom CD | Ticketed Event - \$125

Join us for a memorable evening with fine food, friends new and old, and the presentation of the highest honor from AFS, the Gold Medal. The cash bar opens at 6 p.m. (Credit cards only.) The awards presentation and banquet start at 7 p.m. The event will be held at the Hilton Columbus Downtown.

Past Presidents' Luncheon

Monday, April 25 | 11:45 a.m. | The Refectory Restaurant - 1092 Bethel Road

Must be a previous AFS President to attend

The annual meeting for all past AFS Presidents at The Refectory Restaurant. AFS will provide bus transportation to and from the luncheon for Past Presidents. Buses will pick up attendees from the 3rd St. Connector. *Must be a previous AFS President to attend.*

Guest Excursion

Monday, April 25 | 11:45 a.m. | Columbus Museum of Art | Ticketed Event - \$90

Guests of **CastExpo 2022** attendees are invited to explore the Columbus Museum of Art. Guests can enjoy the museum's impressive collection as well as a luncheon amidst a gallery setting. AFS will provide bus transportation to and from the Columbus Museum of Art. Buses will pick up attendees from the 3rd St. Connector.

Future Leaders of Metalcasting Reception

Monday, April 25 | 4:30 p.m. | Level One - C170 | Online registration

Join the AFS Future Leaders of Metalcasting for networking and get to know others in the metalcasting industry at this fun event. Bring your business cards to enter into a raffle. No pass is required to attend. *(Online registration.)*

Future Leaders of Metalcasting is sponsored by:



Alumni Dinner

Monday, April 25 | 6 p.m. | The Ohio Statehouse

Must be a member of AFS Alumni to attend | Ticketed Event - \$125

Enjoy the camaraderie of other Alumni over dinner and be introduced to this year's award-winners and incoming board members. The Alumni Dinner will be held at the Ohio Statehouse, the state capitol building and seat of government for the state of Ohio. AFS will provide bus transportation to and from the Ohio Statehouse. Buses will pick up attendees from the 3rd St. Connector. *Must be a member of AFS Alumni to attend.*

The AFS HUB

Booth 222

The AFS HUB is a dedicated area for connecting with AFS staff and other attendees. This area features the AFS Store, AFS Products & Services, Foundry-in-a-Box, and the *Casting Source* Theater featuring sponsored presentations from suppliers, and sessions for the Casting Designers & Buyers Track.

Ongoing features and activities include:

Casting Designers & Buyers Track

Find unique training for casting designers, buyers, and OEM representatives in the Casting Designers & Buyers Track, offered exclusively in the HUB. These sessions are open to all CastExpo 2022 attendees.

Sponsored Presentations

Key suppliers will be providing 30-minute sponsored presentations about their services. Plan to attend the sessions of greatest interest.

Casting Source Theater

Brought to you by *Casting Source* magazine, the industry's best resource for designers, buyers, and OEMs, the Casting Source Theater features special events including sponsored presentations, the sessions for casting designers and buyers, and the IJMC/FEF Student Research Competition.

Casting Source Theater sponsored by:



AFS Store

The premier bookseller in the metalcasting industry. Practical and technical publications will be on hand, along with signature clothing and gift items.

AFS Products & Services

Whether you are a member of AFS or want to become one, stop by and learn about the competitive edge AFS membership provides. Issues of *Modern Casting*, *Casting Source*, and *Melting Point* magazine will be available. Stop by and pick up the latest issues.

Foundry-in-a-Box

Get "hands-on" by making your own casting. See how AFS staff conducts outreach with its customized Foundry-in-a-Box kit.

IJMC/FEF Student Research Competition

Saturday, April 23, 3 – 4:30 p.m.

Experience the best in undergraduate metalcasting research during this scholarship and publication competition for AFS student members. Finalists in the IJMC/FEF Student Research Competition will present their projects on metalcasting in the Casting Source Theater, where their research will be judged by a panel of industry experts. Top finishers will receive scholarships and have their work published in the *International Journal of Metalcasting*, the world's premier casting research journal. This competition is cosponsored by the *International Journal of Metalcasting* and the Foundry Educational Foundation. Support our students and join your Masters of Ceremonies – Technical Council Chair David Weiss, Research Board Chair Jim Archibald, and IJMC Editor Thomas Prucha – for an inspirational program. All are encouraged to attend this session and encourage our student metalcasting researchers!

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American Foundry Society

CastExpo 2022 and the 126th Metalcasting Congress is sponsored by the American Foundry Society (AFS), the leading metalcasting association in North America. Based in Schaumburg, IL, AFS provides members with advocacy, coordination and efforts in Washington, D.C., ongoing technical education through its Institute, as well as the transfer of innovative research and technology to the industry.



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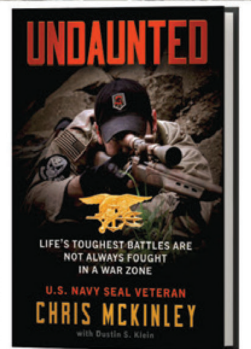


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2022 Keynote Speakers



Saturday, April 23, 2022 | 10:30 - 11:30 a.m. | Short North Ballroom
Leadership Lessons From a Former Navy Commander

Captain D. Michael Abrashoff

Author of "It's Your Ship: Management Techniques from the Best Damn Ship in the Navy"

Mike Abrashoff is the New York Times best-selling author of *It's Your Ship: Management Techniques from the Best Damn Ship in the Navy* and a leadership and teamwork expert. As a U.S. Navy captain, his grassroots leadership approach turned one of the worst ships in the Pacific Fleet into the best ship in just 12 months—all while using the same crew. A gifted presenter, he will bring his inspired leadership principles to a metalcasting audience on the first day of CastExpo. These principles are applicable to any business or management setting.



Monday, April 25, 2022 | 10:30 - 11:30 a.m. | Short North Ballroom
America in 2022: The State of the Public Opinion

Scott Rasmussen

Public opinion pollster, co-founder of ESPN, and author of "The Sun Is Still Rising: Politics Has Failed but America Will Not"

Long recognized as one of the world's leading public opinion pollsters, Scott Rasmussen is constantly measuring and analyzing the mood of the U.S., whether it's an upcoming election, a business trend, or the coronavirus pandemic. But numbers are just part of the story. Rasmussen's knowledge of history and depth of experience put that data in a meaningful context. Aptly described by The Wall Street Journal as a "key player in the contact sport of politics," Rasmussen also is a founder of the cable sports network ESPN.

Join us to hear Rasmussen's thought-provoking CastExpo keynote address. You'll come away with actionable insights into political, business, and social trends in America.

2022 Hoyt Memorial Lecture



Sunday, April 24, 2022 | 10:30 - 11:30 a.m. | Short North Ballroom
**Seven Keys to Long Term Success:
Lessons From a 50-Year Career**

Jean Bye

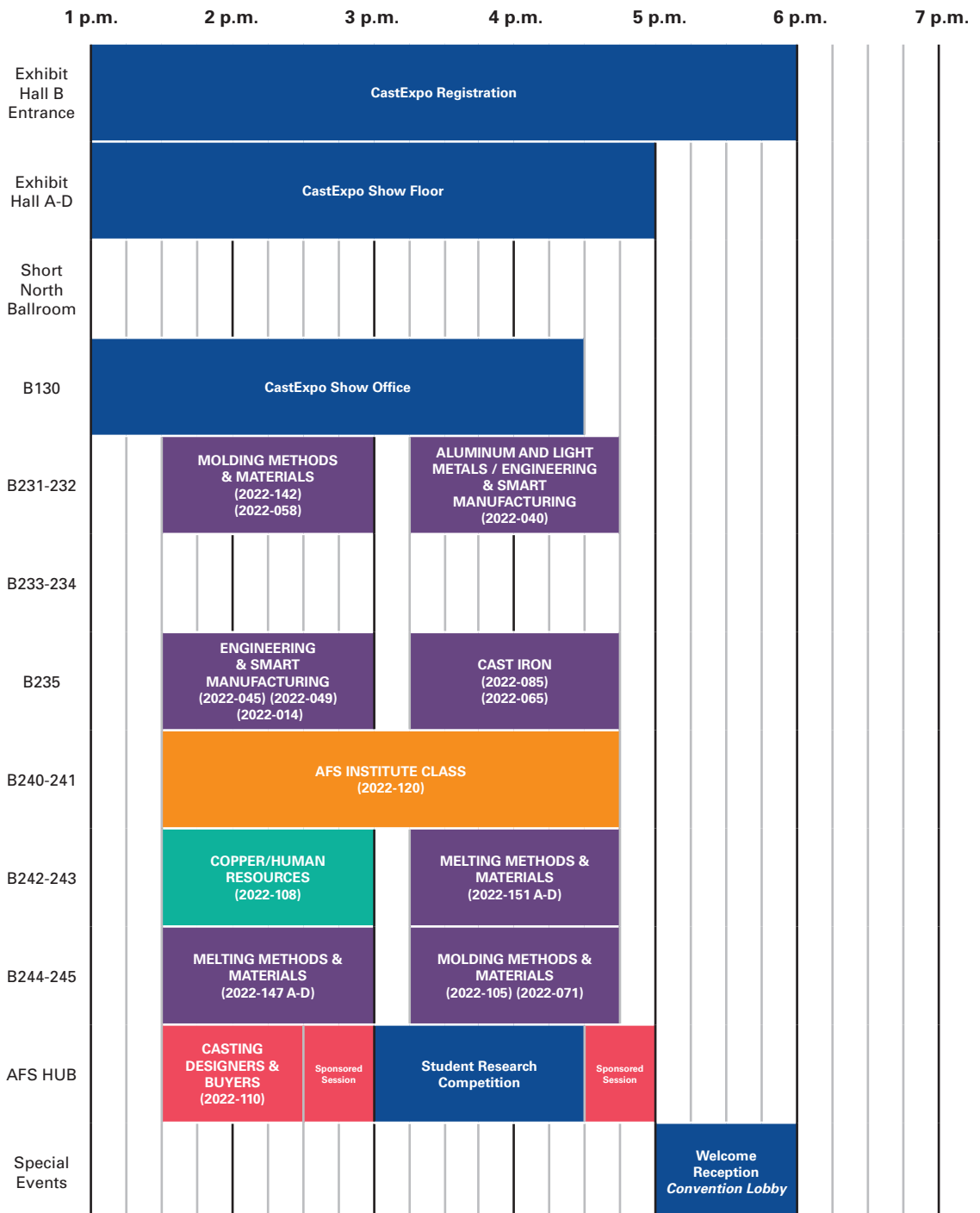
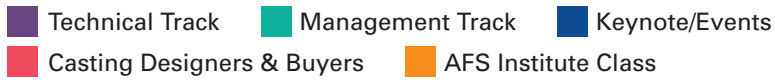
Retired CEO of Dotson Iron Castings and Past President, American Foundry Society

Industry veteran Jean Bye started her career at Dotson Iron Castings as an intern in 1972. Nearly 50 years later, she retired as its CEO. From economic booms and busts to destructive fires and resilient rebuilding, Bye's five-decade career encompassed the kinds of challenges and opportunities every metalcaster will recognize. In this 2022 Hoyt Memorial Lecture, Bye explores the lessons she learned about continuous improvement, defeating biases, building up employees, choosing the right battles, and more.

Schedule at a Glance

Saturday, April 23

	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.	Noon	1 p.m.
Exhibit Hall B Entrance	CastExpo Registration						
Exhibit Hall A-D			CastExpo Show Floor				
Short North Ballroom					Keynote Speaker: D. Michael Abrashoff (2022-129)		
B130		CastExpo Show Office					
B231-232		MOLDING METHODS & MATERIALS (2022-011) (2022-036)		MOLDING METHODS & MATERIALS (2022-052) (2022-023)			
B233-234							
B235				MELTING METHODS & MATERIALS (2022-153)			
B240-241							
B242-243		COPPER (2022-175)		COPPER (2022-146)			
B244-245		MELTING METHODS & MATERIALS (2022-149 A&B)		CAST IRON (2022-056) (2022-015)			
AFS HUB				Sponsored Session	Sponsored Session		
Special Events			Ribbon Cutting Ceremony Exhibit Hall B Entrance				Copper Luncheon C150-151



Schedule at a Glance

Sunday, April 24

	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.	Noon	1 p.m.
Exhibit Hall B Entrance	CastExpo Registration						
Exhibit Hall A-D			CastExpo Show Floor				
Short North Ballroom					Keynote Speaker: Jean Bye (2022-106)		
B130		CastExpo Show Office					
B231-232		MOLDING METHODS & MATERIALS (2022-012) (2022-069)		MOLDING METHODS & MATERIALS (2022-059) (2022-099)			
B233-234							
B235				ENGINEERING & SMART MANUFACTURING (2022-181 A-D)			
B240-241							
B242-243		ALUMINUM AND LIGHT METALS (2022-067) (2022-038)		ALUMINUM AND LIGHT METALS (2022-029) (2022-087)			
B244-245		CAST IRON (2022-135)		CAST IRON (2022-035) (2022-046)			
AFS HUB				Cast in Steel 2022 Award			
Special Events		Women In Metalcasting Breakfast C150-151				Volunteer Leadership Awards Luncheon C160	

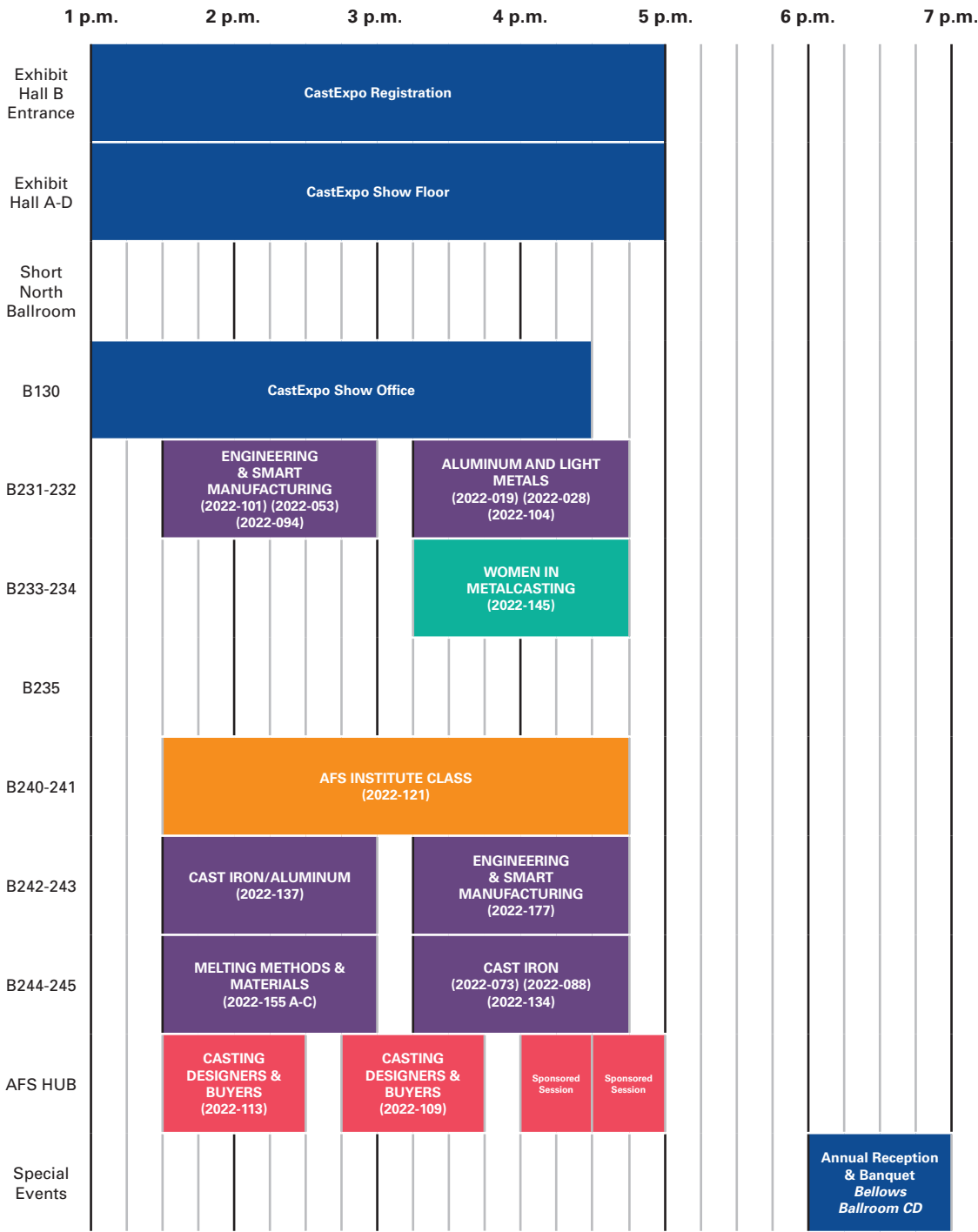
Technical Track

Management Track

Keynote/Events

Casting Designers & Buyers

AFS Institute Class

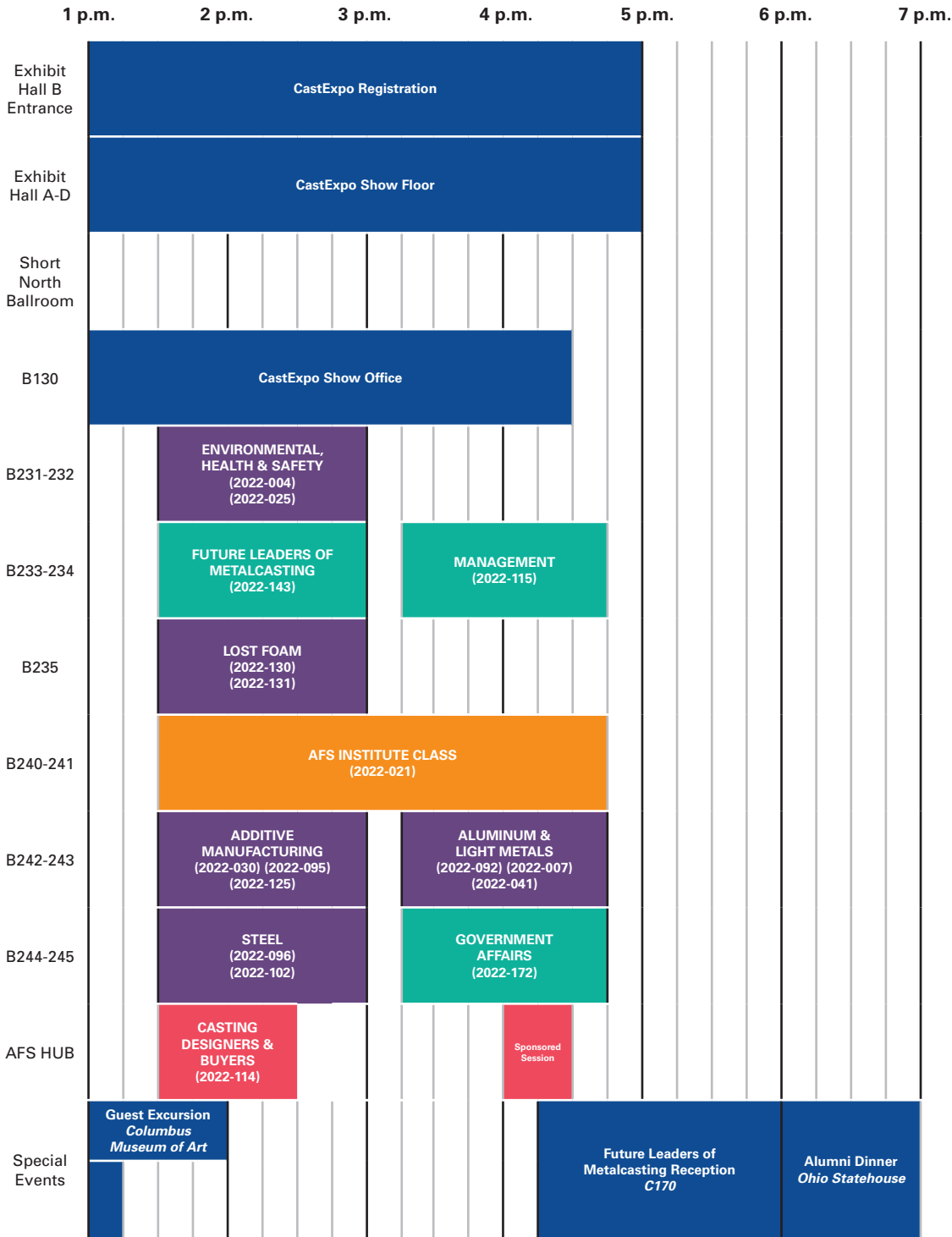


Schedule at a Glance

Monday, April 25

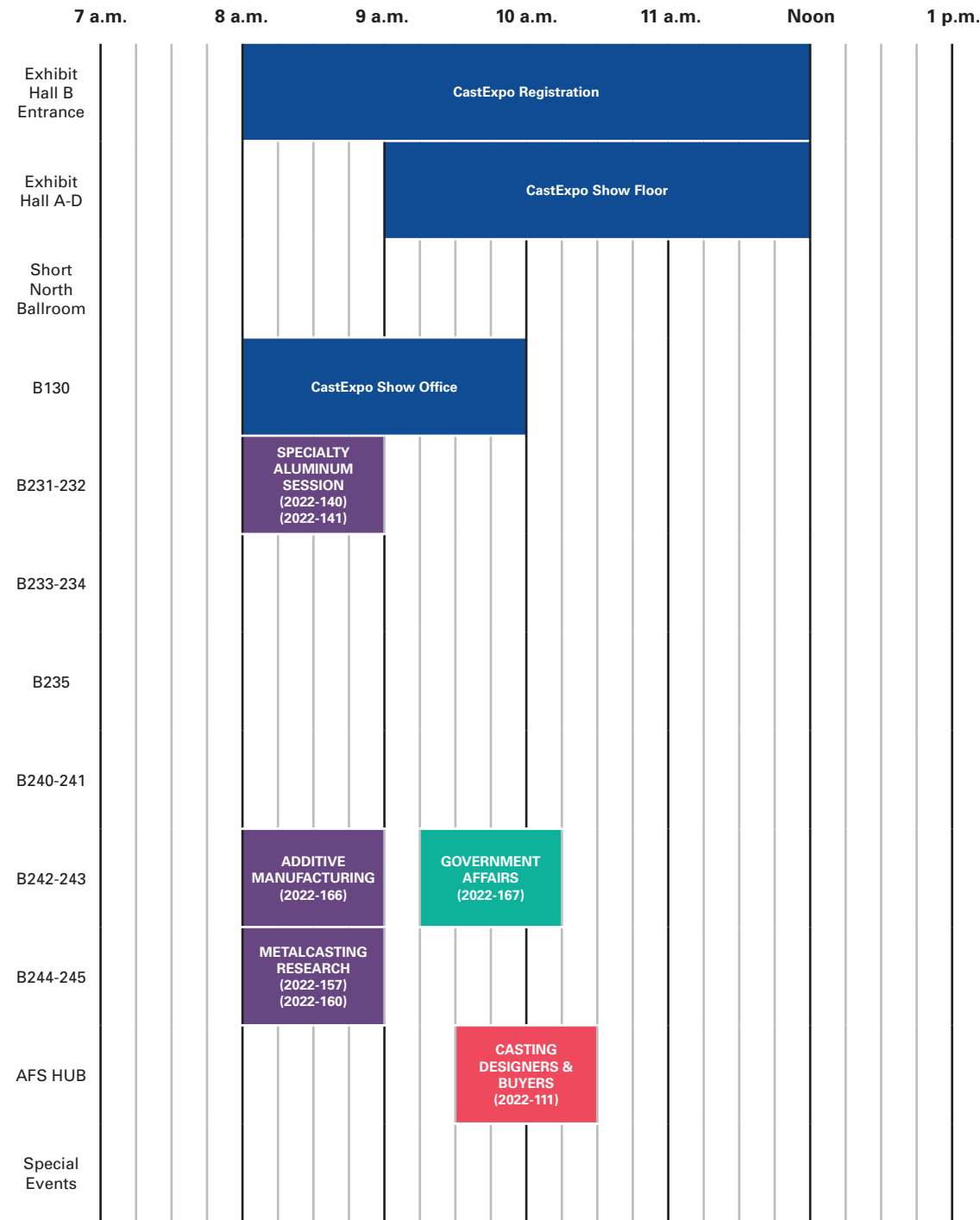
	7 a.m.	8 a.m.	9 a.m.	10 a.m.	11 a.m.	Noon	1 p.m.
Exhibit Hall B Entrance	CastExpo Registration						
Exhibit Hall A-D			CastExpo Show Floor				
Short North Ballroom					Keynote Speaker: Scott Rasmussen (2022-128)		
B130		CastExpo Show Office					
B231-232		METALCASTING RESEARCH (2022-158) (2022-161)		STEEL (2022-006) (2022-064)			
B233-234		MARKETING (2022-162)					
B235				ENVIRONMENTAL, HEALTH & SAFETY (2022-154 A-C)			
B240-241		AFS INSTITUTE CLASS (2022-122)					
B242-243		ADDITIVE MANUFACTURING (2022-039) (2022-022)		ALUMINUM & LIGHT METALS (2022-042) (2022-074)			
B244-245		LOST FOAM (2022-139)		ADDITIVE MANUFACTURING (2022-016)			
AFS HUB				CASTING DESIGNERS & BUYERS (2022-112)			
Special Events						Guest Excursion <i>Columbus Museum of Art</i>	Past President's Luncheon <i>The Refectory Restaurant</i>

- Technical Track
- Management Track
- Keynote/Events
- Casting Designers & Buyers
- AFS Institute Class



Schedule at a Glance

Tuesday, April 26





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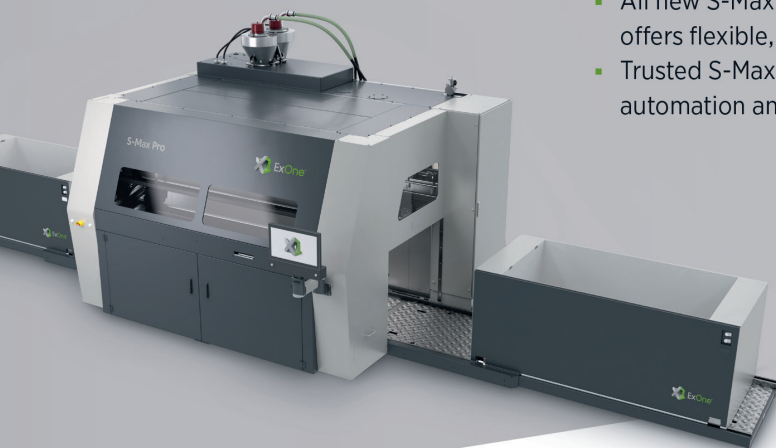
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Show Schedule

Saturday, April 23, 2022

7 – 8 a.m.

ROOM: B246

Author Chair Breakfast

This breakfast is for AFS speakers, session chairs, students, and staff to meet and coordinate details for the day's educational sessions.

8 – 9 a.m.

ROOM: B242 – 243

Copper Division

Session Chair: *Mike Buyarski, The Federal Metal Co., Bedford, OH*

Copper Uses Today and Tomorrow (22-175)

Chris Greenfield, The Federal Metal Co., Bedford, OH; Zachary Spellman, Imperial Group LLC, Chicago, IL

ROOM: B244 – 245

Melting Methods & Materials Division

Session Chairs: *Pat Leper, Saveway USA Corp., North Canton, OH; Steve Heger, Waupaca Foundry, Waupaca, WI*

Panel: Channel Furnace Real Life Case Histories Panel (22-149)

Immediate Actions Taken When Power Was Lost Due to Severe Weather (22-149A)

Johnny Hill, Martin Foundry, Dallas, TX

Successful Maintenance Program on a 65-Ton Vertical Channel Furnace Holding Ductile-Base Iron (22-149B)

Dale Piper, Grede-St. Cloud, Sauk Rapids, MN

ROOM: B231 – 232

Molding Methods & Materials Division

Session Chairs: *Russell Hector, ASK Chemicals, Dublin, OH; Daniel Weaver, REFCOTEC, Orrville, OH*

Experimental Methodology and Modeling of Tool Wear Effects During Sand Core Shooting (22-011)

Ingo Wagner, MAGMA GmbH, Aachen, Germany; Mauricio Velazquez Blandino, MAGMA Foundry Technologies Inc., Schaumburg, IL

The prediction of tool wear in core shooting processes depends on many influencing factors that current simulation tools only highlight with qualitative results. The influence that sand type, tool material, and shooting angles have in relation to tool wear will be presented. The collected data from the experimental analysis was used by MAGMA GmbH to develop a more advanced tool wear simulation model with the intention of helping tooling manufacturers and designers improve and guarantee for the future the highest quality of core boxes by predicting the effective wear on cavity surfaces with quantitative results. With this development project, a major contribution to industry 4.0 was achieved.

Increasing Die Casting Efficiency for Structural and Complex Cast Components With Water-Free Die Release Technology (22-036)

Matt Lococo, Quaker Houghton, Dayton, OH

This presentation will address the specific challenges experienced by today's high pressure diecasting industry in adopting very large diecasting machines and how Lubrolene water-free electrostatic release agents, combined with the inherently lower weight electrostatic spray head technology, can deliver improved diecasting productivity while providing unrivalled release, quality, cost, and sustainability performance for the new generation of 4,500-6,000T diecasting machines. Key topics addressed include meeting future industry needs, die spray system design for 4,500T machines, efficiently maximizing coverage through properties of water-free release lubricant combined with electrostatic spray technology, increased productivity through increased process speed with reduced spray time, increasing uptime and reducing costs through extended tool life, reducing water and effluent waste and improving process sustainability/ environmental performance, and reducing downtime through low-maintenance, reliable spray equipment design.

8:50 – 9 a.m.

ENTRANCE TO EXHIBIT HALL B

Ribbon-Cutting Ceremony

Celebrate the start of CastExpo 2022 with a ceremonial ribbon-cutting with the AFS Executive Board.

9:15 – 10:15 a.m.

ROOM: B244 – 245

Cast Iron Division

Session Chairs: *Dr. Kathy Hayrynen, Applied Process Inc., Livonia, MI; Emily Bosovich, Kohler, Kohler, WI*

Data Usage & Tooling Design: Considering Cost and Process Variability Data During Tooling Design (22-056)

Roy Stevenson, Daniel Coyle, and Konstantin Nikolov, MAGMA Foundry Technologies Inc., Schaumburg, IL

As labor and material shortages are being reported by foundries in many areas across North America, it is more important than ever that iron foundries are not only making castings that meet the quality requirements for each order, but that they use tooling designs that reduce the costs to manufacture the castings, and use tooling that can handle routine process variability while still meeting the given quality requirements. This presentation highlights ways that foundries can use cost and process variability data during the tooling design process to ensure that profits are being maximized for each new job. Three case studies are presented that contrast a traditional approach to tooling design that does not consider costs and variability before building a tool, with two case studies where cost and process variability data are used more proactively before tooling is made.

New Ductile Cast Iron Digital Grade for Automotive Components (22-015)

Ana Isabel Fernandez-Calvo, and Jon Garay; AZTERLAN, Basque Research and Technology Alliance (BRTA), Durango, Spain; Ramon Suarez, and Asier Gonzalez-Zabala, Veigalan Estudio 2010, Durango, Spain; Dale Johnson, Continental Teves AG & Co., Frankfurt, Germany; Cristina Monteiro, AAPICO, Maia, Portugal

This research demonstrates that new cast iron materials can be developed and aided by an expert digital twin (manufacturing twin) and model predictive controls developed based on artificial intelligent tools. The new high-yield- strength material grade was developed by expert analysis of the industrial manufacturing data of monitored automotive brake anchors for more than a year. The well-known EN GJS-550 high-

strength standard material grade with yield strength exceeding 370 MPa, commonly used for safety components, is replaced by the new HS420/250 grade with a yield strength higher than 420 MPa and elongation higher than 5% while the hardness is maintained below 250 HB. This 13.5% increase in yield strength opens new design opportunities for lightweight cast iron components. Using the model predictive control and the corrective protocols developed, a lighter anchor was successfully manufactured with the new high yield strength material.

ROOM: B242 – 243

Copper Division

Session Chair: *Jeff Sorenson, I Schumann & Co, Bedford, OH*

Practices in Channel Furnace Melting and Research on Improved Linings (22-146)

Andy Bain, Ford Meter Box Co. Inc., Carmel, IN; Pete Satre, Allied Mineral Products Inc., Columbus, OH

This presentation will focus on process and product considerations for selecting the proper refractory lining material for channel furnace inductors for copper and copper-based alloy production. This will include methods to control or eliminate zinc penetration in brass furnaces, effects of tramp elements on erosion conditions, factors causing and methods of controlling buildup, and other refractory considerations in this application.

ROOM: B235

Melting Methods & Materials Division

Session Chair: *Mike Dunn, OmniSource Corporation LLC, Brookville, OH*

Panel: Charge Melting Methods for Consideration (22-153)

Critical Safety Considerations for Charge Materials in Coreless Melting (22-153B)

Lenny Basaj, Metal Technologies Ravenna Ductile Iron Plant, Ravenna, MI

Real-Time Mobile Chemical Analysis of Incoming Charge (22-153B)

Jeff Kramer, AMERICAN Cast Iron Pipe Company, Birmingham, AL

ROOM: B231 – 232

Molding Methods & Materials Division

Session Chairs: *Jerry Thiel, University of Northern Iowa, Cedar Falls, IA; David Fletcher, Lodge Manufacturing, Chattanooga, TN*

Evaluating and Reducing the Impact of Hydraulic Oil Contamination on Bentonite-Based Molding Sand and Iron Casting Quality (22-052)

David Kesse and Riley Kerestes, CATERPILLAR, Mapleton, IL; Michelle Ring, Larry Kaiser, and Liam Miller, American Colloid Co., Hoffman Estates, IL; Al Jacobson, Grede, St. Cloud, MN; Tom Arenholz, John Deere Waterloo Works, Waterloo, IA

Foundries have long suspected that contamination of a green sand system with hydraulic oil could cause casting defects. A review of available literature found most related topics were dated and lacked current testing methodologies. Various foundries collaborated to quantify the impact of oil and determine how to detect and monitor the levels in their green sand system. This study represents a joint effort between foundries and a supplier to determine the impact of oil contamination on green sand and casting quality. The study also outlines methods to detect and monitor the levels of oil in molding sands and provides details

of one foundry's improvements to its sand properties and casting quality. Design of Experiment (DOE) methodology was utilized to predict the impact on sand properties as a function of oil contamination, while utilizing a modified Hexane Extractable Material (HEM) test to quantify the level of oil and grease contamination.

A Surfactant Sand Additive - A Detailed Look at How They Benefit the Individual/Specific Green Sand Foundry (22-023)

*Harry Seibel and Stephen Neltner, REFCOTEC,
Orrville, OH*

By now, most foundries have heard of special chemical additives and how their use can enhance the green sand system properties. Along with these improved sand properties comes the reduction in process variation, casting scrap, necessary clay, and required moisture. While any foundry would generally enjoy these benefits, many would also like to understand more specifically how these materials can benefit their individual foundry. This presentation concentrates not only on those sand system improvements, but on the other benefits seen—based historically on individual foundry's metal type poured, the clay type and source, and foundry size. Because of this information, a foundry can now more confidently implement the use of these new additives with a better understanding and anticipation of what to expect from the use of the green sand additive.

9:30 – 10 a.m.

ROOM: CASTING SOURCE THEATER

Sponsored Session

Tomorrow's Sand Printers, Today

*Roger Heise, Omega MDS, Welland, Ontario,
Canada*

Omega Multidimensional Systems (Omega MDS) are passionate about helping small to mid-sized foundries improve their productivity and deliveries. We provide state-of-the-art foundry sand mold and core printers,

Schedule subject to change.

including ancillary equipment. Our game-changing technology reduces the time-consuming and costly aspects of the pattern-making, storage, and molding process. Imagine precision quality and customization at your fingertips. Proudly made in North America. Available worldwide. Join us to find out how we can help.



10 – 10:30 a.m.

ROOM: CASTING SOURCE THEATER

Sponsored Session

A New Approach to Your Shot-Blasting Process with BCT

*Carl Panzenhagen, Blast Cleaning
Technologies, West Allis, WI*

In today's challenging business climate, BCT leads the charge with innovative products focused on increased productivity, safety, ease of maintenance, reliability, electrical controls, and system diagnostics. At BCT we continue to upgrade and expand our state-of-the-art manufacturing and assembly plant in West Allis, Wisconsin. Our recent \$6m expansion and investment includes new machining centers, additional cranes, new 5-axis plasma, weld positioners, robot welding, vertical storage system and a facility expansion creating more than 140,000 SQ. FT. This is all a part of our investment and commitment to support and meet our foundry customer demands right here in the U.S.A.



10:30 – 11:30 a.m.

ROOM: SHORT NORTH BALLROOM

Keynote Session

Session Chair: *Mike Lenahan, Badger Mining Corp., Berlin, WI*

Leadership Lessons from a Former Navy Captain (22-129)

Captain D. Michael Abrashoff, Former Navy Captain

Mike Abrashoff is the New York Times best-selling author of *It's Your Ship: Management Techniques from the Best Damn Ship in the Navy* and a leadership and teamwork expert. As a U.S. Navy captain, his grassroots leadership approach turned one of the worst ships in the Pacific Fleet into the best ship in just 12 months —all while using the same crew. A gifted presenter, he will bring his inspired leadership principles to a metalcasting audience on the first day of CastExpo. These principles are applicable to any business or management setting.

11:45 a.m. – 1 p.m.

ROOM: C150 – 151

Copper Luncheon

The Copper Division will present its annual awards during this luncheon featuring speaker Mark Holbrook, the executive director for the Marion Area Convention and Visitors Bureau. This ticketed luncheon is open to everyone with an interest in copper alloys.
Ticketed Event - \$65

1:30 – 2:30 p.m.

ROOM: CASTING SOURCE THEATER

Casting Designer & Buyers

Session Chair: *Shannon Wetzel, American Foundry Society, Inc., Schaumburg, IL*

Trends and Case Studies in Additive Manufacturing (22-110)

Tom Mueller, Mueller AMS, New Berlin, WI

Additive manufacturing has been universally adopted as a means to create prototype castings. It is also being used to create very low volumes of production castings. Despite these successes, there is virtually no use of printed patterns for low volume (200 + castings) production. Mueller will discuss the reasons it is not being used and go into detail about technology developments over the last few years that are making printed patterns viable for volume production. In addition, he will look at emerging markets that will require the use of printed patterns.

1:30 – 3 p.m.

ROOM: B242 – 243

Copper Division

Human Resources Division

Panel: Conversations in Columbus About People, Talent, and Leadership (22-108)

Moderator: *Joey Leonard, KerberRose, Green Bay, WI*

Panelists: *Amanda Groves, Lodge Mfg. Co., South Pittsburg, TN; Todd Ray, Decatur Foundry Inc., Decatur, IL; Brian Lewis, FEF, Schaumburg, IL*

Join us as members of the AFS HR Division share their perspectives in a back-and-forth discussion about the challenges facing today's workforce.

Discussion topics will include recruitment approaches, retention strategies and leadership development. Participants will walk away with some thought-provoking information to discuss with their teams.

ROOM: B235

Engineering & Smart Manufacturing Division

Session Chair: *Brandon Kruse, Magaldi Technologies, Inc., Atlanta, GA*

Utilizing Computer Simulation to Advance Employee Health and Safety (22-045)

Brian Bakowski, SLR Consulting, Pittsburgh, PA

Health and safety have been at the forefront for decades as manufacturing facilities prioritize the welfare of their employees. Incorporating safety and wellness planning, education and training, and adequate staffing levels are just a few ways this is accomplished. Researching safety vulnerabilities is another method. As part of this method, industrial facilities are using the latest advancements in computer simulation to predict conditions within the work environment and identify potential hazards. By utilizing this technology, engineers can predict conditions and make the necessary changes to provide a safer work environment. This presentation examines computer simulation and how this technology can be applied to provide a safer work environment.

Easing the Labor Crunch Through Industry 4.0 (22-049)

Jim Wenson, Roberts Sinto Corp., Lansing, MI

In the foundry industry, it is getting harder and harder to find, attract, and, most importantly, retain skilled and experienced maintenance personnel. This leads to employees who are spread thin and responsible for an ever-growing list of tasks. Those employees are then asked to participate or lead continuous improvement projects that are necessary to remain competitive in the market. By adopting technologies that have come from the latest industrial revolution, these overworked, inexperienced, or new employees can be trained, guided, and enticed to help your foundry processes (Maintenance, Quality, Production, and Planning).

Schedule subject to change.

Preventing Molten Metal Injuries and Fatalities: An Examination in Proper Clothing When Handling Molten Aluminum (22-014)

Alex Lowery, Wise Chem, New Albany, OH

Foundry workers are needlessly being injured by molten metal explosions because they are not wearing the proper personal protection equipment. This gap in knowledge of why and how to prevent molten metal explosions results in foundry workers being injured and killed. This presentation explains why molten metal explosion injuries occur, with special attention to worker's clothing. Specifically, this presentation closely examines molten aluminum metal explosions and sheds new light on the neglected issue of personal protection equipment in the foundry industry.

ROOM: B244 – 245

Melting Methods & Materials Division

Session Chair: *Lucas Dix, Miller and Co., Birmingham, AL*

Panel: Coreless Melting (22-147)

Power Cabinet Upgrades to Increase Melt Rate Efficiency (22-147A)

Chris Burroughs, Advanced Cast Products, Meadville, PA

Thermal Shock Solution for Non-Silica Dry Vibratable Refractory Linings for Copper-base Melting (22-147B)

Mike Buyarski, The Federal Metal Co., Bedford, OH

Troubleshooting in Coreless Induction Melting (22-147C)

Mark Kohler, Ajax Tocco Magnethermic Corp., North Canton, OH

Experiences When Using Non-Silica Dry Vibratable Linings for Iron Coreless Melting (22-147D)

Steve Tuggle, Rochester Metal Products Corp., Kendallville, IN

ROOM: B231 – 232

Molding Methods & Materials Division

Session Chairs: *Pete Gravunder, Badger Mining Corp, Berlin, WI; Scott Giese, University of Northern Iowa, Cedar Falls, IA*

Silver Anniversary Lecture: Effect of Sand Distribution on Casting Quality (22-142)

Sara Joyce, Badger Mining Corp., Berlin, WI

This presentation recaps the paper “Sand Distribution: Its Effect on Casting Quality,” written 25 years ago by Sara Joyce, Dave Gilson, and Ken Horton. The goal of this research was to determine the effect that sieve analysis had on tensile strength and castings. New tensile strength data will be presented along with a brief review of research on sieve analysis that has been performed in the past 25 years.

Applications of Chromite Sizing for Casting Production (22-058)

Kelley Kerns, HA International, LLC, Westmont, IL; Robert Steele, FACT, Ponte Vedra Beach, FL; Jerry Thiel, University of Northern Iowa, Cedar Falls, IA; Patricia LaFay, and Victor LaFay, Common Sense Applications, Cincinnati, OH

This presentation reviews the impact that chromite sizing has on casting production in the foundry industry. Mined sources of chromite vary in unique chemistry based upon the geological location of the ore. The screen distribution influences many foundry applications, including the casting surface appearance, binder level requirements, and overall performance.

1:30 – 4:45 p.m.

ROOM: B240 – 241

AFS Institute Class

Metalcasting Process Basics (22-120)

Michael Porfilio, Stainless Foundry & Engineering Inc., Milwaukee, WI

This course provides participants with a basic overview of the metalcasting process. Students will trace the path of a casting from quoting through shipping. Common metalcasting terms are covered while highlighting the activities inside the major departments of a metalcasting production facility.

2:30 – 3 p.m.

ROOM: CASTING SOURCE THEATER

Sponsored Session

The Ensemble for the Digital Revolution in Metalcasting Industry

Markus Fournell, ABP Induction Systems GmbH

ABP Induction opens up the world of metalworking industry to digitalization with #ENTERABP. It works like a large concert orchestra. In a foundry, as in an orchestra, there are many individuals who, brought together, operate as a unit. In the foundry, the violins are the furnaces that can be viewed with ABP Intelligence. Properly evaluated and configured, the entire ensemble can be made to vibrate - sand preparation plant, molding plant and transport plant included. In myABP, additional components can be easily integrated digitally. And with ABP's digital Expert on Demand, experts could even quickly show how these components can be integrated via augmented reality. Individual ensemble parts can then be trained via virtual reality in the already award-winning solution ABP Virtual Academy.

ABP
INDUCTION

Technical Track
 Management Track
 Keynote/Events
 Casting Designers & Buyers
 AFS Institute Class

3:15 – 4:45 p.m.

ROOM: B235

Cast Iron Division

Session Chairs: *Brad Steinkamp, Charter Dura-Bar, Crystal Lake, IL; Eric Nelson, Dotson Iron Castings, Mankato, MN*

Opportunities to Fully Exploit Ductile Iron Castings in Lightweighting of Vehicles (22-085)

John Biel, LightSpeed Concepts Inc., Ann Arbor, MI

Ductile (spheroidal graphite) iron is an engineered, cast iron-silicon-graphite nanocomposite. The spheroidal graphite nodules in an iron matrix make the material 10% less dense than steel. The metal matrix can be thermally manipulated to have a range of properties. Ductile iron is 2.5 times denser than aluminum, 2.5 times stiffer, and up to 4 times stronger in tensile loading. Ductile

iron has low embodied energy and is 100% recyclable. Ductile iron's high strength-to-weight ratio makes it very competitive in material selection for light weighting. To exploit the exceptional properties of ductile iron vs high-strength steel, aluminum, or titanium, the ductile iron casting process must evolve to allow for carbide-free 3 mm wall castings and organic designs. A reasonably priced iron alloy that is carbide-free in 3 mm sections with a yield strength of over 600 MPa and greater than 10% elongation would be an exceptional material.

A Novel Approach to Austenite Grain Refinement (22-065)

Richard Gundlach, and John Tartaglia, Element Materials Technology, Wixom, MI

A novel approach to austenite grain refinement was applied to ductile iron in order to improve the strength-ductility properties. Ductile iron has a unique microstructure that



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lends it to producing unusual transformation structures because the graphite is relatively isolated from the iron matrix. The isolation of the carbon phase affects phase transformation in heat treatment. On heating (intercritical austenitizing) above the lower critical temperature, a novel lamellar structure can form with alternating layers of austenite and ferrite. This lamellar structure forms in packets within the ferrite grains. Compared to the coarse-grained, polygonal austenite that forms on heating above the upper critical temperature, the lamellar austenite structures can be an order of magnitude finer. Ductile iron having a fine-grained lamellar austenite-ferrite structure was quenched and tempered. The resulting properties were compared with those of conventional quench and tempered ductile iron with a fully martensitic microstructure.

ROOM: B231 – 232

Engineering & Smart Manufacturing Division

Aluminum & Light Metals Division

Session Chair: *Jim Wenson, Sinto America, Grand Ledge, MI*

Achieving Metallurgical Bonding in Aluminum/Steel Bimetallic Castings (22-040)

Michael Moodispaw, Buwei Chen, and Alan Luo, The Ohio State University, Columbus, OH; Qigui Wang, General Motors, Pontiac, MI

Aluminum castings are increasingly being used in automotive powertrain and structural applications for vehicle light weighting. Cast aluminum parts often need to be machined and joined to steel components in multi-material systems. Bimetallic products produced by casting aluminum over steel substrate are advantageous due to the elimination of machining and dissimilar material joining. However, forming strong metallurgical bonding during overcasting has been challenging. In this research, the effects of processing conditions such as

substrate surface preparation, pre-heating temperature, melt conditions, and casting design were studied by investigating the bimetallic interfaces for aluminum A319 casting alloy and a high alloy steel substrate in a sand casting process. The experimental results suggest a metallurgical bond between aluminum and steel can be formed during the sand casting process via high temperature diffusion. Preliminary results on interdiffusion of Al and Fe during overcasting provide important guidance in producing high-quality bimetallic castings.

ROOM: B242 – 243

Melting Methods & Materials Division

Session Chair: *Pete Satre, Allied Mineral Products Inc., Hilliard, OH*

Panel: Cupola Melting Innovation for the Future (22-151)

Affordable Green Iron for the Future: The Evolution and Status of the Cupola Furnace (22-151A)

David Kasun, Kuttner LLC, Port Washington, WI

AFS Research: A Review of High CSR Coke Study (22-151B)

Stephen Hay, Hay Melting Solutions LLC, South Lyon, MI; Bruce Blatzer, Cary, NC

Coke Specifications for Optimum Cupola Melt (22-151C)

John Gatewood, Cadillac Castings, Inc., Cadillac, MI

ROOM: B244 – 245

Molding Methods & Materials Division

Session Chairs: *Mitchell Patterson, HA International LLC, Westmont, IL; Mark Ziegler, Casting Industry Suppliers Assoc, Rockford, IL*

Effect of Phenolic Urethane Resin Ratios on Ambient and High Temperature Mechanical Properties (22-105)

Brodie Biersner, HA International, LLC., Westmont, IL; Sairam Ravi and Maria Alverio, University of Northern Iowa, Cedar Falls, IA

Understanding the influence that resin ratio has on phenolic urethane nobake and cold-box resins in both room temperature and high temperature physical properties can help the foundry reduce costs associated with the production of mold/cores and overall casting quality. Chemically bonded sand cores used in the foundry industry will ideally have sufficient green strength for core handling, have hot strength for maintaining form over filling and solidification operations, and be able to break apart easily during shakeout. While the effect of resin content has been extensively studied, little published research exists on the effect of Part 1: Part 2 ratio of a phenolic urethane resin on room temperature and higher temperature mechanical properties of core sand. This presentation reviews the effect of resin ratios on the mechanical properties of core sand.

Alternative Method for Evaluating Strip Time in PUNB Sand (22-071)

Andrew Pike, Joshua Gammariello, and Marc Harris, Mueller Water Products, Chattanooga, TN

Properly determining the correct strip time for nobake sand is critical to the process of making high-quality molds and cores. An improper strip time will result in either warped molds and cores if too early, or difficulty in removing the sand from the tooling, leading to potential damage of either, if too late. An alternative method for determining strip time was evaluated against

other methods. Three-point transverse bend and strength tests were conducted using 1 in. x 1 in. x 8 in. sand cores made from both production and lab mixes. The fracture mode results exhibited properties that compared well to actual strip times in a working foundry and were more correlative than the traditional mold indentation hardness. A fuller understanding of mechanical properties, including bend strength and total deflection, is useful for developing predictive tools to control the complex nonlinear properties of nobake sand systems.

3 – 4:30 p.m.

ROOM: CASTING SOURCE THEATER

IJMC-FEF Student Research Competition

Experience the best in undergraduate metal-casting research during this scholarship and publication competition for AFS student members. Finalists in the IJMC/FEF Student Research Competition will present their projects on metalcasting in the Casting Source Theater, where their research will be judged by a panel of industry experts. Top finishers will receive scholarships and have their work published in the *International Journal of Metalcasting*, the world's premier casting research journal. This competition is cosponsored by the *International Journal of Metalcasting* and the Foundry Educational Foundation. Support our students and join your Masters of Ceremonies – Technical Council Chair David Weiss, Research Board Chair Jim Archibald, and IJMC Editor Thomas Prucha – for an inspirational program. All are encouraged to attend this session and encourage our student metalcasting researchers!

4:30 – 5 p.m.

ROOM: CASTING SOURCE THEATER

Sponsored Session

Optimizing the Iron Casting Process

Dan Coyle, MAGMA Foundry Technologies, Inc., Schaumburg, IL

When starting to design an iron casting, there is a long list of unknowns with the manufacturing process. Simulating the manufacturing process can guide not only the casting design, but this complicated manufacturing process as well. Using MAGMASOFT®, the entire process can be analyzed virtually without incurring the costs and time penalties of pouring multiple samples, while ensuring that all quality criteria are met. Furthermore, the tooling and the process can be optimized to avoid costly setbacks and reduce the cost of the casting, which will be demonstrated by presenting multiple case studies.



5 – 6 p.m.

ROOM: NORTH ATRIUM

Welcome Reception

AFS welcomes all attendees to kick off CastExpo 2022 with a reception in the convention lobby. The reception provides the opportunity to meet with customers, vendors, and other attendees. Cocktails and hors d'oeuvres will be served. *Ticketed Event - \$40*

Saturday, April 23



JULY 26 - 27, 2022 | EAGLEWOOD RESORT & SPA | ITASCA, IL

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DIGITAL MANUFACTURING IN THE METALCASTING INDUSTRY

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Sunday, April 24

7 – 8 a.m.

ROOM: B246

Author Chair Breakfast

This breakfast is for AFS speakers, session chairs, students, and staff to meet and coordinate details for the day's educational sessions.

7:30 – 9 a.m.

ROOM: C150 – 151

Women in Metalcasting Breakfast

This event is open to members of the Women in Metalcasting group. It includes a continental breakfast and networking with people who work in all facets of the metalcasting industry. *(Invitation only.)*

Thank you to our sponsors:



8 – 9 a.m.

ROOM: B242 – 243

Aluminum & Light Metals Division

Session Chair: *Paul Jones, Huskerine Technologies, Rochester Hills, MI*

Direct, Quiescent, Clean, Counter Gravity Filling of Aluminum (22-067)

Sam Ramrattan, and Juan Foo, Western Michigan University, Kalamazoo, MI

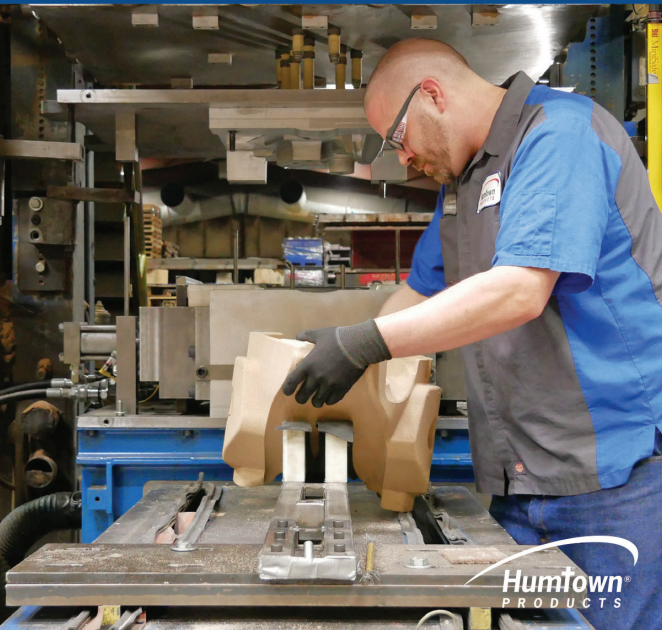
Pouring molten aluminum from a ladle causes turbulent flow that leads to the entrainment of oxide films and results in casting defects. A new approach to delivering aluminum into the mold needs to be developed to avoid entrainment defects. This presentation focuses on a direct, quiescent, clean, true counter gravity filling process that was developed and tested at Western Michigan University. The main features include a smart air pressure control unit, resistance melting system, and a specialized check valve. A dimensionless number for A356, hydrostatic pressure equations, and a flow and solidification simulation tool were used to optimize the filling velocity for the molten alloy. Findings and results from theoretical calculations, simulation, and casting trials are provided.

Optimize HPDC and LPDC Processes for the Automotive Industry Through Simulation (22-038)

Nicolas Poulain, Transvalor Americas Corp., Chicago, IL

The simulation of HPDC and LPDC is crucial to develop and optimize cast products. The presentation showcases two case studies from the automotive industry. A crankcase made through HPDC is analyzed from the filling with the ladle through the solidification as well as thermal cycling. The second case study is a chassis part made from the LPDC process. The results from mold thermal control will be assessed and the simulation results will be compared to the experimental data. The intent of the presentation is to foster the idea that simulation should be used at

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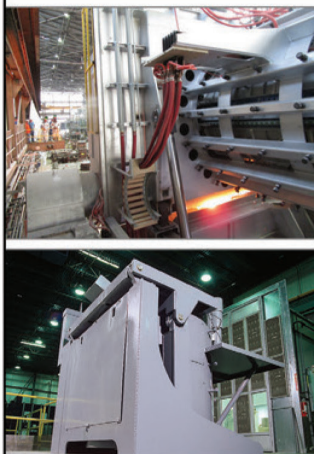


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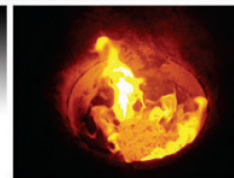


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ROOM: B244 – 245

Cast Iron Division

Session Chairs: *Dr. Kathy Hayrynen, Applied Process Inc., Livonia, MI; David Gilson, SinterCast Inc., Naperville, IL*

Cast Iron Honorary Lecture: Cast Iron Innovation Through Education (22-135)

Robert Voigt, Penn State University, University Park, PA

The pathway forward for sustainable innovation in cast iron science and technology must be driven by a comprehensive strategy for cast iron education. Students, cast iron users, cast iron producers and cast iron technology developers all require uncluttered access to the evolving state-of-the-art and the evolving state-of-practice. A strategic cast iron education action plan will be presented that transitions learning materials from 20th century handbooks and technical papers to a 21st century “Cast Iron University” educational platform designed to enhance cast iron education among all audiences and to drive continuing innovation in cast iron science, technology, and practice.

ROOM: B231 – 232

Molding Methods & Materials Division

Session Chairs: *Brian Rachwitz, EJ, East Jordan, MI; Stephen Neltner, REFCOTEC Inc, Orrville, OH*

Comparing the Green Properties for Silica, Chromite, and Ceramic Sands using AFS Baseline and Non-Standard Dynamic Tests (22-012)

Sam Ramrattan, Western Michigan University, Kalamazoo, MI

This project was developed in regard to a recent AFS research project, Alternative Granular Media for Green Sand Casting. The purpose of this study is to determine the AFS standard baseline properties of the ceramic and chromite green sand systems. Non-standard dynamic green sand tests were used to evaluate the systems. Dynamic green sand tests such as modified cone jolt toughness, hot friability, wet tensile strength, and hot permeability were able to differentiate among various green sand systems for the same compactability level (moisture content) and clay level. The dynamic tests provide more relevant data about these green sand systems compared to the baseline tests. The results obtained in this study are encouraging and present opportunity for the ceramic and chromite green sand systems.

Automated LOI Testing (22-069)

Sam Ramrattan, Western Michigan University, Kalamazoo, MI

An automated loss-on-ignition (LOI) tester has been developed using infrared (IR) heating technology. The new test allows for a short exposure time to heat a foundry sand sample and provides digital data. The actual sample test time is comparable to an induction coil method for LOI and is considerably faster than either the muffle furnace or microwave furnace. The standard of 3-hours for the muffle furnace or 20 minutes for the microwave furnace is time consuming and requires separate samples for individual tests. The induction coil method is comparable in time to conduct the test, but it requires special manipulation of the system to take measurements during testing. This study will confirm there is no significant difference between the AFS Standard LOI test and a new automated LOI test. The complete analysis from the automated LOI test can be accomplished in 10 minutes.

9:15 – 10:15 a.m.

ROOM: B242 – 243

Aluminum & Light Metals Division

Session Chairs: *Adam Kopper, Brunswick Corp., Fond du Lac, WI; Tom Prucha, MetalMorphosis LLC, Rochester Hills, MI*

Implementing SMARTT (Self-Monitoring, Adaptive Re-calculating Treatment Technology) Degassing Into a V-process Foundry Making A356 Aluminum Alloy Castings (22-029)

Brian Began, American Foundry Society, Inc., Schaumburg, IL; Eric Baker, Harmony Castings, LLC, Harmony, PA; Jacob Johnson, Foseco, Cleveland, OH

This presentation documents a project where a metal treatment station unit guided by SMARTT (Self-Monitoring, Adaptive, Re-calculating Treatment Technology) degassing optimized the melt treatment process in the production of A356 aluminum. It reviews the model and the rationale for using adaptive degassing and other treatments including upgassing and flux form grain refining to fully automate the melt treatment process at Harmony Castings, LLC. It also reviews the considerations involved in jobbing type production requiring multiple different specific gravity ranges. A comparison to using SMARTT at a higher production environment is made. It also documents the benefits achieved during the first year after implementation, which include significantly improving mechanical properties (UTS, YS, elongation and BHN). Finally, it reviews the project's primary objectives of higher productivity and lower metallurgical scrap, which were accomplished relative to historical standards, by significantly reducing the degas cycle and scrap.

Porosity Modeling and Validation in Aluminum Sand Castings (22-087)

Andy Wang, General Motors, Rochester, MI

A computational model for predicting porosity in aluminum sand castings is described. The model can predict the size and location of porosity due to solidification shrinkage and hydrogen diffusion. X-ray Computed Tomography (X-ray CT) is adopted to characterize the size and morphology of porosity in samples taken from a sand cast engine block made of A319 alloy. Pore size distribution in the samples is analyzed using Generalized Extreme Value Distribution (GEVD) function from the X-ray CT data. The Equivalent Circular Diameter (ECD) values of pores are used to represent the pore sizes at each location in the sample for model validation. Quantitative comparison of pore sizes at each location shows good agreement between model prediction and experimental observations.

ROOM: B244 – 245

Cast Iron Division

Session Chairs: *Mike Riabov, Eltek Foundry Products, Appleton, WI; Matthew Schultz, Waupaca Foundry, Waupaca, WI*

Influence of Holding Time in the Heating/Pouring Unit on the Metallurgical Quality of Spheroidal Graphite Iron (22-035)

Gorka Alonso, IK4-Azterlan, Durango, Spain; Jose Ramon Olaizola, Azterlan, Durango, Spain; Ramon Suarez, Veigalan Estudio 2010, Durango, Spain; Dr. Doru Stefanescu, The Ohio State University and University of Alabama, Dublin, OH

The final metallurgical quality of a ductile iron is determined by the components of the metallic charge, as well as by the liquid treatment, the melting temperature, and the holding time. All these factors directly affect the nucleation potential of the melt, and therefore the formation of carbides and microshrinkage. The goal of this industrial research was to investigate the effect of different holding times in the heating/pouring

unit on the microstructure and nucleation propensity for a 3.73% C, 2.53% Si spheroidal graphite iron. Cooling curves were recorded, and metallographic analysis was conducted on TA cups to evaluate the nodule count, the shape parameters of graphite and their size distribution. As expected, longer holding times produced higher amounts of carbides. Sulfides and Mg-Si-Al nitrides were detected as the main nuclei through SEM study. Their evolution in time was evaluated. The improvement of the metallurgical quality by inoculation was demonstrated.

Thermochemical Evaluation of Cast Iron Slags Generated From a Holding Furnace (22-046)

Robert Logan, Elkem Foundry Products, Mooresville, NC; Cathrine Hartung, Elkem Foundry Products, Kristiansand, Norway

In the cast iron, slag is a reaction product of alloying elements and process. The slag is a mixture of oxides and sulfides that often appears on the surface of the molten iron, where it can be removed or, in the worst case, carried into the component during casting. In this context, two different samples from an 80-ton holding furnace were collected to study their compositions and give a plausible explanation to their different behavior and why one is preferred and the other not by the foundry. They were called Good and Bad slag samples by the operators. The slags were evaluated by X-ray fluorescence spectroscopy (XRF) and combustion techniques to measure the total concentrations of oxygen and sulfur. This information was used as input parameters for thermodynamics calculations, using Fact Sage & trade to evaluate the equilibrium phases of the slag samples and their behavior as a function of temperature.

ROOM: B235

Engineering & Smart Manufacturing Division

Session Chair: *Patrick McCrevan, B&L Information Systems, Bridgman, MI*

Panel: Practical Methods for Foundry 4.0 Implementation (22-181)

Introduction (22-181A)

Patrick McCrevan, B&L Information Systems, Inc., Bridgman, MI

Leveraging Industry 4.0 in a Tight Labor Market (22-181B)

Eric Nelson, Dotson Iron Castings, Mankato, MN

Applications of Artificial Intelligence to Smart Manufacturing of Metalcasting (22-181C)

Jiten Shah, Product Development & Analysis LLC, Naperville, IL

Practical and Cost Effect KPI Data Collection in Foundries (22-181D)

Jerry Eppler, Artek Integrated Solutions, Folsom, CA

A newly updated Engineering Division with the inclusion of smart manufacturing technologies has organized a panel with an emphasis on Foundry Industry 4.0 relevant technological advancements, adoption, and success stories with business cases. The division's revised mission will be presented with several sub-committees being formed.

ROOM: B231 – 232

Molding Methods & Materials Division

Session Chairs: *Tom Mueller, Mueller AMS,
New Berlin, WI; Jerry Thiel, University of
Northern Iowa, Cedar Falls, IA*

The Effect of Firing Temperature and Time on Silica-Based Investment Shell Strength at Ambient and Elevated Temperatures (22-059)

*Samuel Holt, Jingjing Qing, and Mingzhi Xu,
Georgia Southern University, Statesboro, GA*

Shell flexural strength is an important variable for investment casting. Pre-firing is commonly utilized to increase strength, and each investment manufacturer uses their own pre-firing temperature and time. Previous research has studied ambient and hot flexural strength of silica investment shells, but not over various pre-firing temperatures and times. This research involved ambient and hot flexural strength testing of silica-based shells pre-fired at 1,112F (600C), 1,562F (850C), and 1,832F (1,000C) for 20 mins, 60 mins, 180 mins, and 540 mins. Cristobalite formation was quantified using powder x-ray diffraction from 5 to 70 with a copper target and alumina standard. Samples were examined under microscope to identify the change in grain size. Archimedes method was used to find open porosity and bulk density, and an He pycnometer for closed porosity and true density. It was found that the strength is significantly altered by varying pre-firing temperatures and times.

Lake Sand Mineralogy and Iron Foundry Process Performance (22-099)

Marc King, Nugent Sand, Beverly, OH

This presentation is an overview of lake sand processing, its complex mineralogy compared to high purity silica sands, the mechanical and thermal effects upon resin bonded sand applications, case test analysis and overview of process improvement for scrap reduction, and cost savings.

9:30 – 10:30 a.m.

ROOM: CASTING SOURCE THEATER

Cast in Steel 2022 Award Presentation

AFS is the presenting sponsor of the SFSA Cast in Steel Competition 2022 awards ceremony. The Cast in Steel 2022 competition challenges university students to use modern casting tools to creatively design and produce a functioning version of a Celtic leaf sword.

10:30 – 11:30 a.m.

ROOM: SHORT NORTH BALLROOM

Hoyt Memorial Lecture

Session Chair: *Bradford Muller, Charlotte
Pipe & Foundry Co, Charlotte, NC*

Seven Keys to Long Term Success: Lessons From a 50-Year Career (22-106)

*Jean Bye, retired CEO of Dotson Iron Castings
and Past President, American Foundry
Society*

Industry veteran Jean Bye started her career at Dotson Iron Castings as an intern in 1972. Nearly 50 years later, she retired as its CEO. From economic booms and busts to destructive fires and resilient rebuilding, Bye's five-decade career encompassed the kinds of challenges and opportunities every metalcaster will recognize. In this 2022 Hoyt Memorial Lecture, Bye explores the lessons she learned about continuous improvement, defeating biases, building up employees, choosing the right battles, and more.

11:45 a.m. – 1 p.m.

ROOM: C160

**Volunteer Leadership
Awards Luncheon**

Join us for a fun, fast-paced awards luncheon, which combines the former Division Luncheon and President's Business meeting. Catch up with friends while AFS officers welcome four new board members. The AFS Technical and Management Division chairs will also present key national and divisional awards. AFS Service Citation and AFS Scientific Merit winners will be honored during the luncheon. *Ticketed Event - \$65*

1:30 – 3 p.m.

ROOM: B242 – 243

**Aluminum & Light Metals Division
Cast Iron Division**

Session Chairs: *Eric Nelson, Dotson Iron Castings, Mankato, MN; Dr. Kathy Hayrynen, Applied Process, Inc., Livonia, MI*

**Panel: Cast Iron & Aluminum -
The Great Debate (22-137)**

Moderator: *Vasko Popovski, Advanced Heat Treat Corp., Monroe, MI*

Aluminum: *David Weiss, Eck Industries, Inc., Manitowoc, WI; Randy Oehrlein, Carley Foundry, Inc., Blaine, MN*

Cast Iron: *John Keough, Joyworks LLC, Ann Arbor, MI; Steve Dawson, SinterCast Ltd., Sunninghill Berkshire, UK*

In debate-style format, we pit industry heavyweights in aluminum against leaders in the field of cast iron. Panelists will present an overview of their material and answer prepared questions as well as questions from the audience. The session will focus on material properties, appropriate applications, and overall energy considerations when producing or designing with a given material.

Randy Oehrlein and David Weiss will be representing aluminum vs. John "Chip" Keough and Dr. Steve Dawson on the iron side. The debate will be moderated by a metal neutral, Vasko Popovski.

ROOM: B231 – 232

**Engineering & Smart
Manufacturing Division**

Session Chair: *Jerry Klooster, EJ, Elmira, MI*

**Reconfigurable Robotic
Solution for Effective Finishing
of Complex Surfaces (22-101)**

Fabio Pini, Università degli studi di Modena e Reggio Emilia, Modena, Italy; Simone Mulargia, SIR SpA, Modena, Italy

In nearly every sector of industrial manufacturing, polishing techniques are used. Most often, manual polishing is the only option because the tasks are too complex to be automated in terms of surface quality demands, geometrical features, and restricted tool accessibility. Therefore, the European H2020 Project SYMPLEXITY "Symbiotic Human-Robot Solutions for Complex Surface Finishing Operations" developed a CNC-machine-based machining concept comprising a composition of different finishing technologies. The solution is complemented with an objective metrology surface qualification device, which is capable of measuring big parts holistically. The SYMPLEXITY approach combines both a collaborative, intelligence-based and a cooperative human robot-based technological approach. The demonstrator machine concept is being introduced and first fine machining experiments, comprising polishing and measurements, have been conducted to generate an initial parameter set-up. The experiments have been conducted on an empiric basis to identify the main steering parameters for a future semianalytic, model-based finishing approach.

Manufacturing Process Selection Based on Simulation Driven Design (22-053)

Milan Raval, Jaideep Bangal, and Antony Gray, Altair Engineering, Troy, MI

Every day, simulation technology is becoming increasingly crucial in the current era of manufacturing. Finding an optimal design before performing the actual manufacturing process has become a viable trend among industry experts. Simulation-driven design for manufacturing software provides analysis insights early in product development to pinpoint potential production issues and help designers modify their geometry to maximize production quality. Considering critical factors such as part geometry, cost, material availability, and accuracy help industries understand what type of manufacturing approach should be used to productize a part. The presenter will discuss two major manufacturing processes – casting and additive manufacturing - and compare them by means of a simulation-driven design process. Based on early design process simulations, which process should be used to manufacture a specific part will be determined.

Digitization, Challenges to Data Collection and Meaningful Use in Today's IoT Driven World (22-094)

Adam Westerland, Inductotherm, Rancocas, NJ

The future of the industry lies in the rapidly growing industrial IoT and big data which generate a new drive to provide connectivity with more data access and information than ever before. This drive is causing an evolution of foundry technology, and the difference between standard control technology and information technology is blurring as older technology evolves and new communications and sensors are integrated. This blurring or convergence of technology innovation does come with challenges, including efficient data collection and protocol management; secure data storage and cybersecurity; and the meaningful use and utilization of this data for industry. The uses and valuableness of the data, however, will only rise in the future as

Schedule subject to change.

artificial intelligence (AI) powered analytics improve.

ROOM: B244 – 245

Melting Methods & Materials Division

Session Chair: *Dave Williams, Retired from ASI International, Cleveland, OH*

Panel: Melt Safety (22-155)

Electric Shock Hazard and Bridging in Coreless Furnaces (22-155A)

Harold Harned, Inductotherm Corp., Rancocas, NJ

Oil, Moisture, and Charge Do NOT Work Together (22-155B)

Dave Williams, Retired from ASI International, Hilliard, OH

Safety Considerations for Cupola Bottom Drop (22-155C)

Alex Croll, Waupaca Foundry Inc., Tell City, IN

Critical melt safety discussion.

1:30 – 2:30 p.m.

ROOM: CASTING SOURCE THEATER

Casting Designer & Buyers

Session Chair: *Shannon Wetzel, American Foundry Society, Inc., Schaumburg, IL*

2021 Casting of the Year: Magna Subframe (22-113)

Randy Beals, Magna Cosma, Lake Orion, MI; Nandha Maria Pillai, Magna Cosma Casting Michigan, Portage, MI

Hear the story of the 2021 Casting of the Year in this session. Automotive demand for structural aluminum parts continues to grow, and the size of the parts OEMs want is also increasing. A single casting provides benefits over a multi-part steel weldment, including weight reduction and improved dimensional

stability. Magna's Cosma Casting Michigan (CCMi) out of Battle Creek, Michigan, pushed its capabilities and design engineering expertise to produce a 1,159 x 1,070 x 199-mm front subframe on the largest commercially available diecasting equipment at the time—a 4,400-ton press. The 38.5-lb. (17.46 kg) diecasting resulted in a 29% weight savings over a 17-part stamped and welded steel assembly and helped the 2021 Acura TLX achieve "2021 Top Safety Pick+" status, which is the highest safety rating from the Insurance Institute for Highway Safety (IIHS).

1:30 – 4:45 p.m.

ROOM: B240 – 241

AFS Institute Class

The 10-Step Method for Corrective Action (22-121)

Patrick Kluesner, Precision Cast and Forge, Hartland, WI

This course provides participants with a basic overview of the casting defect analysis procedure. Topics include an introduction to the 10-step procedure for casting defect identification; writing a good problem statement; discussion on the importance of recording process parameters; an introduction to navigating the *International Atlas of Casting Defects*; and a path to identifying the right defect and its root cause for corrective action. Learning a systematic procedure for root cause identification supports the business goal of designing, producing, and selling quality castings that are made in a timely manner and in a safe environment for a profit.

2:45 – 3:45 p.m.

ROOM: CASTING SOURCE THEATER

Casting Designer & Buyers

Session Chair: *Shannon Wetzel, American Foundry Society, Inc., Schaumburg, IL*

Using TCO to Buy and Sell Castings Smarter (22-109)

Harry Moser, Reshoring Initiative, Trevett, MN

Most companies make sourcing decisions based solely on price, often resulting in a 20% to 30% miscalculation of actual offshoring costs. In this session, Moser will show how buyers can use "total cost of ownership" to account for all relevant factors, including overhead, balance sheet, risks, corporate strategy, and other external and internal business considerations that affect true cost.

3:15 – 4:45 p.m.

ROOM: B231 – 232

Aluminum & Light Metals Division

Session Chair: *Rafael Gallo, Pyrotek Inc., North Royalton, OH*

Chemical Composition and Melt Treatment Optimization of 5XXX and 6XXX Alloys for Ablation Technology (22-019)

Emili Barbarias, Asier Bakedano, Ibon Lizarralde, Sergio Orden, and Ana Fernández-Calvo, AZTERLAN, Basque Research and Technology Alliance (BRTA), Durango

One of the most interesting capabilities of ablation technology is its capability to manufacture uncastable alloys such as alloys of the 5XXX and 6XXX aluminum series. Two conventional wrought alloys with relatively low alloying content were selected by thermodynamic simulation to be manufactured by ablation casting technology. Two different grain refiners were tested and compared to unrefined melt alloy. A fine grain size of 0.25-0.30 mm was achieved. The refinement effect was clearly identifiable by thermal analysis technique for both alloys. The density index value and macro inclusion test grades were used to validate the low hydrogen content and the metals' cleanliness. Thus, an optimized chemical composition and

melt treatment is defined for 5XXX and 6XXX alloys suitable for manufacturing by ablation technology. For comparison, 6061 alloy was also cast in a conventional sand mold.

Addressing Interdendritic Shrinkage Porosity in Sand Castings Through Simulation (22-028)

Daniel Hoefert, Eck Industries, Inc, Manitowoc, WI

Both buyers and sellers of aluminum castings occasionally struggle with poor casting soundness (castings that leak) and low tensile property issues. The presentation highlights one of the main culprits of these types of defects: interdendritic shrinkage porosity. It will focus on the cause of this type of porosity, how different alloys affect interdendritic shrinkage porosity, and most importantly—ways in which you can use simulation results to interpret and avoid issues with interdendritic shrinkage porosity.

Distributed Temperature and Gap Measurements at the Metal-Mold Interface During Aluminum Casting Using Optical Fiber Sensors (22-104)

Deva Prasaad Neelakandan, Damilola Balogun, Dinesh Reddy Alla, Soumava Chakraborty, Laura Bartlett, Rex Gerald, Jie Huang, and Ronald O'Malley, Missouri University of Science and Technology, Rolla, MO

Novel methods for quantifying the interfacial heat transfer at the mold-metal interface of a casting during solidification are of great interest to improve the performance of solidification models. In the current work, real-time measurements of the mold gap and the thermal profile in the vicinity of the mold wall have been conducted during solidification using two novel fiber optic sensors in a permanent mold casting of A356 aluminum. Optical fiber enclosed in a fine stainless-steel tube was used to measure temperatures at a spatial resolution of 0.65mm across the mold



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cavity and in the mold walls using Rayleigh scattering technology. In addition, a cleaved optical fiber was embedded into the mold wall to measure the evolving gap between the mold wall and the casting during solidification based on the Fabry-Perot interference principle. This combination of high-resolution temperature profile measurement and gap evolution measurement provides new insights into interfacial heat transfer.

ROOM: B244 – 245

Cast Iron Division

Session Chairs: Brad Steinkamp, Dura-Bar, Woodstock, IL; Emily Bosovich, Kohler Co., Kohler, WI

Development of a Bimetal Composite Casting With Ductile Iron and Steel (22-073)

Shelton Fowler, Mingzhi Xu, Jingjing Qing, James Liggett, and Daniel Garcia, Georgia Southern University, Statesboro, GA

A bimetallic casting was designed and produced to combine the strength and ductility of ductile iron with the toughness of 4140 steel. The bimetallic interface was examined, and it was found that the interface contained a high concentration of carbides due to the re-melting at the interface during pouring. To limit the impact of the cementite on the interface strength, the piece was put through a malleabilization treatment to return some of the carbides back to graphite. This treatment caused a reduction in the brittleness of the interface, which allowed the piece to perform without failure at the boundary.

Development of Semi Solid Die Casting Process to Ductile Iron Castings (22-088)

Haruki Itofuji, Adstefan Casting Solution Center, Ube, Japan

Semi-solid diecasting was attempted for an automobile knuckle made of ductile cast iron. The base molten iron was melted using a 25kg high frequency induction furnace. Since free nitrogen (NF) has already been known to promote chill structure in a former study, base molten iron was denitrified during melting, and re-nitrification was avoided through the process from magnesium (Mg) treatment to pouring as minimum as possible. Mg alloy was designed as low vapor pressure and calm during the reaction. Furthermore, it was designed as low nitrogen content, too. Pouring temperature was selected in the range of 30C-80C over liquidus to form the semi-solid condition during molten flow in a permanent die mold using CAE metal flow simulation.

Mutual B, Ti, N Effects on Phase Transformations in Cast Iron: Thermodynamic Consideration and Experimental Verification (22-134)

Laura Bartlett, Simon Lekakh, and Suyash Pawaskar, Missouri University of Science and Technology, Rolla, MO

Even ppm levels of active elements such as boron (B), titanium (Ti), nitrogen (N), and their combinations could significantly affect microstructure and properties of cast iron; therefore understanding its mutual effect on phase transformations is important for industrial practice. To understand these mutual effects, a thermodynamic simulation of competitive B and TiN precipitates formation during solidification and cooling of gray cast iron with various levels of B were studied. The concept of “free iron borides (Fe-B)” in solid solution was suggested for control ferrite in the matrix. The hypothesized results from the thermodynamic study of B, N, Ti added chemistries were evaluated in an experimental laboratory heat.

ROOM: B242 – 243

Engineering & Smart Manufacturing Division

Session Chair: *Gregory Bray, Electric Controls & Systems, Inc., Birmingham, AL*

Melting Options: Arc Furnace vs. Coreless Furnaces (22-177)

Mark Trapp, and Jack McMillin, Consultant, Birmingham, AL

The pros and cons of arc furnace vs. coreless furnace melting practices will be presented.

ROOM: B233 – 234

Women in Metalcasting

Session Chair: *Michelle Ring, American Colloid Co., Carmel, IN*

Inclusive and Emotionally Intelligent Leadership (22-145)

Sarah Eppink, Aisling Group LLC, Schaumburg, IL

Emotional intelligence is one of the most fundamental strategic skills for effective leadership, and in our current environment, the ability to connect with others is more important than ever before. While self-awareness and the ability to manage oneself is a piece of that, understanding and influencing others is essential. Being successful requires a leadership mindset that embraces empathy and diversity. In this engaging program, we will discuss the four aspects of emotionally intelligent leadership with an emphasis on inclusivity. *Invitation Only*

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4 – 4:30 p.m.

ROOM: CASTING SOURCE THEATER

Sponsored Session

When You Absolutely, Positively Need Properties...

Jay Armstrong, TriALco, Inc., Chicago Heights, IL

Jay Armstrong will discuss the chemistry and properties of aluminum alloy B356.2AH. Along with, A201, A206.2, 535.2, 713.1 & 850.

Armstrong brings 50+ years of experience in the foundry industry with him.



4:30 – 5 p.m.

ROOM: CASTING SOURCE THEATER

Sponsored Session

Arena Flow Core Making Simulation Software Update and Informative Presentation

*Peter Blaser, Arena Flow LLC, Houston, TX;
Thomas Brandt, ASK Chemicals, Dublin, OH*

Arena-flow® is a specialty simulation software package designed specifically for core and mold production. Arena-flow computes the particle (sand) phase as discrete, enabling the capture of individual particle-level details such as sand size distribution, variable air resistance in the tooling, and binder moisture content on each particle. This approach contrasts with that used by traditional continuum flow software, which is typically adapted from methodologies more suitable to liquid flow modeling, such as metal flow and solidification simulation. As a result, Arena-flow is able to predict details of core blowing / shooting and curing that are difficult or impossible to capture well using other modeling tools. ASK Chemicals, the exclusive

distributor of this simulation software, is happy to announce the release of Arena-flow 9.1. With this release a dehydration module for curing inorganic binder systems is available, the post processing capabilities have been updated to provide powerful new capabilities with an improved user experience, and the license manager now provides seamless, cross-platform availability between on-premise and cloud computing resources. This presentation discusses the advantages of using Arena Flow along with the positive impacts of the newest release.

ASKCHEMICALS



6 – 10 p.m.

ROOM: BELLOWS BALLROOM AB

Annual Reception & Banquet

Join us for the presentation of the highest honor from AFS, the Gold Medal. The cash bar opens at 6 p.m. (Credit cards only.) The awards presentation and banquet start at 7 p.m. The event will be held at the Hilton Columbus Downtown. *Ticketed Event - \$125*

Sunday, April 24

Heraeus

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Monday, April 25, 2022

7 – 8 a.m.

ROOM: B246

Author Chair Breakfast

This breakfast is for AFS speakers, session chairs, students, and staff to meet and coordinate details for the day's educational sessions.

8 – 9 a.m.

ROOM: B242 – 243

Additive Manufacturing Division

Session Chair: *Nathaniel Bryant, University of Northern Iowa, Cedar Falls, IA*

Rapid Casting Using Machinable Molds Compared to 3D-Printing Technology (22-039)

Sean Derrick and Sam Ramrattan, Western Michigan University, Kalamazoo, MI

Rapid casting refers to the integration of conventional metalcasting techniques with digital manufacturing technologies, such as additive manufacturing. The core objective of rapid casting is to allow the metalcasting industry to be faster, more flexible, and agile to customer needs. Western Michigan University is researching patternless rapid casting techniques that utilize subtractive machining processes to achieve net shape molds, with zero draft, and do not require coring for undercuts. Using this technique, the final machined molds are patternless, are produced quickly with complex geometries, and obtain excellent surface finishes. Furthermore, unlike 3D printing, this technique offers an isotropic mold media and requires no mold post-processing before use. An initial proof of concept of one such machining-based rapid casting and its comparison to a conventional 3D-printed sand mold will be presented.

AMEC - A Novel Additive Casting Process Merging Fused Filament Fabrication and Evaporative Casting (22-022)

Sarah Jordan, Skuld LLC, London, OH

Additive manufacturing or 3D printing continues to grow due to various benefits including speed, elimination of tooling, and permitted design complexity. A variety of processes are a threat of substitution to casting as well as a means of enabling casting. However, most have drawbacks particularly as it relates to volume, speed, qualification, and especially cost. The presenter will discuss research into a new 3D printing process for metal called AMEC (Additive Manufacturing Evaporative Casting) which has the potential of solving these problems and allowing additive manufacturing to scale as a metalcasting process. The AMEC process merges fused filament fabrication (FFF) of polymer with evaporative casting. The process has been demonstrated in a variety of alloys including gray iron, ductile iron, steel (including stainless), brass, and aluminum. Initial data for proof-of-concept trials and example prototypes will be discussed.

ROOM: B244 – 245

Lost Foam Division

Session Chair: *Jeff Prickett, Metals Alloys & Refractories, Lenoir City, TN*

2022 Lost Foam Division Award Winners: Acknowledgements and Presentations (22-139)

Jeff Prickett, Metals Alloys and Refractories, Lenoir City, TN

Join us to honor the 2022 Lost Foam Division award winners:

Technical Excellence Award: David Florine (Mueller, Albertville, AL)

Industrial Contribution Award: Scenic Industries (Chattanooga, TN)

Ray Donahue Outstanding Service Award: Bill Hesterberg (Brunswick Corp., Rosendale, WI)

Schedule subject to change.

ROOM: B233 – 234

Marketing Division

Session Chair: *Norwin Merens,
Lillian Group LLC, Glenview, IL*

**Developing Your Personal Brand
(22-162)**

*Towanda Long, Charlotte Pipe & Foundry Co.,
Charlotte, NC*

Get tips and resources for developing a personal brand that showcases your skill set and personality. Plus, see how building a brand can benefit you and your organization.

ROOM: B231 – 232

Metalcasting Research

Session Chair: *David Weiss, Eck Industries
Inc., Manitowoc, WI*

**Is the Future Here Yet?
Advances in Aluminum-Based
Nano-Composite Castings (22-158)**

*David Weiss, Eck Industries, Inc.,
Manitowoc, WI*

There has been a significant amount of research in developing cost-effective techniques for the incorporation of sub-micron reinforcements in aluminum alloy castings for over 20 years. The results at laboratory scales have not easily been transferred to the production of a typical foundry casting. The use in in-situ techniques (producing the nano-particles within the melt via a chemical reaction) have shown the most promise for large scale manufacturing. Other strategies that are being developed include distribution of reinforcement via release of particles in mold using ceramic foam filters or particle beds.

**Al-Ce-Ni Hypoeutectic Non-Heat
Treat Casting Alloys (22-161)**

*Diran Apelian, UCI, Worcester, MA; Carl
Soderhjelm, Advanced Casting Research
Center, WPI, Worcester, MA*

With the increased efforts in electrifying the transportation sector, the need for light weighting of vehicles will require novel Al alloys and processes. The heat treatment of cast components is both financially and energetically costly. Moreover, as the size of the casting increase the propensity for geometric distortion and surface blistering also increases. The goal of this research is to utilize integrated computational materials engineering (ICME) to design hypoeutectic structured Al alloys that achieve commercially relevant mechanical properties in the as-cast state. In this work CALculated PHase Diagram (CALPHAD) techniques are implemented to identify candidate compositions.

8 – 10:15 a.m.

ROOM: B240 – 241

AFS Institute Class

Process Control for Engineers - An Overview (22-122)

Ted Schorn, Enkei America, Inc., Columbus, IN

The first goal of every process is stability: a consistent and predictable outcome. When we can make every casting the same, every dimension and every characteristic the same, we can truly say we can control the process. If we can control it, we can improve it. But how are processes controlled? What are the factors of influence on processes that must be managed? An overview of this introductory course is designed to help process and quality engineers answer these questions and develop a methodology of process control.

9:15 – 10:15 a.m.

ROOM: B244 – 245

Additive Manufacturing Division

Session Chair: *Rich Lonardo, Youngstown Business Incubator, Youngstown, OH*

Abrasive Wear Testing of Additively Manufactured Patterns (22-016)

Nathaniel Bryant, and Joshua O'Dell, University of Northern Iowa, Cedar Rapids, IA

Additive manufacturing (AM) in recent years has revolutionized the way castings are designed and fabricated. Consequently, the foundry industry has begun to take advantage of this technology for tooling fabrication. In most cases, AM is used for prototyping a design prior to machining a metal tool, but in some cases, it is suitable for production. Unfortunately, there is little to no information about how the materials used for AM behave, particularly as a foundry pattern. The University of Northern Iowa, in conjunction with the AFS AM Hard Tooling Committee, has conducted a preliminary study to measure the abrasion resistance of 3D-printed polymer specimens using a

newly developed methodology. It was found that the materials had significantly different wear resistances using the proposed method, which is described in greater detail within.

ROOM: B242 – 243

Aluminum & Light Metals Division

Session Chair: *Steve Sikorski, MAGMA Foundry Technologies Inc., Schaumburg, IL*

Liquid Mixing and Casting Process for Aluminum Matrix Composites With High Entropy Alloy Particles (22-042)

Jianyue Zhang, Xuejun Huang, Michael Moodispaw, Jiashi Miao, and Alan Luo, The Ohio State University, Columbus, OH

Particles from an equiatomic AlCrTiV high entropy alloy (HEA) were prepared and added into 7075 Al alloy (Al-5.8Zn-2.3Mg-1.4Cu) to obtain metal matrix composites (MMC) via a liquid mixing and casting process. A high-intensity ultrasonic vibration was used to form high-intensity cavitation and consequent implosion of cavities, which resulted in strong extensive shock waves to disperse the HEA particles in the liquid. By adding 3wt.% HEA particles into the matrix, the mechanical strength of 7075 alloy is significantly improved. This research provided a critical guidance for preparing Al-based metal matrix composites with HEA particles via a simple liquid mixing and casting process.

Cast-In Inserts, Including MMC Inserts in Aluminum Compound Castings (22-074)

Andrew Rohlwing, Kaustubh Rane, Benjamin Church, Pradeep Rohatgi, and Amir Kordijazi, University of Wisconsin- Milwaukee, Milwaukee, WI; David Weiss, Eck Industries, Inc., Manitowoc, WI; Nick Sonnentag, Oshkosh Corporation, Oshkosh, WI

Cast-in aluminum matrix composite inserts in aluminum castings appear to be a promising avenue for increasing performance and offer a lightweight alternative to more traditional ferrous inserts. Recent research on cast-in

inserts in aluminum alloy castings has been critically reviewed. The role of parameters including discontinuities in physical and mechanical properties across the insert casting interface, bond and load transfer at the insert-casting interface, differences in coefficient of thermal expansion, and surface finish and alloying at inserts have been discussed. Additionally, a case study to cast-in an insert of a fiber-reinforced aluminum composite in the matrix of A 206 will be described. Heat and fluid flow conditions were simulated so that optimum casting parameters could be predicted. Limited experiments on the nature of the interface and cooling curve measurements will be presented along with anticipated improvements in properties of A206 alloys because of MMC inserts.

ROOM: B235

**Environmental, Health
& Safety Division**

Session Chair: *Jeff Hannapel, The Policy Group, Rockville, MD*

Panel: Hot Topics (22-154)

Air Quality (22-154A)

Jeet Radia, McWane Inc., Birmingham, AL

Safety & Health (22-154B)

Brent Charlton, Metal Technologies Auburn LLC, Auburn, IN

**Water, Waste & Byproducts
Management (22-154C)**

Bryant Esch, Waupaca Foundry Inc., Waupaca, WI

ROOM: B231 – 232

Steel Division

Session Chair: *Robert Tuttle, Western Michigan University, Kalamazoo, MI*

**New Process of Melting and
Casting Aluminum Steels (22-006)**

Delin Li, CanmetMATERIALS, Natural Resources Canada, Hamilton, Ontario, Canada; Muhammad Qayyum, Canadian Specialty Castings, Niagara Falls, Ontario, Canada

Aluminum-alloyed steel and cast iron are known to exhibit unique materials properties such as heat resistance and lightweight high strength. Unfortunately, aluminum additions adversely influence the melting process and casting quality causing extra slag buildup on furnace lining and dross inclusions in castings. Many methods for overcoming these problems have been investigated. A new process has been developed in this work where aluminum and steel were melted in separate furnaces and tapped into a teapot ladle. Aluminum steel of 1,500 lbs. (680 kg) was cast in a nobake sand mold with a variant of the naturally pressurized gating system. The new process enhanced the Al recovery, furnace lining life, casting cleanliness, and compatibility with making regular steels, and may open opportunities of commercial production of Al steel and iron in air melting.

**Characterization and Charpy Impact
Testing of As-Cast and As-Rolled
AISI 1070 Grade Steel (22-064)**

Jacob Summers, Laura Bartlett, Ronald O'Malley, and Mario Buchely, Missouri University of Science & Technology, Rolla, MO; Richard Pilon, Amsted Rail Company, Griffin Wheel, Overland Park, KS

In this paper, as-cast, Si-killed, AISI 1070 grade steel was mechanically evaluated using Charpy V- and U-notch impact tests at -20C and 20C respectively for comparison

to hot-deformed material at a 66% cumulative reduction. Correlation between microstructural parameters and toughness were examined to design a thermomechanical process (TMP) for industrial application. The microstructure was evaluated by optical and scanning electron microscopy (SEM). Void closure during hot deformation was also correlated to toughness using CT-scans and Automated Feature Analysis (AFA) in SEM. Conclusion: Microstructural parameters of prior austenite grain size and pro-eutectoid ferrite both influence toughness, leading to the conclusion that a low finish rolling temperature (FRT) and a slow cooling rate after rolling are optimal for improving toughness of AISI 1070 steel in thermomechanical processing. The CT-scan verified by AFA in the SEM showed that solidification shrinkage observed in the as-cast condition was closed during hot deformation.

9:30 – 10:30 a.m.

ROOM: CASTING SOURCE THEATER

Casting Designers & Buyers

Session Chair: *Shannon Wetzel, American Foundry Society, Inc., Schaumburg, IL*

Working With Your Casting Suppliers to Shorten Lead Times (22-112)

Anthony D'Agostini, Tooling and Equipment International, Livonia, MI

Metalcasters employ numerous methods to trim lead times for their customers without compromising quality. Speaker will discuss ways casting buyers can work with their foundry sources to avoid delays in product development and delivery.

10:30 – 11:30 a.m.

ROOM: SHORT NORTH BALLROOM

Keynote Session

Session Chair: *Adam San Solo, Neenah Foundry Co., Neenah, WI*

America in 2022: The State of Public Opinion (22-128)

Public opinion pollster, co-founder of ESPN, and author of The Sun Is Still Rising: Politics Has Failed but America Will Not

Long recognized as one of the world's leading public opinion pollsters, Scott Rasmussen is constantly measuring and analyzing the mood of the U.S., whether it's an upcoming election, a business trend, or the coronavirus pandemic. But numbers are just part of the story. Rasmussen's knowledge of history and depth of experience put that data in a meaningful context. Aptly described by The Wall Street Journal as a "key player in the contact sport of politics," Rasmussen also is a founder of the cable sports network ESPN.

Join us to hear Rasmussen's thought-provoking CastExpo keynote address. You'll come away with actionable insights into political, business, and social trends in America.

11:45 a.m. - 1:10 p.m.

THE REFECTORY RESTAURANT

1092 BETHEL ROAD

Past Presidents' Luncheon

The annual meeting for all past AFS Presidents at The Refectory Restaurant. AFS will provide bus transportation to and from the luncheon for Past Presidents. Buses will pick up attendees from the 3rd street connector. *Must be a previous AFS President to attend.*

11:45 a.m. – 2 p.m.

COLUMBUS MUSEUM OF ART

Guest Excursion

Guests of CastExpo 2022 attendees are invited to explore the Columbus Museum of Art. Guests can enjoy the museum's impressive collection as well as a luncheon amidst a gallery setting. AFS will provide bus transportation to and from the Columbus Museum of Art. Buses will pick up attendees from the 3rd St. Connector. Ticketed event - \$90

1:30 – 3:30 p.m.

ROOM: CASTING SOURCE THEATER

Casting Designers & Buyers

Session Chair: Shannon Wetzel, American Foundry Society, Inc., Schaumburg, IL

Auditing a Foundry Workshop (22-114)

Jim White, Consultant, Peoria, IL

The need for an audit can come at different times during a supplier relationship. The obvious time for an audit is when vetting a new supplier, but other instances could be when specific issues have come up that need to be addressed, or if significant organizational or management changes have occurred at the supplier. Every audit will have a different purpose or objective, depending on the situation, and should be customized appropriately. White will walk attendees through the steps to a meaningful evaluation of a potential or existing casting supplier.

1:30 – 3 p.m.

ROOM: B242 – 243

Additive Manufacturing Division

Session Chair: Dave Rittmeyer, Hoosier Pattern, Decatur, IN

How Sand 3D Printing is Reviving Foundries: The Economics of Additive (22-030)

Kirk Keithly, ExOne, North Huntington, PA

Binder jet 3D printing is revolutionizing sand casting and enabling complex cores that can't be produced any other way and organic rigging designs that significantly decrease scrap rates. Foundries embracing the digital workflow are expanding business by offering rapid prototyping with easy design iterations, fast turnarounds without tooling lead times, and decreased scrap rates. When evaluating the additive manufacturing process, foundries must look at its upstream and downstream effects. How quickly can you start pouring pieces? How can you get parts moving into the supply chain faster? How can you improve rigging to ensure successful pours? How can you improve quality and reduce downstream operations? We'll explore the economics of integrating a digital workflow with 3D printing through case studies of successful applications that got product to market faster, made locally, and with fewer labor requirements.

Influence of Refractory Coating Formulation on the Surface Roughness of A356 Aluminum Castings Produced by 3D Printed Sand (22-095)

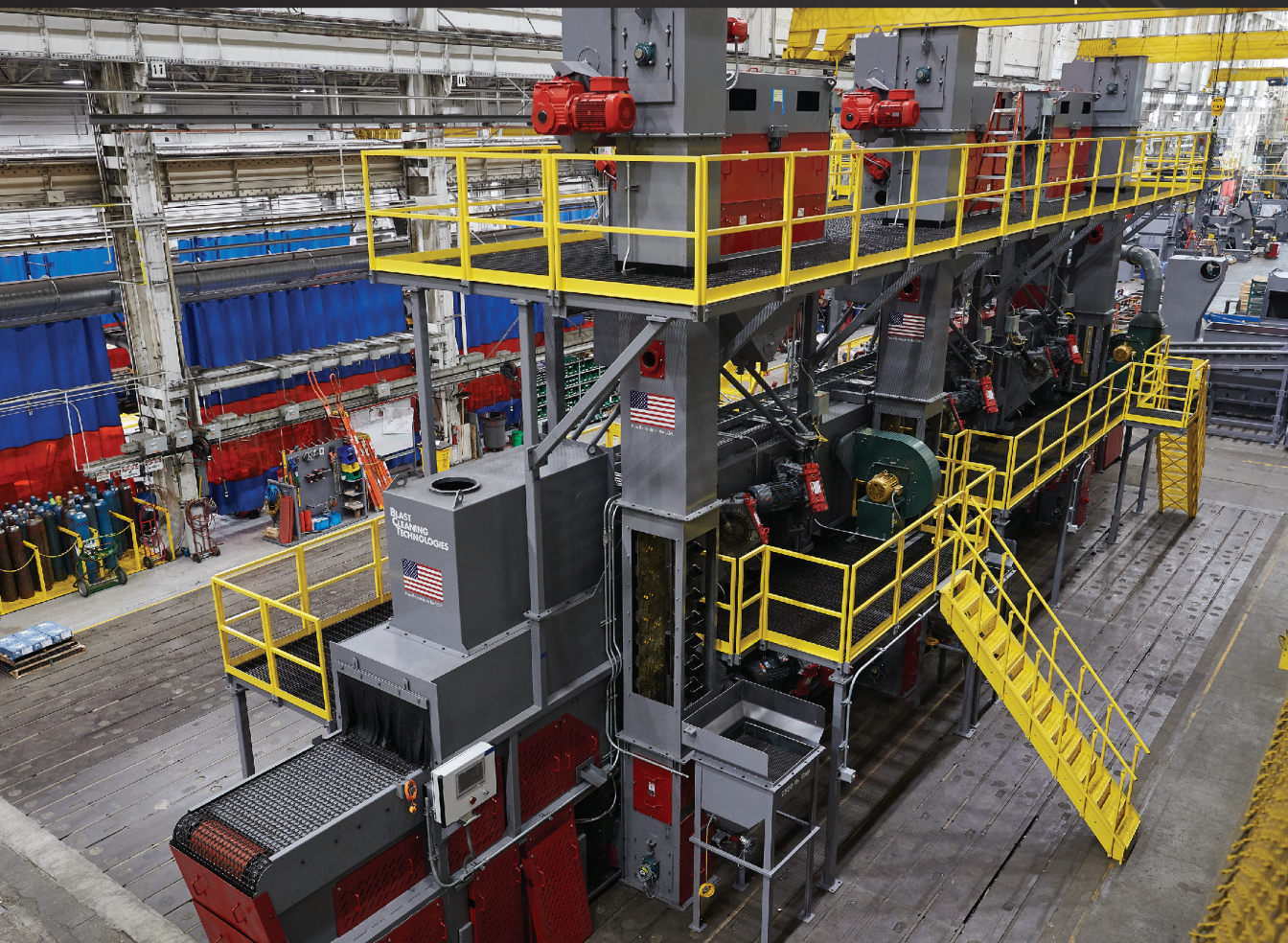
Nathaniel Bryant, University of Northern Iowa, Waterloo, IA; Daniel Cygal, HA International, LLC, Westmont, IL

3D sand printing technology has revolutionized the way castings are produced. With lower lead times, higher dimensional



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accuracy than conventional sand molding methods, and ultimate design freedom, formulating an argument against the adoption of this technology seems like a monumental undertaking; however, while the benefits are significant, additively manufactured molds and cores generally produce rough casting surfaces. The University of Northern Iowa launched an investigation to improve the surface roughness of A356 aluminum castings through the use of refractory mold and core coatings. Fifteen coatings were evaluated in the study, and the performance of these coatings was found to vary heavily depending on the formulation and application method, the extent of which is elaborated upon in this session.

Study on the Dimensional Assessment of Sand Cast Iron Castings Using 3D Printed Cores (22-125)

Jiten Shah, Product Development & Analysis LLC, Naperville, IL; Tyler Nooyen, Waupaca Foundry, Waupaca, WI

This AFS-funded research project was focused on studying the dimensional tolerance capability of 3D printed tooling-less sand casting and compare it to the conventional chemically bonded sand process. A complex iron casting was chosen and the current six-piece core assembly was redesigned with a three-piece core assembly by consolidating features to take advantage of the 3D-printed sand binder jet additive manufacturing technology. Five different 3D core printer ; suppliers contributed over 125 core assemblies total; they consisted of various types of substrate material (silica sand and ceramic synthetic sand) and binder combinations. Series of castings were poured, processed in a production environment, and dimensionally measured using CMM. Final dimensional measurement analysis results comparing the conventional six-piece core design made using chemically bonded sand with a three-piece design of 3D-printed cores will be presented with findings.

ROOM: B231 – 232

Environmental, Health & Safety Division

Session Chair: *Jeet Radia, McWane, Birmingham, AL*

Investigation of the Role of Solvents in Smoke & Tar Generation by Polyurethane Cold Box Binders (22-004)

Sritama Kar, Shania Hayward, Matthew Hartman, and Sean McGovern, ASK Chemicals, Dublin, OH

In an effort to reduce the potential hazardous air pollutants present in the smoke generated during the metalcasting process from the cores and molds made with polyurethane cold box (PUCB) binders in foundries and to prevent duct-fire generated by tar deposition over time and releasing the hazardous air pollutants into the environment, this presentation identifies the key components of the tar generated by these binders and the relationship between the binder compositions and the components in the tar. An investigation of the chemical composition of tar buildup due to thermal decomposition of PUCB binders of varied solvent packages and binder ratios were conducted and analyzed by gas-chromatography mass spectrometry. This analytical testing method was later applied to compare to the tar produced via pouring liquid aluminum metal into PUCB sand cores. A comparative study between the smoke and tar generated by the binders was conducted as well.

Executive Safety Responsibility (22-025)

Ted Schorn, Enkei America, Inc., Columbus, IN

Top management support is the most commonly cited factor in the success of safety programs in the literature of the safety professional. The lack of such support

is also cited as a frequent reason for poor safety performance in manufacturing plants. Unfortunately, in many cases, the specific expectations of senior management and the definition of the needed support are seldom defined. Just what is it that executive managers need to do to foster excellent safety performance? In this session, Schorn provides a review of the executive's role, responsibility, and potential contribution to plant safety performance. Specific actions are identified and linked to the needed values within top management to provide practical advice.

ROOM: B233 – 234

Future Leaders of Metalcasting

Nucleation Site: Interact With Metalcasting Industry Leaders on This Panel to Get Actionable Steps for Building Strong and Effective Teams (22-143)

Steve Sikorski, MAGMA Foundry Technologies Inc., Schaumburg, IL; Bruce Dienst, Simpson Technologies Corporation, Aurora, IL; Mike Selz, Allyance Group, Inc., Mint Hill, NC; Peter Reich, LAEMPE REICH, Mountain Brook, AL

Join this interactive panel and hear metalcasting leaders share stories of building successful teams and overcoming common roadblocks when leading. Bring your questions!

ROOM: B235

Lost Foam Division

Session Chair: *Jeff Prickett, Metals Alloys & Refractories, Lenoir City, TN*

Virtual Tour of Betz Industries (22-130)

Tedd Sheets, Betz Industries, Grand Rapids, MI

Virtual tour of Betz Industries followed by questions.

Virtual Tour of Mercury Marine (22-131)

Jacob Belke, Mercury Marine, Oshkosh, WI

Virtual tour of Mercury Marine followed by questions.

ROOM: B244 – 245

Steel Division

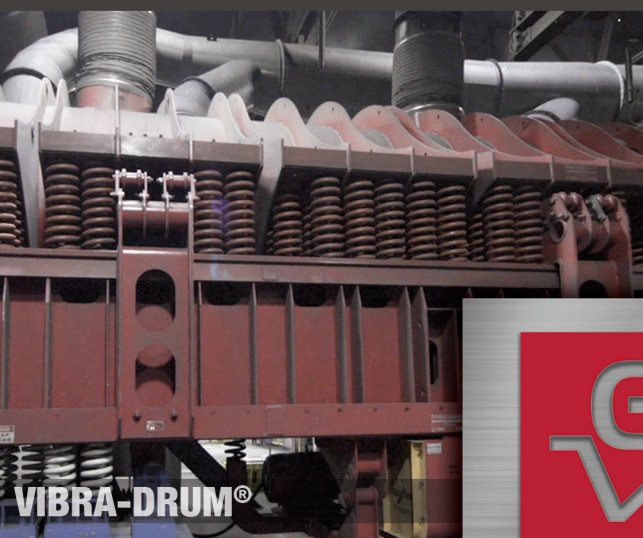
Session Chairs: *Robert Tuttle, Western Michigan University, Kalamazoo, MI; Laura Bartlett, Missouri University of Science & Technology, Rolla, MO*

Effect of Ti Master Alloys in HY100 (22-096)

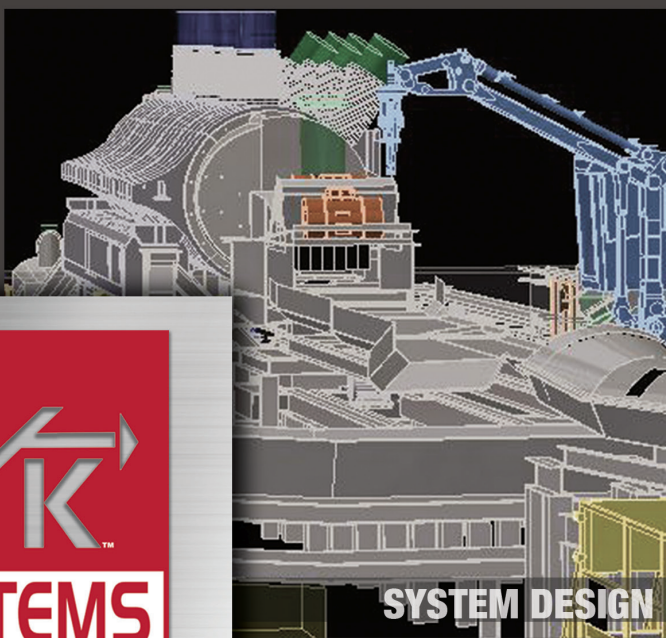
Robert Tuttle, Western Michigan University, University Center, MI

Steel grain refinement via a solidification route has garnered considerable interest in the foundry industry. While a significant body of work has focused on rare earth additions, titanium additions also provide a route for refining steels that initially solidify with δ -ferrite. TiC and TiN have been found to act as heterogeneous nuclei. However, their role in industrial settings remains unclear. Additionally, HY100 has not been successfully grain refined. This work employs two TiC containing master alloys in HY100. Mechanical testing, macrostructure examination, and thermal analysis were conducted to understand changes in the material. The macrostructure improved. Thermal analysis found additional phase reactions, but the liquidus temperature remained the same for all steels. It appears that the TiC particles dissolved and the finer macrostructure was due to a grain pinning mechanism.

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1:30 – 4:45 p.m.

ROOM: B240 – 241

AFS Institute Class

A Selling Framework for Engineers (22-021)

Jared Lockwood, Sandler Training, Beaver Creek, OH

Sales is a dirty word when used with engineering, so we'll call it business development. Those who are responsible for managing sales and the continued development of business should attend this session. Insights as to why "sales" should not be a dirty word by sharing a framework and process for identifying the right behaviors, attitudes and techniques to maximize your chances of success. It's a no nonsense, ethical, let's get to the truth philosophy that creates the right kind of long-term valuable customers and mutually beneficial partnerships. This session will expose attendees to what's included in the full sales workshop that the AFS Institute will be offering in June. The bonus part of the session is reserved for attendees to receive on the spot advice and guidance on current sales frustrations.

3:15 – 4:45 p.m.

ROOM: B242 – 243

Aluminum & Light Metals Division

Session Chair: *Hideki Gebken, Standard Manufacturers Services, Winnipeg, Manitoba, Canada*

Aluminum Degassing: A Historical Review (22-092)

Geoffrey Sigworth, GKS Engineering, Harrisonburg, VA

Proper degassing is probably the single most important factor in producing castings of high quality. This paper reviews 40 years of experience with a focus on our scientific understanding of the degassing process. Although progress has been made, there is still room for improvement. Recent experiments in Norway show the importance of gas pickup from water vapor in the atmosphere. Working foundrymen are aware of this problem, but the recent studies allow us to accurately model the entire degassing/regassing process for the first time. The model is presented and results from simulations are presented to illustrate important practical implications.

Factors Influencing Mechanical Properties in Aluminum Castings Part 1: The Roll of Filling Systems on Mechanical Properties (22-007)

David Weiss and Daniel Hoefert, Eck Industries, Inc, Manitowoc, WI

Quite a lot of effort has been devoted to the development of filling systems that quiescently deliver mold to the edge of the mold cavity, as if this was the primary way to insure the best mechanical properties achievable. This paper examines data from recently AFS funded research by Hoefert et al, using Bayesian statistics to determine what level of influence the filling system has on the mechanical properties in four different aluminum alloys, A356, C355, E357 and A206.

Neutralizing Iron Impurity in Cast Aluminum Alloys (22-041)

Alan Luo, Emre Cinkilic, Michael Moodispaw, and Jianyue Zhang, Ohio State University, Columbus, OH

Iron (Fe) has long been considered as a major “impurity” element in cast aluminum alloys, due to its often detrimental effect on the mechanical properties of castings with high Fe contents. Fe can form numerous intermetallic phases in aluminum alloys depending on other alloying elements and cooling rates during solidification. The size, morphology, and volume fraction of these Fe-containing intermetallics have a pronounced effect on the mechanical properties of aluminum castings. Our research, based on thermodynamic modeling and experimental investigation, found that proper alloying can neutralize the detrimental effect of Fe-containing intermetallics in cast aluminum alloys. Our casting experiments (both gravity and high pressure die casting) show that cast aluminum alloys containing about 0.5-1.0% Fe have similar mechanical properties to those of primary alloys with less than 0.2% Fe. This research provides a scientific foundation for increasing secondary alloy and scrap recycling usage in aluminum casting industry.

ROOM: 244 – 245

Government Affairs Division

Panel: From The Nation’s Capital: Key Legislative and Regulatory Matters that Metalcasters Need to Prepare For in 2022 & Beyond (22-172)

Eric R. Meyers, CEO, Oil City Iron Works, Corsicana, TX, and Chair, AFS Government Affairs Committee; Kiley Eck Hayon, President, Eck Industries, Inc., Manitowoc, WI; Brett Morehead, Southwest Operations Manager, Porter Warner Industries, Arlington, TX; Stephanie Salmon, Vice President, Government Affairs, American Foundry Society, Washington D.C.

Be a part of the conversation at Cast Expo as we discuss AFS’ top 2022 policy priorities in Washington, upcoming critical federal regulations, supply chain, workforce and trade matters impacting the U.S. metalcasting industry.

ROOM: B233 – 234

Management Division

Panel: We Want You! How to Get, Stay, or Encourage Others to be Involved... (22-115)

Sara Timm, Waupaca Foundry Inc., Waupaca, WI; Emily Shedlarski, Mueller Co., Chattanooga, TN; Jessica Luffy, McConway & Torley LLC, Pittsburgh, PA; Amanda Groves, Lodge Mfg. Co., South Pittsburg, TN

If you are new to metalcasting, this is the session for you to come and learn about different opportunities to share your talent, expand your knowledge and build your own network throughout the industry. This event will not only discuss opportunities from the Technical and Management Council at AFS, but it will also highlight the importance of being intentional about involvement and how it can impact recruitment and retention.

If you have been in the metalcasting industry for years, this also is the session for you to come share your experience or be reminded of the importance of supporting involvement.

4 – 4:30 p.m.

ROOM: CASTING SOURCE THEATER

Sponsored Session**ASKNow - Virtual Field Services***Charlie Hoertz, ASK Chemicals, Dublin, OH*

Live-streaming video via mobile device has been accessible for several years. In fact, ASK-Representatives have commonly used tools like FaceTime to support remedying foundry related issues. This worked well in special occasions where urgency was needed. Yet, it was never intended to replace in-person visits, or even reduce them. Nevertheless, the pandemic changed this. What was once an outlier solution transitioned into an essential solution. Virtual field services would require a more robust solution fully integrated into internal processes.

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ASKCHEMICALS

**4:30 – 6 p.m.**

ROOM: C170

Future Leaders of Metalcasting Reception

Join the AFS Future Leaders of Metalcasting for networking and get to know others in the metalcasting industry at this fun event. Bring your business cards to enter into a raffle. No pass is required to attend.
(Online registration.)

Future Leaders of Metalcasting is sponsored by:

**6 – 8 p.m.**

THE OHIO STATEHOUSE

Alumni Dinner

Enjoy the camaraderie of other Alumni over dinner and be introduced to this year's award-winners and incoming board members. The Alumni Dinner will be held at the Ohio Statehouse, the state capitol building and seat of government for the state of Ohio. AFS will provide bus transportation to and from the Ohio Statehouse. Buses will pick up attendees from the 3rd St. Connector.

*Must be a member of AFS Alumni to attend.
Ticketed Event - \$125*



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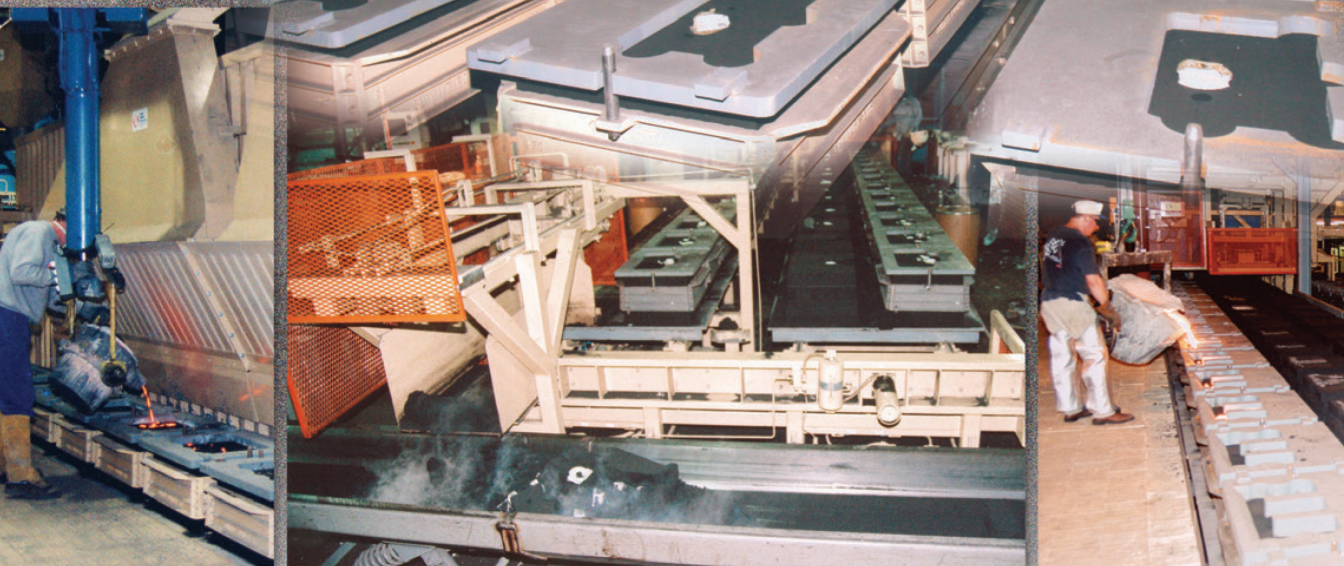
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Tuesday, April 26, 2022

7 – 8 a.m.

ROOM: B246

Author Chair Breakfast

This breakfast is for AFS speakers, session chairs, students and staff to meet and coordinate details for the day’s educational sessions.

8 – 9 a.m.

ROOM: B242 – 243

Additive Manufacturing Division

Session Chair: Jerry Thiel, University of Northern Iowa, Cedar Falls, IA

Panel: Industry 4.0: What Is Going on in the Foundry Industry? (22-166)

Rich Lonardo, Youngstown Business Incubator, Youngstown, OH; Nathaniel Bryant, University of Northern Iowa, Waterloo, IA; Tom Mueller, Mueller AMS, New Berlin, WI; Brandon Lamoncha, Humtown Products, Columbiana, OH

Discussing the latest in additive manufacturing, robotic automation, and sensors are adding to the productivity and safety of the foundry environment. Additive manufacturing examples of fixture and tooling production for increased productivity and speed to market will be discussed. Robotic automation applications like tooling, automated cleanout, automated grinding, will be highlighted as well as the use of low cost, high fidelity sensors to optimize casting practices in the foundry. In addition, finding and developing personnel to be capable of industry 4.0 applications will be discussed.

ROOM: B244 – 245

Metalcasting Research

Session Chair: Mark Osborne, Wabtec, Haslet, TX

Cast Metal-Ceramic Composite Lattice Structures for Lightweight, Energy Absorbing Applications (22-160)

Alan Druschitz, Manuel Umanzor, Romesh Batra, and Chris Williams, Virginia Polytechnic Institute and State University, Blacksburg, VA

Lattice structures can dissipate energy by plastically deforming and can resist penetration if hard ceramic or hard metal tiles are incorporated within the lattice structure design. In this project, cast lattice structures have been produced in aluminum alloys, steel alloys, and Fe30Mn(4-9)Al alloys. Low cost, high hardness, white cast iron or lightweight, high hardness, ceramic tiles have been incorporated within the cast lattice structures. 3D-printed sand molds and the gravity casting process were used to make lattice castings at the Virginia Tech foundry and at two commercial foundries. Computer simulation and physical testing were used to determine the mechanical properties of these castings and casting simulation and casting trials were used to determine the practical limits of the casting process.

AI/ML and ICME Driven Framework for Intelligent Design and Manufacturing of Castings (22-157)

Jiten Shah, Product Development & Analysis LLC, Naperville, IL

A methodology and framework to develop meta model using historical process data will be presented along with uncertainty quantification for sporadic shrinkage porosities and variations in the properties. Presentation will explain the application of modern methods of AI (artificial intelligence)/ ML (machine learning) to build a meta model

for the intelligent design and processing control in near real time. The framework being developed consists of a hybrid approach of using current ICME tools, controlled experimental data and production historical data to predict and eliminate sporadic shrinkage and consistent properties and will be demonstrated with a case study. A meta model for predicting properties as a function of section thickness also will be presented.

ROOM: B231 – 232

Specialty Aluminum Session

Session Chair: *Luis Trueba, Texas State University, San Marcos, TX*

From the Forthcoming AFS Publication “Aluminum Castings for Structural Applications - Aluminum Alloys for High Temperature Applications” (22-140)

Mahi Sahoo, Ottawa, Ontario, Canada

Cast aluminum alloys are used for structural components in automotive, aerospace and military applications to reduce weight, greenhouse gas emissions and improve efficiency and performance. Major applications include engine block and cylinder head castings for gasoline engines, suspension components and compressor wheels for turbines. Engine components operate at high temperatures up to about 200 C. Higher operating temperatures and pressures are required to improve engine efficiency. This chapter focuses on ways to improve high temperature performance of aluminum alloys including solid solution and precipitation hardening, ceramic particle reinforcement to produce MMC and development of new alloys with alloy additions such as scandium, cerium to stabilize the high temperature mechanical properties. Highlights of alloys developed to date would be presented together with suggestions for future work

From the Forthcoming AFS Publication Aluminum Castings for Structural Applications - Gating, Riser, Chills and Filters (22-141)

David Weiss, Eck Industries, Inc., Manitowoc, WI

We define a gating system as the mechanism to fill and feed a casting and to supply metal to the casting during solidification. This encompasses everything that happens from the lip of the ladle until the casting is 100% solid. The gating system is one of the most important aspect in the art and science of making a casting since it is the primary contributor to casting soundness and the mechanical properties that come from those castings. While simulation software is widely used in the development of gating systems, a starting model needs to be fed into the software to analyze. The closer that model is to the fundamental physics of metal filling and feeding, the quicker a casting can be fully developed.

9:15 – 10:15 a.m.

ROOM: B242 – 243

Government Affairs Division

Session Chair: *Stephanie Salmon, American Foundry Society, Washington, D.C.*

Marijuana in the Workplace – Crafting Safety and HR Policies for the Metalcasting Industry (22-167)

Bryan Johnson, Michelman & Robinson, LLP, Chicago, IL

Cannabis can have a major impact on the safety of employees, and cannabis legalization is creating new challenges for U.S. metalcasters. Cannabis is currently legal in 33 states for medical use and 11 states for recreational use. These policy developments have created a new challenge for manufacturers. Employment attorney Bryan Johnson of Michelman & Robinson will provide an overview of how cannabis and employment laws interact, address potential

legislative activities from federal and state perspectives, and discuss how to develop metalcasting workplace policies to address the risks of cannabis in foundry safety and HR plans.

9:30 – 10:30 a.m.

ROOM: CASTING SOURCE THEATER

Casting Designers & Buyers

Session Chair: Shannon Wetzel, American Foundry Society, Inc., Schaumburg, IL

Using CADS (Casting Alloy Data Search) to Choose the Best Alloy for the Job (22-111)

Jiten Shah, Product Development & Analysis LLC, Naperville, IL

CADS, or Casting Alloy Data Search, is a unique resource provided by AFS, in conjunction with the Defense Logistics Agency. All properties in CADS have a known "pedigree." CADS data includes detailed casting process pedigree information based on process-related details, such as part-size, how it was made, or thickness of the material the test bars were taken from. Shah will instruct how to use this tool to give designers and specifiers a higher level of confidence in their material choice.

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Alphabetical *(As of 2/18/22)*

A

ABP Induction LLC *	Booth 1515
Acme Manufacturing	Booth 503
Adams Burke & Associates LLC	Booth 1805
Advanced Foundry Specialists LLC	Booth 1827
Advanced Material Solutions	Booth 827
Advanced Pattern Works *	Booth 2518
American Metalcasting Consortium	Booth 1820
Advanced Tooling Inc.	Booth 1849
Ajax Tocco Magnethermic Corp. *	Booth 1103
Albarrie Canada *	Booth 1009
Alkegen	Booth 1015
Allied Mineral Products Inc.	Booth 1026
Aluminum Alloys MFG LLC *	Booth 603
AFS - Casting of the Year *	Booth 2627
AFS - The Hub *	Booth 222
AIM Recycling	Booth 1838
AMETEK Inc. *	Booth 1709
Ammat Technology Co.	Booth 1943
AMV Soluciones	Booth 2449
Asbury Carbons Inc. *	Booth 1043
ASK Chemicals	Booth 2307
ATD Engineering & Machine *	Booth 1234
ATS Applied Tech Systems LLC	Booth 908
August Mack Environmental Inc.	Booth 617

Automatic Foundry Solutions Booth 1749

B

B&L Information Systems Inc. *	Booth 1726
Badger Mining Corp. *	Booth 802
Bartley Crucible & Refractories Inc.	Booth 1819
Blasch Precision Ceramics Inc.	Booth 1016
Blast Cleaning Technologies *	Booth 2435
Brokk Inc. *	Booth 1144
Burleigh Industries *	Booth 1349

C

Can Eng Furnaces International Ltd.	Booth 2012
Capital Refractories Inc. *	Booth 2122
CAPTURE 3D	Booth 2208
CARBO *	Booth 726
Carpenter Brothers Inc. *	Booth 1808
Carrier Vibrating Equipment Inc. *	Booth 1123
Champion Chisel Works Inc.	Booth 722
Chesapeake Specialty Products Inc.*	Booth 2349
Clansman Dynamics USA *	Booth 1314
Cleveland Vibrator Co.	Booth 1920
CMH Manufacturing Co.	Booth 941
Conveyor Dynamics *	Booth 1525

Covia Corp. *

CPC Inc.

CRONYNG

Booth 1003

Booth 2319

Booth 2043

Foundry Solutions
& Design LLC *

Booth 1109

Foundry Solutions &
Metallurgical Services

Booth 1823

D

Daubert Cromwell

Booth 927

Del Sol Industrial Services Inc.

Booth 1108

DIAMANT Polymers Inc.

Booth 1912

Didion International Inc. *

Booth 1525

Digitize Designs

Booth 1112

DISA *

Booth 2135

Diversified Pattern &
Engineering

Booth 2614

Dustmaster Enviro Systems *

Booth 527

EElectric Controls &
Systems Inc. (EC&S)

Booth 1739

EKK Inc.

Booth 2503

Elkem Silicon Products *

Booth 2303

EMSCO Inc. *

Booth 1703

Engis Corporation *

Booth 2015

Epic Machine Inc. *

Booth 2626

Equipment Manufacturers
Intl. Inc. (EMI)

Booth 2325

ERIEZ

Booth 1902

Ervin Industries Inc.

Booth 2141

ETA Engineering Inc. *

Booth 1835

Everett Industries LLC *

Booth 940

ExOne ***Booth 2009**

EZ Grout Corp. *

Booth 2121

EZG Manufacturing *

Booth 2121

F

Fargowear Inc.

Booth 809

FEF

Booth 521

Ferroglobe

Booth 2602

Finite Solutions Inc. *

Booth 634

FISA North America *

Booth 1816

Flexovit USA Inc. *

Booth 1722

Foseco *

Booth 1935

G

Gaylord Family Enterprises Inc.

Booth 935

Gemco Cast Metal Technology

Booth 1145

General Kinematics Corp. ***Booth 1303**

Gibson Centri Tech Ltd.

Booth 1124

Goff Inc.

Booth 1023

Green Diamond

Performance Materials *

Booth 602

Green Packaging Inc. *

Booth 626

GreenSand Controls Inc. *

Booth 1027

Griffin Tool Inc.

Booth 904

Guardian Bandsaws Ltd. *

Booth 823

Guardian Software
Systems Inc. *

Booth 1126

Gudgeon Thermfire Intl. Inc.

Booth 1834

H

HA International LLC *

Booth 1503

HarbisonWalker International

Booth 2509

HeatTek Inc.

Booth 1917

Helluva Container *

Booth 1904

Henschel Andromat Inc. *

Booth 1011

Heraeus Electro-Nite Co. *

Booth 2427

Herschel Products Co. Inc.

Booth 2335

Hi-Vac Corporation *

Booth 911

Hill & Griffith *

Booth 1543

Hirado Kinzoku Kogyo Co. Ltd.

Booth 1244

Hitachi High-Tech
Analytical Science

Booth 505

Hoosier Pattern Inc. ***Booth 1603****Humtown *****Booth 1623**Hunter Foundry
Machinery Corp.

Booth 649

I

I2r Power *

Booth 1034

Indopower Enggs

Booth 948

Induction Iron Inc. *	Booth 1813
Induction Technology Corp. *	Booth 1942
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Innovative Analytical Solutions	Booth 1818
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J

JB DeVenne Inc.	Booth 2527
JOEST Inc.	Booth 635
Joy Mark Inc. *	Booth 1735

K

King Tester Corp. *	Booth 1919
Kodiak Group *	Booth 835
KUENKEL-WAGNER Germany GmbH	Booth 1643
Kuttner LLC *	Booth 1002

L

LAEMPE REICH *	Booth 1535
Larpen Metallurgical Service *	Booth 1721
LECO Corporation *	Booth 2016
LightSpeed Concepts Inc. *	Booth 2642

M

Macawber Engineering Inc.	Booth 2010
Magaldi Technologies LLC *	Booth 1927
MAGMA Foundry Technologies Inc. *	Booth 2127
Mancuso Chemicals Ltd. *	Booth 1035
Matrix Sensors LLC	Booth 1803
Maumee Pattern Co.	Booth 1923
MB Superabrasives	Booth 2250
MCM	Booth 541
Metrics Works	Booth 2419
Metaltec Steel Abrasive Co.	Booth 915
Metrologic Group Services Inc.	Booth 2109
Michigan Pneumatic Tool Inc. *	Booth 1118

Mid State Industrial An Ohio Tool Systems Company	Booth 709
Miller and Company *	Booth 1843
Modern Equipment Co. LLC *	Booth 1004
Molten Metal Equipment Innovations (MMEI)	Booth 1948
Mostardi Platt *	Booth 2150
Multi-Vac: a division of M & W Shops *	Booth 2403

N

Nederman MikroPul *	Booth 2008
New London Engineering *	Booth 721
Non-Ferrous Founders Society	Booth 2522
NovaCast *	Booth 1717
Novis Works LLC *	Booth 2027
Nugent Sand Co. *	Booth 1142
Nutec Bickley	Booth 1811

O

OmniSource Corp.	Booth 1727
Online Resources	Booth 1938
Otto Junker (Junker Inc.)	Booth 1115

P

PADNOS	Booth 1850
Palmer Engineered Products *	Booth 2341
Palmer Mfg. & Supply Inc. *	Booth 2341
Pangborn Corp. *	Booth 1842
Peerless Metal Powders & Abrasive *	Booth 1903
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Pillar Induction *	Booth 1103
Product Development & Analysis LLC	Booth 2603
ProfitGuard LLC *	Booth 1817
ProFound Alloys LLC	Booth 1135
ProServiceTech Inc.	Booth 2022
PureFlo	Booth 1918
Pyrotek Inc.	Booth 1448

Q

Quad City Safety Inc. * Booth 517

R

RMG Raffineria Metalli
Guizzi SpA Booth 2423

RAMPF Group Inc. Booth 2434

REFCOTEC Inc. * **Booth 1035**

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Reno Refractories Booth 1949

Resco Products Inc. Booth 909

Rio Tinto * Booth 2515

RUF Briquetting Systems Booth 1916

S

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Steel Grip Inc. Booth 902

StrikoWestofen * Booth 2135

Summit Foundry Systems Inc. * **Booth 735**

Superior Graphite Co. * Booth 2115

SYNCHRO ERP LTD * Booth 2023

T

TEMC Metal & Chemical Corp. * Booth 646

Thermafield Power Components Booth 816

Thermo Fisher Scientific Booth 705

Tinker Omega Sinto LLC * **Booth 1315**

Titan Robotics Ltd. * Booth 1238

Top Cat Air Tools Booth 1822

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TriALco Inc. Booth 2142

U

U-Metco Inc. Booth 1719

United Refractories Co. Booth 916

V

Verder Scientific Inc. Booth 2003

Versevo Inc. * Booth 1743

VIBROTECH Engineering S L Booth 1922

ViewTech Borescopes Booth 509

Viking Blast & Wash Systems * Booth 921

Viking Technologies Inc. * Booth 1008

VJ Technologies Inc. * Booth 1839

Voxeljet America Inc. * Booth 535

Vulcan Engineering Co. Inc. * **Booth 1648**

Vulkan Blast Shot Technology Booth 1139

W

W Abrasives (Winoa USA) Booth 2443

Walbert USA LLC Booth 1848

Waltz-Holst Blow Pipe Co. Booth 1810

Washington Mills Hennepin Inc. * Booth 1723

Webb-Stiles Co. Booth 803

Weiler Abrasives Group Booth 2505

Wheelabrator * Booth 2135

Whiting Equipment Canada Inc. Booth 2620

X

X1 Safety LLC Booth 1014

Z

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Zerust Corrosion Solutions Booth 1809



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Ferroglobe	Booth 2602
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Zerust Corrosion Solutions	Booth 1809

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Thermo Fisher Scientific	Booth 705

Alloys/Materials - Iron

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Elkem Silicon Products *	Booth 2303
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Ferroglobe	Booth 2602
HA International LLC *	Booth 1503
HarbisonWalker International	Booth 2509
Miller and Company *	Booth 1843

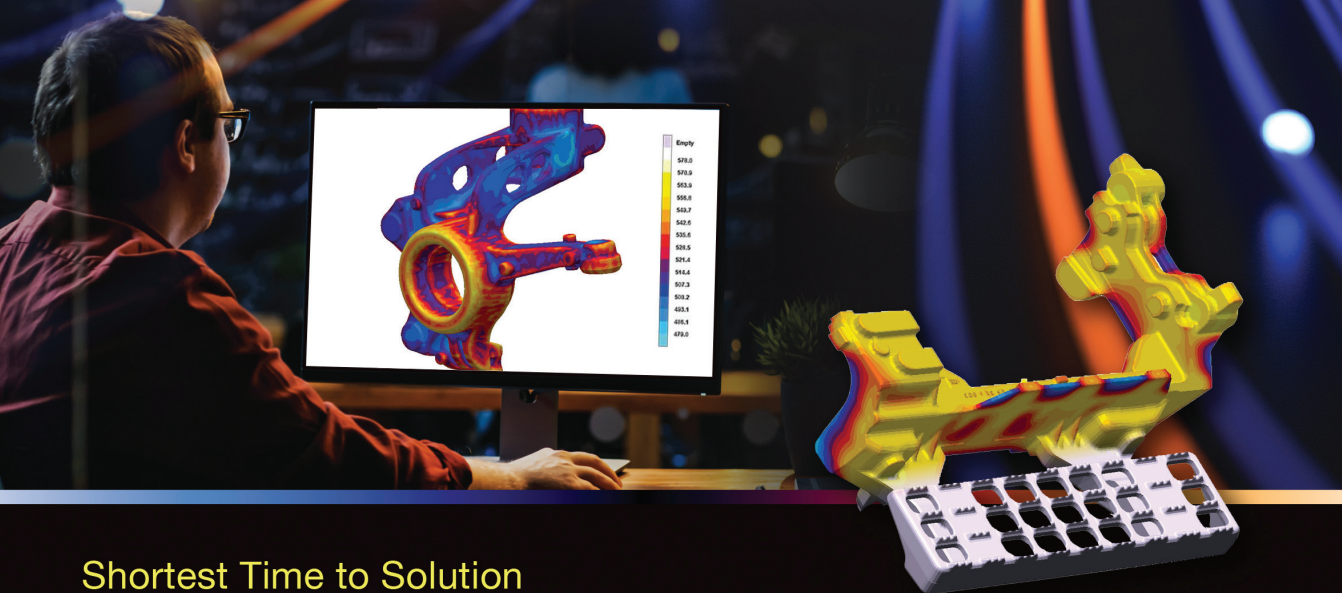


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Product Development & Analysis Booth LLC	Booth 2603
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Rio Tinto *	Booth 2515
RUF Briquetting Systems	Booth 1916
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Washington Mills Hennepin Inc. *	Booth 1723
Zerust Corrosion Solutions	Booth 1809

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Alloys/Materials - Steel

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Ferroglobe	Booth 2602
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Finite Solutions Inc. *	Booth 634
Foundry Solutions & Design LLC *	Booth 1109
Gemco Cast Metal Technology	Booth 1145
GreenSand Controls Inc. *	Booth 1027
HA International LLC *	Booth 1503
Hirado Kinzoku Kogyo Co. Ltd.	Booth 1244
Hoosier Pattern Inc. *	Booth 1603
Indopower Enggs	Booth 948
Joy Mark Inc. *	Booth 1735
Kodiak Group *	Booth 835
Kuttner LLC *	Booth 1002
Macawber Engineering Inc.	Booth 2010
Magaldi Technologies LLC *	Booth 1927
Maumee Pattern Co.	Booth 1923

MCM	Booth 541
Novis Works LLC *	Booth 2027
Palmer Mfg. & Supply Inc. *	Booth 2341
Product Development & Analysis LLC	Booth 2603
ProServiceTech Inc.	Booth 2022
Pyrotek Inc.	Booth 1448
Reliability Concepts *	Booth 922
Schust *	Booth 2126
Scientific Dust Collectors *	Booth 903
SELEE Corporation *	Booth 727
Simpson Technologies Corp. *	Booth 1549
Sinto America *	Booth 1325
Summit Foundry Systems Inc. *	Booth 735
Thermafield Power Components	Booth 816
VIBROTECH Engineering S L	Booth 1922
Walbert USA LLC	Booth 1848

Engineering/Capital Equipment - Environmental, Health and Safety

CARBO *	Booth 726
Didion International Inc. *	Booth 1525
Dustmaster Enviro Systems *	Booth 527
ETA Engineering Inc. *	Booth 1835
Guardian Bandsaws Ltd. *	Booth 823
IVI Inc. *	Booth 808
Michigan Pneumatic Tool Inc. *	Booth 1118
PureFlo	Booth 1918
Schust *	Booth 2126
Viking Technologies Inc. *	Booth 1008

Engineering/Capital Equipment - Heat Treatment

Ajax Tocco Magnethermic Corp.	Booth 1103
Clansman Dynamics USA *	Booth 1314
King Tester Corp. *	Booth 1919
Magaldi Technologies LLC *	Booth 1927
Pillar Induction *	Booth 1103

Engineering/Capital Equipment - Investment Casting Equipment & Accessories

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Bartley Crucible & Refractories Inc.	Booth 1819
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Multi-Vac: a division of M & W Shops *	Booth 2403
Pillar Induction *	Booth 1103
SELEE Corporation *	Booth 727
StrikoWestofen *	Booth 2135
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Voxeljet America Inc. *	Booth 535
Webb-Stiles Co.	Booth 803

Engineering/Capital Equipment - Maintenance

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Ajax Tocco Magnethermic Corp.	Booth 1103
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Bartley Crucible & Refractories Inc.	Booth 1819
Guardian Bandsaws Ltd. *	Booth 823
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Multi-Vac: a division of M & W Shops *	Booth 2403
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StrikoWestofen *	Booth 2135
VIBROTECH Engineering S L	Booth 1922
Voxeljet America Inc. *	Booth 535
Webb-Stiles Co.	Booth 803

Engineering/Capital Equipment - Patternmaking & Tooling

Advanced Pattern Works *	Booth 2518
CPC Inc.	Booth 2319
DISA *	Booth 2135
Diversified Pattern & Engineering	Booth 2614
Epic Machine Inc. *	Booth 2626
Griffin Tool Inc.	Booth 904
Hoosier Pattern Inc. *	Booth 1603
Maumee Pattern Co.	Booth 1923
MB Superabrasives	Booth 2250
Palmer Engineered Products *	Booth 2341
RAMPF Group Inc.	Booth 2434
Titan Robotics Ltd. *	Booth 1238
Top Cat Air Tools	Booth 1822
Versevo Inc. *	Booth 1743
Walbert USA LLC	Booth 1848

Engineering/Capital Equipment - Permanent Mold Equipment & Accessories

Advanced Pattern Works *	Booth 2518
ATD Engineering & Machine *	Booth 1234
CMH Manufacturing Co.	Booth 941
CPC Inc.	Booth 2319
ERIEZ	Booth 1902
Foundry Solutions & Metallurgical Services	Booth 1823
Maumee Pattern Co.	Booth 1923
Sinto America *	Booth 1325
StrikoWestofen *	Booth 2135
Versevo Inc. *	Booth 1743
VIBROTECH Engineering S L	Booth 1922

Engineering/Capital Equipment - Software

ATS Applied Tech Systems LLC	Booth 908
B&L Information Systems Inc. *	Booth 1726
CAPTURE 3D	Booth 2208

DISA *	Booth 2135
EKK Inc.	Booth 2503
Finite Solutions Inc. *	Booth 634
Guardian Software Systems Inc. *	Booth 1126
Metrologic Group Services Inc.	Booth 2109
NovaCast *	Booth 1717
ProServiceTech Inc.	Booth 2022
Reliability Concepts *	Booth 922
Sinto America *	Booth 1325

Engineering/Capital Equipment - Value-Added Services (Machining, Painting, Assembly, etc...)

Acme Manufacturing	Booth 503
Finite Solutions Inc. *	Booth 634
Reno Refractories	Booth 1949
SIR Robotics Inc. *	Booth 1934
StrikoWestofen *	Booth 2135
VJ Technologies Inc. *	Booth 1839

Melting/Melting Quality - Casting Quality & Testing

Advanced Material Solutions	Booth 827
American Metalcasting Consortium	Booth 1820
AMETEK Inc.	Booth 1709
CAPTURE 3D	Booth 2208
ERIEZ	Booth 1902
Foundry Solutions & Metallurgical Services	Booth 1823
Heraeus Electro-Nite Co. *	Booth 2427
Hitachi High-Tech Analytical Science	Booth 505
Innovative Analytical Solutions	Booth 1818
InterTest Inc.	Booth 627
Joy Mark Inc. *	Booth 1735
King Tester Corp. *	Booth 1919
MAGMA Foundry Technologies Inc. *	Booth 2127
SELEE Corporation *	Booth 727

Thermo Fisher Scientific	Booth 705
Verder Scientific Inc.	Booth 2003
VJ Technologies Inc. *	Booth 1839
ZEISS Industrial Quality Solutions	Booth 1908

Melting/Melting Quality - Ferrous Melt Quality

AMETEK Inc.	Booth 1709
Elkem Silicon Products *	Booth 2303
Heraeus Electro-Nite Co. *	Booth 2427
Hitachi High-Tech Analytical Science	Booth 505
Innovative Analytical Solutions	Booth 1818
ProServiceTech Inc.	Booth 2022
Reno Refractories	Booth 1949
United Refractories Co.	Booth 916
Verder Scientific Inc.	Booth 2003
Washington Mills Hennepin Inc. *	Booth 1723

Melting/Melting Quality - Ferrous Melting

Ajax Tocco Magnethermic Corp.	Booth 1103
Bartley Crucible & Refractories Inc.	Booth 1819
Capital Refractories Inc. *	Booth 2122
Carrier Vibrating Equipment Inc. *	Booth 1123
Conveyor Dynamics *	Booth 1525
Elkem Silicon Products *	Booth 2303
HarbisonWalker International	Booth 2509
Heraeus Electro-Nite Co. *	Booth 2427
I2r Power *	Booth 1034
Induction Technology Corp. *	Booth 1942
Inductotherm Corp. *	Booth 1334
JOEST Inc.	Booth 635
Kuttner LLC *	Booth 1002
Otto Junker (Junker Inc.) *	Booth 1115
Pillar Induction *	Booth 1103
Saint-Gobain	Booth 926
Superior Graphite Co. *	Booth 2115

United Refractories Co.	Booth 916
University of Northern Iowa	Booth 616
Washington Mills Hennepin Inc. *	Booth 1723
Whiting Equipment Canada Inc.	Booth 2620

Melting/Melting Quality - Ferrous Pouring

AMETEK Inc.	Booth 1709
Bartley Crucible & Refractories Inc.	Booth 1819
Capital Refractories Inc. *	Booth 2122
HarbisonWalker International	Booth 2509
Inductotherm Corp. *	Booth 1334
Modern Equipment Co. LLC *	Booth 1004
Otto Junker (Junker Inc.) *	Booth 1115
ProServiceTech Inc.	Booth 2022
Saint-Gobain	Booth 926
Sinto America *	Booth 1325
Steel Grip Inc	Booth 902
Viking Technologies Inc. *	Booth 1008
Whiting Equipment Canada Inc.	Booth 2620

Melting/Melting Quality - Nonferrous Melt Quality

Aluminum Alloys MFG LLC *	Booth 603
AMETEK Inc.	Booth 1709
DIAMANT Polymers Inc.	Booth 1912
Foundry Solutions & Metallurgical Services	Booth 1823
Heraeus Electro-Nite Co. *	Booth 2427
Hitachi High-Tech Analytical Science	Booth 505
Innovative Analytical Solutions	Booth 1818
Molten Metal Equipment Innovations (MMEI)	Booth 1948
Pyrotek Inc.	Booth 1448
United Refractories Co.	Booth 916
Verder Scientific Inc.	Booth 2003

Melting/Melting Quality - Nonferrous Melting

Ajax Tocco Magnethermic Corp	Booth 1103
Bartley Crucible & Refractories Inc.	Booth 1819
Capital Refractories Inc. *	Booth 2122
Electric Controls & Systems Inc. (EC&S) *	Booth 1739
Foundry Solutions & Metallurgical Services	Booth 1823
HarbisonWalker International	Booth 2509
Heraeus Electro-Nite Co. *	Booth 2427
I2r Power *	Booth 1034
Indopower Enggs	Booth 948
Induction Technology Corp. *	Booth 1942
Inductotherm Corp. *	Booth 1334
JOEST Inc.	Booth 635
Kuttner LLC *	Booth 1002
Modern Equipment Co. LLC *	Booth 1004
Molten Metal Equipment Innovations (MMEI)	Booth 1948
Otto Junker (Junker Inc.) *	Booth 1115
Pillar Induction *	Booth 1103
Saint-Gobain	Booth 926
StrikoWestofen *	Booth 2135
United Refractories Co.	Booth 916
University of Northern Iowa	Booth 616
Whiting Equipment Canada Inc.	Booth 2620

Melting/Melting Quality - Nonferrous Pouring

AMETEK Inc.	Booth 1709
Bartley Crucible & Refractories Inc.	Booth 1819
Capital Refractories Inc. *	Booth 2122
Inductotherm Corp. *	Booth 1334
Modern Equipment Co. LLC *	Booth 1004
Saint-Gobain	Booth 926
Steel Grip Inc.	Booth 902
StrikoWestofen *	Booth 2135

United Refractories Co. Booth 916
Whiting Equipment Canada Inc. Booth 2620

Molding Processes - Centrifugal

Gibson Centri Tech Ltd. Booth 1124
REFCOTEC Inc. * **Booth 1035**

Molding Processes - Chemically-Bound Sand

Carpenter Brothers Inc. * Booth 1808
Conveyor Dynamics * Booth 1525
CRONYNG Booth 2043
Del Sol Industrial Services Inc. Booth 1108
Didion International Inc. * Booth 1525
Electric Controls & Systems Inc. (EC&S) * Booth 1739
Gudgeon Thermfire Intl. Inc. * Booth 1834
HA International LLC * Booth 1503
Humtown * **Booth 1623**
Joy Mark Inc. * Booth 1735
MCM Booth 541
Novis Works LLC * Booth 2027
Palmer Mfg. & Supply Inc. * Booth 2341
REFCOTEC Inc. * **Booth 1035**
Simpson Technologies Corp. * Booth 1549
Solex Thermal Science Inc. * Booth 905
Tinker Omega Sinto LLC * **Booth 1315**
Vulcan Engineering Co. Inc. * **Booth 1648**

Molding Processes - Continuous

DIAMANT Polymers Inc. Booth 1912
Electric Controls & Systems Inc. (EC&S) * Booth 1739
General Kinematics Corp. * **Booth 1303**

Molding Processes - Diecasting

American Metalcasting Consortium Booth 1820
Carrier Vibrating Equipment Inc. * Booth 1123
CMH Manufacturing Co. Booth 941

Gemco Cast Metal Technology Booth 1145
General Kinematics Corp. * **Booth 1303**

MAGMA Foundry Technologies Inc. * **Booth 2127**

Pyrotek Inc. Booth 1448
SIR Robotics Inc. * Booth 1934
VJ Technologies Inc. * Booth 1839
Walbert USA LLC Booth 1848

Molding Processes - Green Sand

Advanced Pattern Works * Booth 2518
ATD Engineering & Machine * Booth 1234
CARBO * Booth 726
Carpenter Brothers Inc. * Booth 1808
Carrier Vibrating Equipment Inc. * Booth 1123
Conveyor Dynamics * Booth 1525
CRONYNG Booth 2043
Del Sol Industrial Services Inc. Booth 1108
Didion International Inc. * Booth 1525
DISA * Booth 2135
Electric Controls & Systems Inc. (EC&S) * Booth 1739
Equipment Manufacturers Intl Inc (EMI) * Booth 2325
ERIEZ Booth 1902
Gemco Cast Metal Technology Booth 1145
General Kinematics Corp. * **Booth 1303**
GreenSand Controls Inc. * Booth 1027
HA International LLC * Booth 1503
Joy Mark Inc. * Booth 1735
KUENKEL-WAGNER Germany GmbH Booth 1643
Kuttner LLC * 1 Booth 002
MAGMA Foundry Technologies Inc. * **Booth 2127**
Michigan Pneumatic Tool Inc. * Booth 1118
Palmer Engineered Products * Booth 2341
REFCOTEC Inc. * **Booth 1035**
Simpson Technologies Corp. * Booth 1549
Sintex Minerals & Services Inc. * Booth 1615
Sinto America * **Booth 1325**

Southeastern Foundry Products & Foundry Coatings Inc.*	Booth 804
Summit Foundry Systems Inc. *	Booth 735
Vulcan Engineering Co. Inc. *	Booth 1648
Walbert USA LLC	Booth 1848
Wheelabrator *	Booth 2135

Molding Processes - Investment

MAGMA Foundry Technologies Inc. *	Booth 2127
Sinto America *	Booth 1325

Molding Processes - Lost Foam

CARBO *	Booth 726
Electric Controls & Systems Inc. (EC&S) *	Booth 1739
Gemco Cast Metal Technology	Booth 1145
REFCOTEC Inc. *	Booth 1035
Southeastern Foundry Products & Foundry Coatings Inc.*	Booth 804

Molding Processes - Permanent Mold

Advanced Pattern Works *	Booth 2518
ATD Engineering & Machine *	Booth 1234
CMH Manufacturing Co.	Booth 941
CPC Inc.	Booth 2319
Denison Industries Inc. *	Booth 2717
Diversified Pattern & Engineering	Booth 2614
MAGMA Foundry Technologies Inc. *	Booth 2127
Versevo Inc. *	Booth 1743
Walbert USA LLC	Booth 1848

Molding Processes - Vacuum Processes (sand or metal mold)

ATD Engineering & Machine *	Booth 1234
Humtown *	Booth 1623
REFCOTEC Inc. *	Booth 1035
Sinto America *	Booth 1325

Sand Mold/Core Making - Additive Manufacturing

American Metalcasting Consortium	Booth 1820
Ammat Technology Co.	Booth 1943
CAPTURE 3D	Booth 2208
Chesapeake Specialty Products Inc.*	Booth 2349
Hoosier Pattern Inc. *	Booth 1603
Humtown *	Booth 1623
LightSpeed Concepts Inc. *	Booth 2642
Novis Works LLC *	Booth 2027
Palmer Mfg. & Supply Inc. *	Booth 2341
Product Development & Analysis LLC	Booth 2603
Sinto America *	Booth 1325
Titan Robotics Ltd. *	Booth 1238
University of Northern Iowa	Booth 616
Versevo Inc. *	Booth 1743

Sand Mold/Core Making - Core Machines

ATD Engineering & Machine *	Booth 1234
Equipment Manufacturers Intl Inc (EMI) *	Booth 2325
Gaylord Family Enterprises Inc	Booth 935
LAEMPE REICH *	Booth 1535
Palmer Mfg. & Supply Inc. *	Booth 2341
ProServiceTech Inc	Booth 2022
Sinto America *	Booth 1325
SIR Robotics Inc. *	Booth 1934

Sand Mold/Core Making - Coremaking

ASK Chemicals	Booth 2307
Carpenter Brothers Inc. *	1808
Diversified Pattern & Engineering	Booth 2614
Green Diamond Performance Materials *	Booth 602

HA International LLC *	Booth 1503
Hoosier Pattern Inc. *	Booth 1603
Humtown *	Booth 1623
LAEMPE REICH *	Booth 1535
MCM	Booth 541
Novis Works LLC *	Booth 2027
Solex Thermal Science Inc. *	Booth 905
Tinker Omega Sinto LLC *	Booth 1315
Voxeljet America Inc. *	Booth 535

Sand Mold/Core Making - Rapid Prototyping

CAPTURE 3D	Booth 2208
CPC Inc.	Booth 2319
Hoosier Pattern Inc. *	Booth 1603
Humtown *	Booth 1623
LightSpeed Concepts Inc. *	Booth 2642
Maumee Pattern Co.	Booth 1923
Product Development & Analysis LLC	Booth 2603
RAMPF Group Inc.	Booth 2434
Voxeljet America Inc. *	Booth 535

Sand Mold/Core Making - Sand Molding Equipment

Badger Alloys Inc. *	Booth 2615
CAPTURE 3D	Booth 2208
CPC Inc.	Booth 2319
Hoosier Pattern Inc. *	Booth 1603
Humtown *	Booth 1623
LightSpeed Concepts Inc. *	Booth 2642
Maumee Pattern Co.	Booth 1923
Product Development & Analysis LLC	Booth 2603
RAMPF Group Inc.	Booth 2434
Tooling & Equipment International *	Booth 2727
Voxeljet America Inc. *	Booth 535

Sand Mold/Core Making - Sand Preparation & Testing

ASK Chemicals	Booth 2307
Badger Mining Corp. *	Booth 802
CARBO *	Booth 726
Carrier Vibrating Equipment Inc. *	Booth 1123
CRONYNG	Booth 2043
Del Sol Industrial Services Inc	Booth 1108
Dustmaster Enviro Systems *	Booth 527
Equipment Manufacturers Intl Inc (EMI) *	Booth 2325
Fargowear Inc.	Booth 809
Gemco Cast Metal Technology	Booth 1145
General Kinematics Corp. *	Booth 1303
Green Diamond Performance Materials *	Booth 602
GreenSand Controls Inc. *	Booth 1027
JOEST Inc	Booth 635
KUENKEL-WAGNER Germany GmbH	Booth 1643
MCM	Booth 541
Michigan Pneumatic Tool Inc. *	Booth 1118
Nugent Sand Co. *	Booth 1142
Simpson Technologies Corp. *	Booth 1549
Sinto America *	Booth 1325
Summit Foundry Systems Inc. *	Booth 735
University of Northern Iowa	Booth 616



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abpinduction.com
(732) 932-6400

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Acme Manufacturing**Booth 503**

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acmemfg.com
(248) 393-7300

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Advanced Foundry Specialists LLC Booth 1827

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afswi.com
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Adams Burke & Associates LLC**Booth 1805**

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Manchester, MO 63011
adamsburke.com
(636) 230-8100 x101
Adams Burke & Associates LLC is a

Advanced Material Solutions**Booth 827**

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Mesa, AZ 85204
advancedmaterialsolutions.com
(602) 442-1899

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Advanced Pattern Works * **Booth 2518**

305 Railroad Ave.

Collinsville, IL 62234

advancedpatternworks.com

American Metalcasting Consortium **Booth 1820**

315 Sigma Dr.

Summerville, SC 29486

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(843) 760-4500

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Advanced Tooling Inc. **Booth 1849**

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advancedtoolinginc.net

(920) 753-2420

Ajax Tocco Magnethermic Corp. * **Booth 1103**

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Warren, OH 44483

ajaxtocco.com

(800) 547-1527

Ajax TOCCO Magnethermic has worldwide operations in nine countries. In North America, we have manufacturing facilities in two major locations as well as eight regional service centers. Ajax TOCCO maintains a full-time research and development program. We design and build all of our power supplies and as a result, are able to supply our customers with the latest technology available. Our 600+ domestic and international employees give us the ability to handle large orders or volume increases while maintaining our commitment to quality, service, and delivery. Contact us to discuss your needs.

Albarrie Canada * **Booth 1009**

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alkegen.com

(716) 768-6500

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alliedmineral.com
(614) 876-0244

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Aluminum Alloys MFG LLC * **Booth 603**

150 South Orchard St.
Dallastown, PA 17313
aluminumalloysllc.com
(717) 501-5277

AFS - Casting of the Year **Booth 2627**

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afsinc.org
(847) 824-0181

Presented by AFS and Casting Source magazine, view the best in foundry achievements at the Casting of the Year display.

AFS - The Hub **Booth 222**

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Schaumburg, IL 60173-4555
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The American Foundry Society is a dynamic technical and advocacy organization that serves and represents the \$44 billion metalcasting industry. AFS is the only association serving the entire industry, including all metals and processes, with a three-part focus on advocacy, education, and innovation. AFS also publishes Modern Casting and Metal Casting Design & Purchasing magazines and presents Metalcasting Congress and CastExpo, the largest metalcasting trade events in North America. Founded in 1896, the organization is based in Schaumburg, Illinois, with an advocacy office in Washington, D.C.

AIM Recycling **Booth 1838**

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Canada
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(905) 547-5533

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AMETEK Inc. * **Booth 1709**

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ametefpp.com
(570) 645-6917

AMETEK Foundry Products is the partner of choice for leading foundries and investment

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Ammat Technology Co. **Booth 1943**

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ammategroup.com
(614) 761-8881

Ammat Technology Company is an international company providing consumable materials and solutions to foundries. Sand additives are its specialty products, which are innovated and large production usage. These solve casting defects such as veining and sand burn on/in, issues with smoke emission and moisture in sand, and increase quality, productivity and environment and reduce cost and liability significantly. Meantimes, Ammat provides broad solutions to needs by foundries for castings and compact machines for equipment installation and maintenance in constrained workshops.

AMV Soluciones **Booth 2449**

Ctra Bembrive 23, Vigo 36214
Spain

Asbury Carbons Inc. * **Booth 1043**

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Asbury, NJ 18802
asbury.com
(908) 537-2155

ASK Chemicals **Booth 2307**

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Dublin, OH 43017
ask-chemicals.com
(800) 848-7485

ATD Engineering & Machine * **Booth 1234**

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ats-global.com

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Lewis Center, OH 43035
augustmack.com
(740) 548-1500

August Mack is a nationally recognized, award-winning, environmental consulting firm with seven offices. We provide due diligence, environmental building science services, regulatory compliance services, subsurface investigation, and remediation services to a wide range of market segments. With over 170 employees and more than 1,400 clients, our mission is to provide superior service to clients and an unwavering commitment to employees.

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Bridgman, MI 49106

blinfo.com

(269) 465-6207

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Badger Mining Corp. * **Booth 802**

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Berlin, WI 54923

badgerminingcorp.com

(920) 361-2388

Badger Mining Corporation is a family-owned industrial sand producer operating multiple mining and distribution facilities throughout North America. Our customer focus is evident in the high quality products and services we provide each day. We value people (ours and yours), the planet and their collective prosperity.

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Trenton, NJ 08638

(609) 393-0066

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Menands, NY 12204

blaschceramics.com

(518) 436-1263

Founded in 1979, Blasch Precision Ceramics, Inc., an Albany, NY based manufacturing company, produces and markets net shape ceramic and refractory components to a wide variety of industrial markets worldwide, including specialty alloys, non-ferrous metals, chemical/petrochemical processing, power generation, industrial process heating, and mining.

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Monroe, WA 98272

brokk.com

Burleigh Industries * **Booth 1349**

104 Commons Blvd., Ste. D

Piedmont, SC 29673

burleighindustries.com

(864) 546-1593

Wholesale distribution company selling steel abrasives for blast cleaning castings.

Can Eng Furnaces International Ltd. **Booth 2012**

6800 Montrose Rd.

PO Box 628

Niagara Falls, Ontario L2E 6V5

Canada

can-eng.com

(905) 356-1327

Capital Refractories Inc. * **Booth 2122**

1548 Mims Ave. SW

Birmingham, AL 35211

capital-refractories.com

CAPTURE 3D **Booth 2208**

3207 S. Shannon St.

Sana Ana, CA 92704

capture3d.com

(714) 546-7278

CAPTURE 3D, a ZEISS company, is the GOM GmbH partner in the USA since 1997. We have several locations nationwide with 3D Measurement Technology Centers. Our team is dedicated in helping companies optimize product development, manufacturing, and production processes with the application of innovative 3D technology. CAPTURE 3D's industry knowledge and experience has helped companies reduce cycle times, solve engineering issues, prevent future problems, eliminate costs, and improve product quality while speeding up time to market. Find out more at www.capture3d.com

CARBO * **Booth 726**

5050 Westway Park Blvd., Ste. 150

Houston, TX 77041

carboceramics.com

(281) 921-6400

CARBO INDUSTRIAL TECHNOLOGIES is a leading provider of high-performance ceramic media and industrial technologies engineered to increase process efficiency, improve end-product quality and reduce operating cost. Our minerals processing and custom manufacturing services help bring new products to market faster and meet customer demands while minimizing investment.

Carpenter Brothers Inc. * **1808**

7100 W. Donges Bay Rd.

Mequon, WI 53092

carpenterbrothersinc.com

(800) 558-9244

Serving industry since 1917, CBI offers foundry, metalcasting and environmental supplies, equipment and expert services. Metals & ferro-alloys, molten metal sensors, sand additives, pre-blends, specialty sands, chemical binders, abrasives & refractories & more. Equipment includes sand preparations, heaters & coolers, continuous mixers & mullers, automated core & molding machines, shake-out and material handling conveyors, sand reclaimers, melting furnaces & turnkey foundry systems & engineering. Also supply products to sand processing, civil engineering, blast cleaning & finishing industries.

Carrier Vibrating Equipment Inc. * Booth 1123

3400 Fern Valley Rd.
Louisville, KY 40213
carriervibrating.com
(502) 969-3171

Carrier Vibrating Equipment has decades of experience custom designing foundry equipment to help solve issues in the foundry industry. Every step of the foundry operation can rely on our heavy-duty equipment to increase casting quality and efficiency, reducing overall costs. We engineer and build the best Conveyors, Feeders, Furnace Charge Feeders, Shakeouts, Barrel Horses, Attrition Mills, and Sand Coolers you can find.

Champion Chisel Works Inc. Booth 722

804 E. 18th St.
Rock Falls, IL 61071
championchisel.com
(815) 535-0647

Chesapeake Specialty**Products Inc. * Booth 2349**

5055 N. Point Blvd.
Baltimore, MD 21219
chesprod.com
(410) 388-5055

Chesapeake Specialty Products, Inc. is a U.S. based company, with worldwide manufacturing facilities, producing environmentally friendly metallic abrasive, foundry sand additives, and iron products that reduce waste, minimize emissions and reduce the cost to consumers.

Since 1989, Chesapeake has developed and manufactured sand additives, iron oxides, and recyclable metallic abrasive products for customers who seek to utilize economical and environmentally friendly alternatives in industrial applications.

Clansman Dynamics USA * Booth 1314

2524 Columbus Ave.
Springfield, OH 45503
clansmandynamics.com

Cleveland Vibrator Co. Booth 1920

4544 Hinckley Industrial Pkwy.
Cleveland, OH 44109
clevelandvibrator.com
(216) 241-7157

CMH Manufacturing Co. Booth 941

1320 Harvard St.
Lubbock, TX 79403
cmhmfg.com

CMH produces the HALL line of foundry equipment with special emphasis on aluminum tilt pour gravity die-casting. Tilt pouring reduces turbulence as molten metal enters the die cavity, provides shorter cycle times, and requires less metal for feeding systems. Aluminum castings produced in metal molds have a tighter dendrite structure than castings produced in other processes and aluminum castings are harder and have better pressure characteristics. We offer a full line of Autocast die casting machines designed around the tilt pour principle.

Conveyor Dynamics * Booth 1525

7000 W. Geneva Dr.
Saint Peters, MO 63376
conveyordynamicscorp.com
(636) 279-1111

Conveyor Dynamics will feature its line of Vibratory Foundry Equipment. Mold Dump Conveyors, Shakeouts, Attrition Mills, Sorting Conveyors, Indexing Furnace Charge Feeders, Shot Blast Feeders, Screeners, and Casting Cooling Conveyors. Unique features include variable amplitude and our dynamically balanced and isolated design for lower foundation and installation costs.

Covia Corp. * Booth 1003

3 Summit, Ste. 700
Independence, OH 44131
coviacorp.com
(800) 243-9004

Covia offers a broad array of high-quality mineral and material products and the industry's most comprehensive and accessible

distribution network. We believe in the power of long-term partnerships built on integrity, reliability, and an innovative solutions mindset to deliver shared success.

CPC Inc. Booth 2319

25732 Commercentre Dr.

Lake Forest, CA 92630

cpcmachines.com

(949) 830-7797

The CPC -Group of companies are the provider of Counter Pressure Casting Machinery and Technology. Counter Pressure technology is used worldwide in the production of aluminum castings where high strength and lightweight properties are required. CPC is recognized as the leading technology used in the production of safety critical chassis components for the automotive industry such as aluminum steering knuckles, control arms, crossmembers, subframes and nodes. CPC-Group is the producer of Casting Equipment, CPC technology, Molds/Tooling production and R&D in Counter Pressure.

CRONYNG Booth 2043

8010Cd Ind Mitras

Garcia, Nuevo Leon 66023

Mexico

grupodyasa.com

+528186855372

CRONYNG Green Sand Technologies is part of DYASA serving the Foundry Industry since 1987. Based in Mexico, it has both domestic and international experience in products such as Refractory Coatings, Release Agents, Anti veining Additives, Sand Core Glues, Raw Sand, Shell Sand, etc. Experienced R&D Team to develop custom made solutions.

Daubert Cromwell Booth 927

12701 S. Ridgeway Ave.

Alsip, IL 60803

daubertcromwell.com

(708) 293-7750

Daubert Cromwell, an ISO 9001:2015 company, is a global manufacturer of

corrosion inhibitor (VCI) packaging for metals. Used by customers in Metalworking & Fabricating, Heavy Equipment, Automotive, Aviation, Aerospace, Military, and other industries where corrosion prevention is critical. As specialists in rust prevention and environmentally friendly corrosion management solutions, we help reduce the costs of corrosion. VCI packaging keeps metal parts clean, dry, and ready for immediate use without additional cleaning or treatment - during all stages of production, storage, & shipment.

Del Sol Industrial Services Inc. Booth 1108

PO Box 3149

Canyon Lake, TX 7813

delsolservices.com

(830) 935-4430

Del Sol Industrial Services, Inc. is a provider of foundry equipment and engineering services. Specialties include no bake molding, automated greensand molding, and cold box core rooms. Engineering services from a simple form, fit, and function to full turnkey foundry construction are available.

DIAMANT Polymers Inc. Booth 1912

3495 Mustafa Dr.

Cincinnati, OH 45241

diamantpolymersinc.com/

(513) 979-4011

Manufacturer and distributor of Sealers for porosity is casted parts and repair kits for blowholes, surface repair, and rebuild of castings. Also we provide Iron Cement for maintenance of continuous casting machines.

Didion International Inc. * **Booth 1525**

7000 W. Geneva Dr.
Saint Peters, MO 63376
didion.com

(636) 278-8700

DIDION® designs, engineers, and manufactures a full range of rotary processing equipment for foundries including Rotary Media Drums, Rotary Sand Reclaimers, Rotary Sprue Crushers, Rotary Slag / Metal Reclaimers, Rotary Sand / Casting Separators, Rotary Blending / Cooling Drums, and Rotary Sand Screens. Engineered to a strict calculus the patented designs provide the lowest operating cost per ton making foundries more efficient and more profitable. DIDION® is the world leader in rotary foundry machinery with over 1,500 installations in 55 different countries.

Digitize Designs **Booth 1112**

400 Birnie St., Ste. I
Greenville, SC 29611
digitizedesigns.com

(864) 469-0093

Digitize Designs offers 3D scanning equipment and software solutions sales as well as 3D scanning, Metrology, and reverse engineering services.

DISA * **Booth 2135**

1606 Executive Dr.
LaGrange, GA 30240
disagroup.com

(630) 820-3000

DISA develops and manufactures a complete range of metal casting and moulding equipment, services and production solutions for the ferrous and non-ferrous foundry industries. DISA Group has a long-standing tradition of innovation, reliability and commitment to providing its customers with end-to-end grey iron foundry equipment - both vertical and horizontal moulding. DISA has the broadest industry offer to support our customers with their current moulding process through our technical expertise, parts and services and guidance.

Diversified Pattern & Engineering **Booth 2614**

100 Progress Way
Avilla, IN 46710
diversifiedpatternco.com

(260) 897-3771

We are a pattern shop that specializes in production and prototype tooling for all types of casting manufacturing. Also have 3D printing capabilities. Reverse engineering is also a staple in our scope of work.

Dustmaster Enviro Systems * **Booth 527**

PO Box 10
Pewaukee, WI 53072
dustmaster.com

(262) 691-3100

DustMASTER offers a performance proven solution for processing very difficult-to-handle waste streams from cupola dust and foundry sand to shot blast. The DustMASTER process converts these materials into a uniform, non-dusting product that can be easily recycled, transported, and disposed of economically. DustMASTER also offers three (3) different style mixers for dry and low moisture castable refractory materials. Our Prashak horizontal shaft paddle mixer and Turbin mixer have been the mainstay in the refractory industry for the last 40 years. We also offer a Planetary mixer in three sizes.

Electric Controls & Systems Inc. (EC&S) * **Booth 1739**

5639 Miller Industrial Blvd.
Birmingham, AL 35242
ecands.com

(205) 833-9900

EC&S has been a turn-key engineering and construction provider to the foundry industry for over 40 years! We have core strength with applications in melting, power distribution, process control, product flow, sand reclamation and dust collection. With our own designs in auto pour, bag houses, sub-stations, sand reclamation and electrical shipping containers, we are a true turn-key resource for your current facility or your next foundry!

EKK Inc. Booth 2503

37682 Enterprise Ct.

Farmington Hills, MI 48331

ekkinco.com/

(248) 624-9957

EKK Inc. is a global supplier of Casting Simulation Software and Consulting Services. The EKKcapcast software suite provides the ability to seamlessly set up 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.

Elkem Silicon Products * Booth 2303

PO Box 266

Pittsburgh, PA 15230

elkem.com

(412) 299-7234

Visit Elkem's booth to find out how Elkem's high-performance inoculants, nodulizers, cover alloys, and pre-conditioners can improve gray-, ductile-, and CG-iron production and casting properties. Topics can include micro-porosity, shrinkage, graphite sizes and shapes, ladle design, and costs. For example, using Elkem's unique LAMET®; nodulizer and TOPSEED® conditioner in pocket ladles gives a quieter magnesium reaction in ductile iron and produces castings with less shrinkage and better properties. Adding ULTRASEED® inoculant to ductile iron reduces chill and improves machinability.

EMSCO Inc. * Booth 1703

1000 Nave Rd. SE

Massillon, OH 44646

emsco.com

(877) 773-6726

EMSCO is the melting industry's first responder ready to dispatch mechanics, engineers, and account managers 24/7 to keep your foundry up and you in business. EMSCO services and installs induction melting equipment produced by any OEM.

From repairing/rebuilding induction furnaces and coils to complete melt deck design and construction, EMSCO has generations of experience servicing foundry equipment in almost every scenario imaginable. Additionally, EMSCO engineers process cooling equipment and is the exclusive manufacturer of HyprCool® Hybrid Process Cooling Systems.

Engis Corporation * Booth 2015

105 W. Hintz Rd.

Wheeling, IL 60090

engis.com

Engis specializes in the design and manufacture of custom electroplated products, bringing our application and manufacturing experience together to provide high-quality products, which exhibit superior performance, even in the most demanding applications.

Electrogrip® diamond and CBN electroplated grinding wheels and cutting tools are engineered to your exact requirements and designed to deliver unsurpassed productivity with consistent quality. We offer tailor-made grinding wheels, pins, dressing blocks, and more specialty items.

Epic Machine Inc. * Booth 2626

201 Industrial Way

Fenton, MI 48430

epicmachine.com

Equipment Manufacturers Intl. Inc. (EMI) * Booth 2325

16151 Puritas Ave.

Cleveland, OH 44135

emi-inc.com

(216) 651-6700

Molding - Core Making - Automation - Engineering

Equipment Manufacturers Intl. (EMI) is the leading manufacturer of metal casting equipment solutions for foundries of all sizes.

Supporting & Improving on the Top Industry Brands

Equipment - Parts - Service - Repairs – Remanufacturing

EMI has acquired well-known industry brands such as; Osborn, SPO, CE Cast, IMPACT, Sutter, Herman, and most recently Harrison Equipment. We've pioneered innovative and patented improvements to these traditional equipment lines that bring longer life, lower maintenance, and higher productivity.

ERIEZ Booth **Booth 1902**

2200 Asbury Rd.

Erie, PA 16506

eriez.com

(814) 835-6000

Founded in 1942, Eriez manufactures a full line of permanent and electromagnetic separators for removing steel parts from the product stream. Vibratory Feeders, Conveyors and Screen Separators help classify products by size. Vibratory Conveyors, as well as Bin Vibrators, help keep production lines moving. Lifting Magnets help improve productivity and safety in the foundry industry.

Ervin Industries Inc. **Booth 2141**

PO Box 1168

Ann Arbor, MI 48106-1168

ervinindustries.com

(734) 769-4600

ETA Engineering Inc. * **Booth 1835**

10605 E. Baseline Rd.

Avilla, IN 46710

etaapc.com

(260) 897-2800

From concept to compliance, ETA specializes in the design, fabrication and complete turnkey installation of environmental air pollution control systems. Celebrating our 40th year, ETA has a full discipline of engineers who have extensive design & installation expertise. Emphasis is always placed on client's needs & system requirements, with consideration to budget restriction and need for a maintenance friendly process. ETA Engineering owns & operates our on-site fabrication facility

allowing us to assure on time deliveries, quality and tolerances. Visit our website at etaapc.com

Everett Industries LLC * **Booth 940**

3601 Larchmont Ave. NE

Warren, OH 44483

everettindustries.com

(330) 372-3700

Everett, founded in 1962, designs and manufactures abrasive saws and automated abrasive saw systems. Since its 2017 acquisition by the engineering-based Warren Industrial Group, the modernized company designs and builds industrial duty, custom-engineered, cut-off solutions to serve the foundry, forge, and investment caster with charge cut-off as well as post-cast cut-off and trim systems that meet modern, functional-safety standards.

ExOne * **Booth 2009**

127 Industry Blvd.

N. Huntington, PA 15642

exone.com

(877) 773-9663

EZ Grout Corp. * **Booth 2121**

405 Watertown Rd.

Waterford, OH 45786

ezgmfg.com

(800) 417-9272

The Refractory Mud Hog® line uses only top-quality materials to support industrial level mixing. All devices are reinforced with bolt in hardened steel drum liners, making the Refractory Mud Hogs the most durable refractory mixers on the market. The unique paddle design is exclusive to EZG. The paddles are oriented vertically to forcibly cut through material and reversible to prevent clogging. Durable REMA clean paddle rubber wipers allow for uniform mixing. In addition to the large variety of refractory mixers, any product can be modified by EZG to suit any needs unique to your industry.

EZG Manufacturing ***Booth 2121**

1833 N. Riverview Rd.
Malta, OH 45786
ezgmfg.com

Cast Iron Foundries. A pioneer in ductile iron treatment processes, potent inoculant compositions complemented by best-in-class continuous cast and rapidly solidified nodularizers.

Fargowear Inc.**Booth 809**

1801 Caniff St.
Detroit, MI 48212
fargowear.com
(313) 865-2028

Fargowear is the premier manufacturer of wear parts for all brands of sand mixers and mullers. Fargowear invented the carbide protected plow and we continue to provide innovative solutions to wear problems primarily caused by sand abrasion.

Finite Solutions Inc. ***Booth 634**

4769 Highland Park Dr.
Slinger, WI 53086
finite.solutions
(262) 644-0785

Creators of SOLIDCast and FLOWCast, the world's most popular and cost-effective casting simulation software.

SOLIDCast contains built-in gating and riser design functions, so simulation helps you to DESIGN an effective rigging system, not just test an existing design. It also contains automatic process optimization to fine tune your results for the highest process yields while guaranteeing casting quality.

See live demonstrations of version 9.0 of the software. Easier to use and faster than ever! You can earn a discount of 10% on systems purchased by June 20, 2022.

FEF**Booth 521**

1695 N. Penny Ln.
Schaumburg, IL 60173
fefinc.org
(847) 490-9200

FEF is celebrating 75 years as the metalcasting industry's link to the brightest new technical talent from universities across North America. FEF provides scholarships to students interested in our industry and program support to sustain world-class academic metalcasting programs. FEF students graduate with critical industry knowledge and hands-on training from industry-built laboratories. Since 1947, FEF has provided millions of dollars to thousands of students and programs thanks to the support of our partners in the metalcasting industry.

FISA North America ***Booth 1816**

260 Stanley St.
Elk Grove Village, IL 60007
fisa.com
(847) 299-8400

Flexovit USA Inc. ***Booth 1722**

1305 Eden Evans Center Rd.
Angola, NY 14006
flexovitabrasives.com
(800) 689-3539

Flexovit is a North America-based manufacturer of high productivity industrial abrasives for portable power tools, including resin-bonded abrasive cutting wheels, grinding wheels and coated abrasive flap discs. Flexovit also markets a range of professional high-value products including coated abrasives, nonwoven abrasives, carbide burs, wire brushes and construction diamond blades. Established in 1977, Flexovit

Ferroglobe**Booth 2602**

PO Box 157
Beverly, OH 45715
ferroglobe.com

Ferroglobe is one of the world's largest vertically integrated producers of Silicon Metal, Ferro Silicon, Calcium Silicon and Manganese Alloys. Supplying commodity and customized specifications globally to a broad range of industries including photovoltaics, chemical silicones, Aluminum, Steel and

manufactures at a brand-new 110,000 square feet, ISO 9001-certified factory in Western New York State. Flexovit is operating four distribution centers in the USA, Canada and Mexico.

Foseco * **Booth 1935**

20200 Sheldon Rd.
Cleveland, OH 44142
vesuvius.com

(440) 826-4548

Foseco is the Foundry Division of Vesuvius Group plc, a world leader in the supply of foundry consumables and solutions. Our mission is to partner with customers, focusing on improving their business performance. Together, we create new value by enabling foundries to produce castings in the most cost-effective, technically efficient, and sustainable way.

Foundry Solutions & Design LLC * Booth 1109

316 Maxwell Rd., Ste. 500
Alpharetta, GA 30009
foundrysd.com

(770) 667-4545

Foundry Solutions & Design (FS&D) provides complete Engineering & Consulting Services to the Foundry Industry. FS&D develops recommendations for customized, high performance manufacturing systems, for foundry applications including melting, core making, molding, material handling and finishing. With significant casting processing and facility knowledge, both in-house and through our International projects and partners, FS&D's customers are well served with the experience gained from many years in the foundry industry.

Foundry Solutions & Metallurgical Services **Booth 1823**

714 Dezainde St.
Magog, Quebec J1X 6A8
Canada
solutionsfonderie.com/we-measure-your-melt

We measure your melt ! SF metallurgists are your one-stop partner for your foundry

product supply, equipment and metallurgical process support. In 2022 we are launching our new SFTA Thermal Analysis equipment for aluminum and SF4.0 software.

We also have our QualiFlash for inclusions, 100% X-Ray inspection and automated LIBS for live chemistry of your melt.

We have local support for you in Canada, USA, Europe and India.

Treat your melt based on data using SF4.0 software.

Get in touch at francois.audet@solutionsfonderie.com or +1 581 990 5308.

Gaylord Family Enterprises Inc. **Booth 935**

630 S. Cottage St.
Independence, MO 64050
gfe-usa.com
(816) 833-4575

Gemco Cast Metal Technology **Booth 1145**

Science Park Eindhoven 5053
Son, 5692 EB
The Netherlands
gemco.nl

31 40 2643 607

GEMCO Cast Metal Technology consists of GEMCO ENGINEERS and KNIGHT WENDLING. We offer consulting, engineering and project management for the foundry industry. Our goal is to develop projects that enable our customers to be successful and to realize sustainable cast metal facilities with the lowest possible carbon footprint and minimal impact on the environment.

From offices in EU, NA, and Asia we provide custom solutions to your specific needs as: Consulting (MR/M&A); Engineering; Project Management; Planning Capital Investment; Process Integration, Interface Engineering; TurnKey Contracting.

General Kinematics Corp. *

Booth 1303

5050 Rickert Rd.
Crystal Lake, IL 60014
generalkinematics.com
(815) 444-3222

General Kinematics delivers unique foundry solutions incorporating vibratory equipment, rotary equipment, and process systems to leading manufacturing and material processing organizations throughout the world. Our technical expertise combined with more than 60 years of experience will save you money, and effectively process your commodities through our proven two-mass natural frequency designs. GK Systems provides foundry expertise in engineering, planning and constructing of turnkey foundry systems.

Gibson Centri Tech Ltd.

Booth 1124

Hilltop Works
Trent Valley Industrial Estate
Eastern Ave.
Lichfield, Staffordshire WS13 6UY
United Kingdom
gibsoncentritech.com
+44 (0)1543 418701

Gibson Centri Tech Limited are recognized as one of the leading manufactures of technologically advanced centrifugal casting machines.

Gibson Centri Tech Limited understand the unique environment of the foundry and we design and manufacture our equipment accordingly, this is why we have remained at the forefront of development in centrifugal casting machines.

We manufacture a wide range of horizontal, vertical and dual face plate machines. Our machines are capable of producing castings for a variety of applications including, roll making, cylinder liners, reformer tubes, pipes and bushes.

Goff Inc.

Booth 1023

PO Box 1607
Seminole, OK 74868
goff-inc.com
(405) 278-6200

Manufacturer of a complete line of abrasive shot blast peening and cleaning equipment.

Green Diamond

Performance Materials *

Booth 602

PO Box D
500 E. 6th Ave
Riddle, OR 97469
greendiamondpdm.com
(541) 874-3111

Green Packaging Inc. *

Booth 626

2299 Amber Drive
Suite 110
Hatfield, PA 19440
green-vci.com
(215) 368-7265

RUST. It costs foundries millions of dollars every year! Green Packaging, Inc. helps foundries save money and improve quality by eliminating rust on their castings using VCI technology. The rust prevention experts at Green Packaging, Inc. have solved complex rust and corrosion problems for many of the largest foundries in North America. Foundries rely on us for the most effective, safest, and cleanest corrosion inhibiting systems on the market. Our VCI bags are specifically formulated for the protection of cast metals, making them the best choice for preventing rust on your valuable castings

GreenSand Controls Inc. *

Booth 1027

PO Box 247
Fremont, WI 54940
greensandcontrols.com
(920) 446-2468

GreenSand Controls is a leading international supplier of green sand process control

technology. Specializing in automation and control of green sand, plants, green sand preparation and return sand systems. GSC has offices in the USA and India and is a subsidiary of Belloi & Romagnoli (Modena Italy). Belloi is a leading international supplier of greenfield foundries, Tight Flask molding equipment and green sand plant engineering and preparation equipment.

Griffin Tool Inc. **Booth 904**

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

Designing, building, and service of the highest quality trim and shear tooling, presses, fixtures, and finish automation for foundry since 1988. Our experience saves you production cost.

Guardian Bandsaws Ltd. * **Booth 823**

61 Leonard Rd.
Auckland, Auckland 1060
New Zealand
guardianbandsaw.com
+6421482734

Inventor and manufacturer of the Guardian safety bandsaws. The bandsaws use high speed vision to detect operators gloved hands. Upon detection the blade is stopped in a few milliseconds preventing harmful injuries.

Footage of each activation can be reviewed on the screen of the bandsaw as well as through a web portal. The web portal displays a host of productivity and safety data from the bandsaws allowing you to proactively manage bandsaw performance and safety.

Guardian Software Systems Inc. * **Booth 1126**

109 S. Concord Rd.
Oconomowoc, WI 53066
guardiansoft.com
(262) 567-0341

Guardian Software Systems is the developer of the Guardian ERP Solution with MES,

designed specifically for foundries. Guardian transforms complex data, processes and functions into seamless communication and benefits to your bottom line. Every module within the Guardian ERP Solution is aimed at helping to improve productivity and workflow. Guardian MES provides detailed, live shop floor data reporting all aspects of production from current status to employee efficiency. From inception to invoice, mold to ship, Guardian provides the complete solution. Supplier

Gudgeon Thermfire Intl. Inc. **Booth 1834**

420 Neptune Cir.
London, Ontario N6M 1A1
Canada
gudgeonthermfire.ca

HA International LLC * **Booth 1503**

630 Oakmont Ln.
Westmont, IL 60559
ha-international.com
(630) 575-5775

HA International offers North American core shops and foundries a comprehensive range of high-performing products: Resins Systems for bonding sand; Resin Coated Sand for the shell process; Refractory Coatings, Feeding systems, Wedron Flux for molten metal processing, and auxiliary products. The results HAI delivers from these products increases casting quality, decreases production costs, and reduces scrap to deliver more to your bottom line. HAI is a member of Hüttenes Albertus, the leading international manufacturer of environmentally responsible chemical products for the foundry industry.

HarbisonWalker International **Booth 2509**

1305 Cherrington Pkwy. Ste. 100
Moon Twp, PA 15108
thinkhwi.com
(800) 492-8349

With over 150 years of industry leadership and global recognition, HarbisonWalker International (HWI) is the largest supplier of refractory products and services in North

America. Headquartered in Pittsburgh, Pa, the company's international network spans North America, Europe, and Asia. Serving virtually every major industry that requires refractory solutions to enhance production and protect assets, HWI is consistently recognized for its talented experts, industry firsts, and intensely driven excellence.

HeatTek Inc. **Booth 1917**

W1285 Industrial Dr.

Ixonia, WI 53036

heattek.com

(262) 569-7410

HeatTek supplies the Metal Casting industry with Solution Heat Treat Systems (inc. Drop Bottom Furnaces and Horizontal Quench), Stress Relief Furnaces (inc. Box Furnaces, Car Bottom Furnaces and Continuous Furnaces), Mold Preheat Ovens (inc. Batch Ovens, Conveyor Ovens and specialized ovens interfaced to pour equipment) and Industrial Wash Equipment (Continuous multi stage wash, rinse and dry systems).

Helluva Container * **Booth 1904**

2007 Jack Nicklaus Dr.

Elk Point, SD 57025

helluva.com

(605) 356-2232

ONE HELLUVA DIFFERENCE Helluva Container is one of the largest providers of FIBC Bulk Bags and new and used Gaylord Boxes throughout the US. We also buy used Gaylord boxes. We are a Midwestern company with Midwestern values and have distribution locations across the country, so we can ship what you need for less. Because every penny counts. We're not Kinduva, Gooduva or Okayuva. We're Helluva. There is a difference. So, insist on the toughest boxes and bags around. Insist on Helluva. It's the difference between buying for performance versus buying for price.

Henschel Andromat Inc. * **Booth 1011**

160 Commercial Ct.

Alabaster, AL 35007

andromatusa.com

(205) 664-2484

HENSCHEL ANDROMAT INC. is the North American, wholly owned subsidiary of the industry leading manufacturer Henschel Industrietechnik GmbH (Kassel Germany) offering the fastest, strongest, most reliable and affordable world-class ANDROMAT manipulators, pneumatic degate hammers, hydraulic gate breaking auxiliary equipment. With over 700 units world-wide (80 here in the USA) from our Alabama office and warehouse we provide North America with sales, engineering, OEM stocked spare parts and factory-trained technical and field service(s) for the complete ANDROMAT product line. Stop by and see us!

Heraeus Electro-Nite Co. * **Booth 2427**

541 South Industrial Dr.

Hartland, WI 53029

electro-nite.com

(800) 558-9008

Heraeus Electro-Nite is the world's leader in the development and supply of immersion sensors, instrumentation, and sampling sensors for the molten metal industry. This has resulted in the most reliable, consistently accurate, and dependably available expendable and semi-continuous sensors with all the necessary support hardware and instrumentation. Some innovations include Thermal Analysis Cups for Iron, Steel, and non-ferrous metals, along with single immersion thermocouples, multiple immersion thermocouples, and Continuous thermocouples.

Herschel Products Co. Inc. **Booth 2335**

3778 Timberlake Dr.

Richfield, OH 44286

herschel.com

(330) 523-5300

Herschel Products has served the foundry industry since 1957. We design and manufacture a variety of Knockout Machines from simple A-Frames to fully automated machines. We also offer a full line of foundry supplies including skimmers and ladles.

Hi-Vac Corporation ***Booth 911**

117 Industry Rd.
 Marietta, OH 45750
hi-vac.com
 (740) 374-2306

Hi-Vac has perfected the large industrial vacuum system by engineering the total package to maximize flow, optimize filtration, minimize pressure losses, and assure flexibility and longevity. These optimized designs are applied to a full range of vacuum systems specifically designed for virtually limitless applications. The result is a complete line of dynamic industrial vacuum systems that set the industry standard for performance and reliability. With operational cost efficiency built in, Hi-Vac industrial vacuum systems deliver industry-leading return on investment, safety, and ease-of-operation.

Hill & Griffith ***Booth 1543**

1085 Summer St.
 Cincinnati, OH 45204
hillandgriffith.com
 (800) 543-0425

In 1896 when John Hill founded The Hill and Griffith Company, he stated our concept of quality, HG feels that the integrity of the company must be represented in the products and services bearing our name and labels. Today, this tradition still lives on supplying and supporting the needs of the metal casting industry.

Hirado Kinzoku Kogyo Co. Ltd.**Booth 1244**

6-22-37 Tsukiguma
 Hakata-ku, Fukuoka 812-0858
 Japan
hirado.co.jp
 +81 92 503 3421

Japanese manufacturer of hydraulic tools, degating wedges, deeder breakers etc.

**Hitachi High-Tech
Analytical Science****Booth 505**

2 Technology Park Dr., 2nd Fl.
 Westford, MA 01866
hitachi-hightech.com/hha
 (978) 850-5580

Hitachi High-Tech Analytical Science is a leading provider of high-technology Optical Emissions Spectroscopy (OES), X-Ray Fluorescence (XRF), and Laser Induced Breakdown Spectroscopy (LIBS) instruments. These instruments provide critical metal analysis used for testing and material inspection throughout all phases of the metals manufacturing and casting supply chain. Come visit Hitachi at booth 505 to see the groundbreaking OE750 spark spectrometer and speak to one of our experts about your application needs or email contact@hitachi-hightech-as.com to set up an on-site demo.

Hoosier Pattern Inc. ***Booth 1603**

PO Box 7
 Decatur, IN 46733
hoosierpattern.com
 (260) 724-9430

Since opening our doors in 1997, Hoosier Pattern has continually gained recognition as a premier pattern shop and leader in the industry. At Hoosier Pattern, we invest heavily in our technology. As of 2020, we are one of the only service providers to own and operate multiple 3D sand printers in house. In addition to 25 machining centers, we have added a 5-axis machining center, three Doosan machining centers, one Doosan 4-axis horizontal machining center, and a robotic milling cell for sand molds.

Humtown ***Booth 1623**

44708 Columbiana-Waterford Rd.
 PO Box 367
 Columbiana, OH 44408
humtown.com
 (330) 482-5555

Humtown is a family-owned business dedicated to serving the foundry industry with the highest-quality products possible.

A manufacturer of cold box, air-set and 3D printed sand cores and molds, Humtown has the capability of producing extremely high-quality cores in a wide variety of sizes, weights and configurations. With additive manufacturing, Humtown can 3D print sand cores and molds for legacy and low volume parts along with production quantity cores and molds. To meet tooling and rigging needs, Humtown has an on-site Pattern Shop and also offers the UNItube Blow Tube System.

Hunter Foundry Machinery Corp. * Booth 649

2222 Hammond Dr.
Schaumburg, IL 60196
hunterfoundry.com

I2r Power * Booth 1034

4300 Chamber Ave SW
Canton, OH 44706
i2rpower.com
(330) 588-3000

Your melt equipment runs at maximum electrical efficiency with minimal loss through I2r POWER water-cooled power cables. I2r POWER works with you to solve design and melt productivity challenges. Hand-built using top-grade materials, I2r POWER technicians craft your high-current components to your exact specifications for any induction system brand, type or application. Reliable products built to last, I2r POWER cables reduce maintenance and service chores. Put I2r POWER's long history of expertise to work engineering a solution fit for your melt production. Enter the HOF football drawing now!

Indopower Enggs Booth 948

56/A/4, Phase1, Road no B
Nr Bank of India
Vatva Ahmedabad Gujarat 382445
India
indopower.in
(+91) 982-4412 949
Manufacturers & Exporter of Induction
Melting & Heating furnaces Manufacturers of

Induction Furnaces Spares Indopower Enggs has already installed 800+ equipment of induction melting & heating furnaces across India and all over the world.

Indo Power proudly presents itself as an Ahmedabad (Gujarat) based ISO certified company that has been offering premium solutions through its products and services. The company is known as a dependable manufacturer, exporter, and supplier of products like induction crucible, induction furnace.

Induction Iron Inc. * Booth 1813

13909 N. Dale Mabry Hwy., 203B
Tampa, FL 33618
inductioniron.com
(813) 969-3300

Induction Iron Incorporated was founded in 1975 and is located in Tampa, Florida with manufacturing facilities in Warren, Ohio and Evansville, Indiana. Induction Iron specializes in producing extra low carbon.

Induction Technology Corp. * Booth 1942

22060 Bear Valley Rd.
Apple Valley, CA 92308
inductiontech.com
(760) 246-7333

Induction Technology Corporation (ITC) is an international company which specializes in the design and manufacturing of complete induction melting and heating systems. Induction Technology Corporation was founded in 1979. The company was started with the main objective of providing superior service and innovative products for the induction melting and heating industry. ITC newest news is that as of June 2019 it has become a part of the UltraFlex Power Group.

Inductotherm Corp. ***Booth 1334**

10 Indel Ave.
PO Box 157
Rancocas, NJ 08073
inductotherm.com

(609) 267-9000

Inductotherm Corp. continues to be the induction technology leader, providing solutions with new advancements in controls, system integration, and diagnostics. Furnace capacities range from a few ounces to tons of metal. We design and manufacture the most advanced induction melting, heating, holding, and pouring systems for virtually all metals. Our company builds rugged, high-quality melting equipment, and develops innovative technologies to provide our customers with reliable systems that melt more metal faster with less.

sales@inductotherm.com

Industrial Ceramic Products Inc. * Booth 1019

14401 Suntra Way
Marysville, OH 4304
industrialceramic.com

Innovative Analytical Solutions Booth 1818

528 County Rd. 69 Lot 6
Bremen, AL 35033
steelanalyzer.com

InterTest Inc.**Booth 627**

303 State Route 94
Columbia, NJ 07832
intertest.com

Since 1981, InterTest®, Inc. has created and provided remote visual inspection (RVI) tools and non-destructive testing (NDT) equipment to customers around the world. With our extensive experience in inventing and innovating industrial inspection and testing methods, we are proud to offer an armory of unparalleled products and solutions for virtually any industry and environmental application. Our team promises to meet and exceed your expectations.

ITOCHU Ceratech Corp.**Booth 2242**

1707 N. Randall Rd. Ste. 300
Elgin, IL 60123
itc-cera.co.jp/english
(469) 503-1763

Our products range from refractory raw materials and new materials such as Cerabeads ceramic sand, to various peripheral equipment. We also contribute to improving efficiency and cost by meeting the needs of iron and steel plants around the world by exporting the most advanced refractory products, machinery and consumables for iron and steel plants. We are constantly developing new materials, building on our superior capability of collecting information and taking prompt action.

IVI Inc. ***Booth 808**

W6395 Speciality Dr.
Greenville, WI 54944
ivinc.com
(920) 757-6001

IVI, Inc is a full service industrial ventilation contractor with 150 employees spread over six locations: four in Northeast Wisconsin, one in Spartanburg, South Carolina, and one in Muskogee, Oklahoma. These facilities total more than 99,000 square feet of manufacturing space servicing the United States, as well as Canada and Mexico. IVI, Inc. has used technology and experience as fuel for developing innovative air quality solutions. We have evolved into one of the only full-service industrial ventilation; design-build contractors in the United States

JB DeVenne Inc.**Booth 2527**

1060 W. Bagley Rd.
Berea, OH 44017
jbdevenne.com
(440) 234-4800

JOEST Inc.**Booth 635**

800 Roosevelt Rd., Unit B400
Glen Ellyn, IL 60137
joest-us.com

(630) 469-0900

Celebrating 100-years, Joest is one of the world's largest manufacturers of vibratory equipment and thermal processing solutions for green sand and no-bake foundries including shakers, sand and casting coolers, conveyors, feeders, screens, dross recovery systems, charging cars and complete alloying solutions. Joest combines precision German engineering with US-based design and manufacturing for locally tailored solutions, support, spare parts and service. Joest's low stroke, high frequency FSM conveyors significantly reduce noise while eliminating high-maintenance rocker arms.

Joy Mark Inc. *

Booth 1735

5935 S. Pennsylvania Ave.

Cudahy, WI 53110

joy-mark.com

(414) 769-8155

JOY-MARK, INC., and GTP Joymark, LLC now offers a complete catalog of feeding aids within the Foundry Industry to service all molding line applications. Our wide selection of insulating/exothermic risers & direct pour cups are manufactured through high quality vacuum formed and high density/precision controlled processes. JOY-MARK, INC., continues to provide a full range of specialty risers, hot toppings, gating tile, pour cups basins, sprues, and ladle liners for both ferrous and non-ferrous applications.

King Tester Corp. *

Booth 1919

308 Schell Ln.

Phoenixville, PA 19460

kingtester.com

(610) 279-6010

King Tester is an industry leader in portable Brinell hardness testers, Rockwell testers, test blocks and microscopes. All King Portable Brinell Testers are made in the USA. KING Tester received the ISO 17025 accreditation from the American Association for Laboratory Accreditation (A2LA). All King Tester products are certified and calibrated per ASTM E10 standards. King Tester has been manufacturing high quality and ruggedly designed portable Brinell Testers and related equipment since 1936.

Kodiak Group *

Booth 835

PO Box 483

Grayling, MI 49738

kodiakgrp.com

(989) 344-2166

Kodiak Group is an Industrial Engineering Design and Equipment Supply company. Our creative and experienced people provide innovative solutions you will not be offered elsewhere. At Kodiak Group we emphasize efficiency, economy, reliability, and safety in our design.

KUENKEL-WAGNER

Germany GmbH

Booth 1643

Hannoversche Str 59

Alfeld

Germany 31061

kuenkel-wagner.com

49 5181 780

Kuttner LLC *

Booth 1002

211 N Franklin St. Ste. 300

Port Washington, WI 53074

kuttnera.com

LAEMPE REICH *

Booth 1535

PO Box 218

Trussville, AL 35173

laempereich.com

(205) 655-2121

LAEMPE REICH is the North America center of Laempe Mossner Sinto advanced core making equipment, project management, installation, service, and spare parts support. LAEMPE REICH facilities and team offer core sampling, tooling evaluation, simulation tests, pre-installation training, and continuing training programs for coreroom personnel as well as full production coremaking.

Larpen Metallurgical Service * Booth 1721

1111 Western Dr.
Hartford, WI 53027
larpen.com

LECO Corporation * Booth 2016

3000 Lakeview Ave.
Saint Joseph, MI 49085
leco.com

(269) 985-5496

LECO has been providing technologically advanced products and solutions for inorganic, organic, and metallographic analysis for over 80 years, including determinators for carbon, sulfur, hydrogen, nitrogen, and oxygen, and atomic emission spectrometers. Our metallographic product line features a variety of sectioning machines, grinders/polishers, mounting equipment and supplies, microscopes, and hardness testers.

LightSpeed Concepts Inc. * Booth 2642

16000 E. Michigan Ave.
Albion, MI 49224

Research and Product Process Development in Metallurgy, Molding, and Casting technology.

Macawber Engineering Inc. Booth 2010

1829 Clydesdale St.
Maryville, TN 37801
macawber.com

(865) 984-5286

Macawber Engineering, Inc. designs and manufactures pneumatic conveying systems for bulk handling processes. Our expertise is in low velocity conveying for difficult, abrasive and fragile applications. We handle powders, slurries, lumps and more from peanuts, sand and EAF dust to sugar, ash, cement and many others. True to our core business for over 45 years with thousands of installations, we offer long term, reliable and efficient solutions to process industries worldwide.

Magaldi Technologies LLC * Booth 1927

370 Great Southwest Pkwy.
Atlanta, GA 30336
magaldi.com

(678) 705-9219

Founded in 1929, Magaldi is the world's leading manufacturer of steel belt conveyors to handle materials under the toughest process conditions (e.g. high temperatures, heavy loads, dusty, bulky, grain or abrasive materials) in industries where high dependability is essential. For the metalcasting industry, Magaldi has developed a wide range of technological solutions based on the proprietary and patented Superbelt®. The opening of Magaldi Technologies, LLC is the latest step in the company's commitment to providing outstanding domestic service to North American markets more efficiently.

MAGMA Foundry Technologies Inc. * Booth 2127

10 N. Martingale Rd. Ste. 425
Schaumburg, IL 60173
magmasoft.com

(847) 969-1001

MAGMASOFT® is the comprehensive and effective optimization tool for improving metal casting quality, optimizing process conditions and reducing production costs. Utilizing the methodology of Autonomous Optimization, robust process parameters and optimized casting layouts can be established for all cast materials and processes, including heat treatment and melt metallurgy, efficiently and comprehensively at the same time. With Autonomous Engineering, simulations with MAGMASOFT® can be used in an automated virtual test plan to pursue different quality and cost objectives simultaneously.

Mancuso Chemicals Ltd. * Booth 1035

5725 Progress St.
Niagara Falls, Ontario L2G 0C1
Canada
mancusochemicals.com

(905) 357-3626

Matrix Sensors LLC

Booth 1803

2525 S. 162nd St.
New Berlin, WI 53151
matrixsensors.com
(262) 439-4171

Matrix Sensors, LLC was created in 2003 to provide a cost-effective alternative for temperature sensing and thermal analysis. Since then Matrix Sensors has provided a low cost, high quality product with superior performance. Our competition tries to complete by lowering the prices, changing their product to try and get more readings then Matrix Sensors. Our product has the most readings per thermocouple. With our certification to ISO 17025:2017, in 2013 that covers both our manufacturing quality and instrument quality. You can guaranty to receive the best product at the best price.

Metrics Works

Booth 2419

1609 W. Wernsing Ave.
Effingham, IL 62401
metricsworks.com
(888) 697-1609

Metrics Works offers a wide range of services including precision CNC machining, warehousing, inventory management, supply chain, post-manufacturing rework, product inspections, and more.

Metrics Works is focused on building highly connected, technology-enabled, automation, quick tool changes, flexible manufacturing cells SMART Factories. Regardless of which process we run in our factories, equipment, machines, and cells are connected with IoTs, Controllers, and software to monitor yield, OEE, scrap, downtime, and preventive maintenance instantly and proactively.

Maumee Pattern Co.

Booth 1923

1019 Hazelwood St.
Toledo, OH 43605
maumeepattern.com

MB Superabrasives

Booth 2250

1404 Old Dairy Dr.
Columbia, SC 29201
mbsuperabrasives.com
(803) 252-3211

MCM

Booth 541

5213 Dunewood Way
Avon, IN 46123
mcmfoundry.com
(502) 881-1140

Designer and manufacturer of no bake foundry equipment including sand mixers, roll overs, complete molding lines, pumping packages, shake-out systems and mechanical/thermal sand reclaimers. Complete line of spare parts for all no bake foundry equipment.

Metaltec Steel Abrasive Co.

Booth 915

41155 Joy Rd.
Canton, MI 48187
metaltecsteel.com
(734) 459-7900

Metrologic Group Services Inc.

Booth 2109

28064 Center Oaks Ct.
Wixom, MI 48393
metrologic.group
(248) 504-6200

We empower the casting industry to solve complex 3D measurement challenges and boost their measuring device operation using the most innovative industry independent 3D metrology software solutions and dedicated electronics. The five access nature of casting present unique inspection problems. Metrologic presents proven, industry tested solutions to these problems. In the 3D metrology market since 1980, our software solutions are considered the reference in industries like automotive, aerospace, transportation, energy, watchmaking and medical.

Michigan Pneumatic Tool Inc. * Booth 1118

6850 Middlebelt Rd.

Romulus, MI 48174

michiganpneumatic.com

(800) 521-8104

Michigan Pneumatic Tool is a full service industrial air tool company celebrating 75 years as a leader in the design, manufacturing, distribution, repair, and rebuilding of heavy-duty air tools. MPT manufactures and assembles over 550 models of pneumatic tools in Romulus MI. We also service leading industrial brands of foundry, material removal, bolting, construction, and demolition pneumatic tools. Michigan Pneumatic Tool also offers an unrivaled inventory of replacement parts including brand name, hard to find, discontinued, and obsolete. We have the parts you need, when you need them.

**Mid State Industrial
An Ohio Tool Systems Company Booth 709**

4125 Westward Ave.

Columbus, OH 43228

ohiotool.com

(888) 687-9983

Miller and Company * Booth 1843

9550 W. Higgins Rd. Ste. 380

Rosemont, IL 60018

Millerandco.com

(847) 696-2400

Miller and Company has a longstanding tradition of Service, Quality, and Integrity under a dynamic team that has solidified the company's standing as the premier supplier of raw materials to the ferrous foundry and steel industries of North America. We supply our customers with Briquetted alloys, Silicon Carbide Grain, Sorelmetal®, Pig Iron, Vale Nickel, Milco Carbon, Ferrophosphorous, Ferro-alloys, Ferrosilicon based Inoculants, Coorstek Ceramic Filters, Desulfurizers, Cored wire, and Cogebi Mica.

Modern Equipment Co. LLC * Booth 1004

25 Central Industrial Dr.

Granite City, IL 62040

moderneq.com

Modern Equipment Company is a designer and manufacturer of aluminum melting & holding furnaces, launders, foundry ladles and molten metal handling solutions. We're celebrating 100 years of American craftsmanship, service/support and innovation in providing Foundries with reliable solutions in melting, holding and handling molten metal.

**Molten Metal Equipment
Innovations (MMEI) Booth 1948**

15510 Old State Rd.

Middlefield, OH 44062-8208

mmei-inc.com

(440) 632-9119

MMEI designs, manufactures, sells, and supports a complete line of engineered molten metal circulation pumps and transfer pumps to improve metal flow challenges. MMEI also offers a complete scrap submergence system called the ScrapEater. Designed to increase metal reclamation and improve metal quality, this proven solution improves longevity and fast pay-back. To compliment the entire process, MMEI offers complete in-line degassing systems and replacement parts designed to withstand harsh foundry requirements and provide many years of trouble-free service, while minimizing maintenance costs.

Mostardi Platt * Booth 2150

888 Industrial Dr.

Elmhurst, IL 60126

mostardipltatt.com

(630) 993-2100

**Multi-Vac:
a division of M & W Shops * Booth 2403**

21209 Durand Ave.

Union Grove, WI 53182

multivacinc.com

Nederman MikroPul * **Booth 2008**

4433 Chesapeake Dr.

Charlotte, NC 28216

nedermanmikropul.com

(704) 399-7441

Nederman MikroPul is a global leader in industrial air filtration for heavier dust collection applications such as foundry, smelting and chemical processing. The company has global expertise in pulse jet collectors and baghouses as well as air scrubbers and cyclones. The main advantages MikroPul offers is a beginning to end offering of equipment, design services, fabrication and after-market support that is unparalleled in the marketplace.

New London Engineering * **Booth 721**

1700 Division St.

New London, WI 54961

nleco.com

(920) 982-4030

Since 1948, New London Engineering is a full line conveyor OEM based in Wisconsin who specializes in high quality and quick delivery conveyors in a variety of models. We are industry focused and work as a system partner, saving you time and money while helping you expand your capabilities with our extensive conveyor knowledge across a variety of applications and industries. Our foundry & forge duty conveyors are built to stand up to the rigorous environments of your industry. We have collaborated with some of the top foundry and forge companies to design conveyors specifically for higher.

Non-Ferrous Founders Society **Booth 2522**

905 East Chicago Rd., Ste. 1

Sturgis, MI 49091

nffs.org

(847) 299-0950

Our Mission: Advancing the manufacturing, recycling and use of non-ferrous castings
Non-Ferrous Founders Society (NFFS) is a membership trade association representing the nonferrous metal casting industry. Benefits include OSHA and EPA Compliance assistance, monthly webinars and newsletters,

regional and annual meetings, and an effective committee structure representing the concerns and interests of non-ferrous foundries and industry suppliers. NFFS also manages the ICON portal, providing daily casting sales opportunities directly to foundries, with over \$280 Million in contracts awarded.

NovaCast * **Booth 1717**

55 Shuman Blvd., Ste. 850

Naperville, IL 60563

novacast.se

(630) 450-1647

Novis Works LLC * **Booth 2027**

400 Schroyer Ave. SW

Canton, OH 44702

novisworks.com

(330) 453-4646

Novis Works, LLC is a specialty chemical company located in NE Ohio that developed and uses a unique method of manufacturing. Our Technical Sales Team has over 250 years of combined experience in the metalcasting industry. Novis Works is strategically linked with MT Systems, an industry leader in process control & system automation. This unique blend of experience yields superior process support, process control and chemical knowledge. Products include specialty resins, release agents, sand additives, adhesives, amine recycling and engineering services. Please come see us at Booth 2027.

Nugent Sand Co. * **Booth 1142**

2925 Lincoln St.

Muskegon, MI 49441

nugsand.com

(231) 755-1686

Nugent Sand is family owned sand mine located in Muskegon, MI since 1912. We specialize in custom blended lake sand for core and mold making. We offer an average grain fineness range of 32-80.

Nutec Bickley**Booth 1811**

Carr. Saltillo-Monterrey No.100
 Santa Catarina, Nuevo Leon 66359
 Mexico

nutechbickley.com

(855) 299-9566

"ENGINEERED THERMAL SOLUTIONS"

Nutec Bickley, created in 2000 when Bickley joined Nutec, is committed to carry on the tradition of excellence that began with the delivery of the first Bickley furnace in 1958. When coupled with Nutec Bickley's high quality and low-cost manufacturing capabilities, this synergy results in a company that can offer top quality and high tech Heat Treating equipment at very competitive prices. Nutec Bickley, has established itself as one of the prime furnaces and ovens engineering /manufacturing companies in the world.

OmniSource Corp.**Booth 1727**

7575 W. Jefferson Blvd.

Fort Wayne, IN 46814

omnisource.com

(260) 422-5541

OmniSource is a trusted, dependable source of ferrous and non-ferrous recycled metals producing an array of high-quality products for foundry & mill applications including busheling, cast, P&S, shred, slitter, copper, aluminum, brass, stainless & alloys. Our focus on customer needs and in-depth knowledge of melting operations makes OmniSource the obvious choice for foundry scrap raw materials. Advanced processing and material management systems ensure consistency and reliability across all product categories. Full-service scrap management programs are custom-designed to specific requirements.

Online Resources**Booth 1938**

125 N. West St.

Lebanon, IN 46052

onlineresourcesinc.com

(765) 482-9700

Otto Junker (Junker Inc.) ***Booth 1115**

391 Wegner Dr.

West Chicago, IL 60185

junkerinc.com

(630) 231-3770

PADNOS**Booth 1850**

185 W. 8th St.

Holland, MI 49423

(616) 441-4483

Founded in 1905, PADNOS is a family-owned and operated recycling company located in Michigan & Indiana, USA with national & global reach. With diverse processing capabilities, PADNOS is able to collaborate and innovate with customers to provide sustainable scrap solutions. With over 25 locations, PADNOS provides accurate and efficient scrap management for industrial manufacturers in addition to helping individual community members turn their discarded material into renewable resources. PADNOS is headquartered in Holland, Michigan, USA. For more information, visit www.PADNOS.com.

Palmer Engineered Products ***Booth 2341**

1310 W. Main St.

Springfield, OH 45504

palmereng.com

Palmer Mfg. & Supply Inc. ***Booth 2341**

PO Box 2579

Springfield, OH 45504

palmermfg.com

(937) 323-6339

For 45 years, Palmer Manufacturing & Supply, (originally Palmer Foundry) has been one of the largest and most successful suppliers to the No-Bake foundry industry. We are foundrymen. We have sold over 2000 continuous sand mixers in North & South America and provide sales, service and support to: USA, Canada, Mexico, South America, Asia & in over 23 countries. Equipment: Automated Molding Systems UMM & FMM, Sand Mixers,

CoreMakers, Pumping Systems, Shake-Out / Sand Reclamation, Knock-Out, Rollovers, Compaction, Dryers, Mold Handlers, Feeders, Elevators, Melt Shop, Testing, Foundry Layout.

Pangborn Corp. * **Booth 1842**

4630 Coates Dr.

Fairburn, GA 30213

pangborn.com

(404) 665-5700

Pangborn provides superior shot blasting equipment and surface preparation solutions. Our sales, engineering, and service teams design best-in-class solutions, parts, and service that help our customers drive operational excellence, realize improved total cost of ownership, and increased profitability.

Peerless Metal Powders & Abrasive * **Booth 1903**

124 S. Military St.

Detroit, MI 48209

peerlessmetal.com

Perfect Patterns Inc. * **Booth 2622**

2221 E. Pensar Dr.

Appleton, WI 54911

perfectpatterns.com/

(920) 734-6643

Full service foundry tooling supplier and production machining facility.

Pillar Induction * **Booth 1103**

21905 Gateway Rd.

Brookfield, WI 53045

pillar.com

(800) 558-7733

Founded in 1966, Pillar Induction is committed to helping its melting customers achieve leaner, more profitable foundries, and continues to add products and engineered solutions for an integrated approach to foundry workflow. Pillar manufactures,

services, and supports ferrous and nonferrous coreless melting systems. We pride ourselves on supplying the most reliable, durable and efficient equipment available to the industry today. Our line of induction melting furnaces range in capacity from 1 pound to 20 tons. Power supplies range in power from 10 to 6,000 kW.

Product Development & Analysis LLC **Booth 2603**

1776 Legacy Cir., Ste. 115

Naperville, IL 60563

pda-llc.com

(630) 505-8801

PDA LLC has been providing metal casting design and manufacturing services for over 26 years to over 160 OEMs, metalcasters & tool makers towards new product development, casting conversion, redesign, reverse engineering for all alloys and processes utilizing CAD, FEA, CFD, Casting Process Simulation, 3D Scanning, Rapid Prototyping and Additive Toolingless Processes. PDA specializes in the design and development of new casting alloy and process, casting configuration, rigging & process for conventional and Additive Manufacturing; and advance simulation for porosity, hot tear, residual stress.

ProfitGuard LLC * **Booth 1817**

30200 Telegraph Rd., Ste. 450

Bingham Farms, MI 48025

eprofitguard.com

ProFound Alloys LLC **Booth 1135**

6000 Waterdam Plaza Dr., Ste. 240

McMurray, PA 15317

profoundalloys.com

(412) 833-9733

Provides Ferroalloys and raw materials.

ProServiceTech Inc. Booth 2022

36550 Chester Rd. Apt. 1901

Avon, OH 44011

proservicetech.net

(440) 773-7197

ProserviceTech is the ideal partner to drive customers into Industry 4.0.

Expertise, Technology and Innovation are our pillars.

We offer customized solutions for Coating Preparation and Application, Drying Ovens and Automated Robotic Cells for coating and drying.

TACA Thermal Analysis Software to integrate foundry data, In-Stream Inoculant Dispenser and Vision, Cored Wire Station for Mg treatment and Alloy Dispenser.

Automated Ladle Transportation and Pouring System improves safety, productivity and casting quality.

Headquarters in Italy. Sales & Service in USA & Germany. Sales Rep worldwide.

PureFlo Booth 1918

324 Main St.

Carbondale, PA 18407

gentex.com

(888) 894-1755

Part of Gentex Corporation's line of industrial safety solutions, PureFlo industrial respiratory protection systems provide integrated respiratory, head, face, and eye protection against industry hazards while enhancing end user mobility, comfort, and workplace performance. (PureFlo is a registered trademark of Helmet Integrated Systems Ltd, a wholly owned subsidiary of Gentex Corporation).

Pyrotek Inc. Booth 1448

705 W. 1st Ave.

Spokane, WA 99201

pyrotek.com

(866) 797-6835

For decades Pyrotek's innovative technology has improved casting quality in foundry processes worldwide, delivering solutions from the ingot to the final cast part.

A team of Pyrotek engineers and product experts will be at CastExpo 2022 at Booth 1448.

Don't miss this opportunity to learn how a wide range of Pyrotek capital equipment and consumable parts can improve metalcasting operations. Ask about customized engineered solutions to meet the biggest challenges.

Quad City Safety Inc. * Booth 517

5311 Tremont Ave.

Davenport, IA 52809

quadcitysafety.com

(563) 445-2170

At Quad City Safety our goal is to provide workers the RIGHT safety products at the RIGHT price ON TIME. We stay up to date with information on regulations, standards, best practices, and the latest PPE has to offer because it's our job to help get people home safe. We make our customer's aware of the changes and educate them on what they can do to become safer and more compliant. You have a safety program to run so let us help you solve problems when it comes to PPE. We will do the research for you to incorporate new technologies and products into your companies PPE.

RMG Raffineria Metalli Guizzi SpA Booth 2423

Via San Lorenzo 54

Villa Carcina, Brescia 25069

Italy

rmg.it/en

+390308900427

We are an Italian family-run business producing copper based alloy ingots since 1961. Our activity consists in the production of copper-based alloy ingots: tin bronze, aluminum bronze, manganese brass and special alloys. The production cycle begins with the procurement of raw materials and scrap deriving from production waste and

dismantling of plants. We manufacture copper-based alloy ingots in compliance with the main regulations of the industry, always updated to the latest version: UNI EN 1982, ASTM B30, JIS H 2202. Furthermore, we also produce custom-made products.

RAMPF Group Inc. **Booth 2434**

49037 Wixom Tech Dr.
Wixom, MI 48393
rampf-group.com

REFCOTEC Inc. * **Booth 1035**

542 Collins Blvd.
Orrville, OH 44667
refcotec.com

(330) 683-2200

REFCOTEC, Inc. based in Orrville, OH has grown to one of the industries premier manufacturers of foundry consumables. The company started in 1989 producing custom made refractory coatings. The products were manufactured to the exact specifications of the foundry requirements. Over the last 33 years REFCOTEC has grown drastically using a customer first approach. This has led to expansion through partnerships and acquisitions in the foundry industry REFCOTEC has grown to include all foundry resin systems, sand additives and riser sleeves.

Refractory & Insulation Supply * **Booth 1035**

101 Trails Rd.
Eldridge, IA 52748
refins.com

Reliability Concepts * **Booth 922**

658 E. Chicago Rd.
Coldwater, MI 49036
reliabilityconcepts.com
(517) 278-8057

Reliability Concepts provides lot, predictive maintenance, vibration analysis, laser machinery alignment, condition monitoring and reliability solutions for all types of industries. Reliability Concepts has over 30

years of experience in the foundry and the metals industries. We stand out with industry proven success in providing predictive maintenance, onsite services, consulting, instruments, tools and training. We specialize in successful, sustainable and affordable reliability and lot solutions for any size enterprise.

Reno Refractories **Booth 1949**

PO Box 201
Morris, AL 35116
renorefractories.com
(800) 741-7366

Established in 1976, RENO Refractories prides itself as "The Conqueror of Heat." The Mission of RENO Refractories, Inc. is to deliver value added refractory products and services to our customers in North America. Our responsibility is to supply the best value in refractory technology; thus, we can optimize the profits and safety of our customers. We take pride in our reputation as a leader in these endeavors. To learn more, visit us at www.renorefractories.com.

Resco Products Inc. **Booth 909**

PO Box 7247
Greensboro, NC 27407
rescoproducts.com

Rio Tinto * **Booth 2515**

200 E. Randolph Ste. 7100
Chicago, IL 60601
riotinto.com

Rio Tinto is a mining and metals company operating in 35 countries around the world. Our purpose is to produce the materials essential to human progress.

Our four product groups bring this purpose to life: Aluminum, Copper, Minerals and Iron Ore. These are complemented by our Safety, Technical and Projects, Strategy & Development, and Commercial groups, as well as our service and support functions.

Our materials are essential for the low-carbon transition.

RUF Briquetting Systems **Booth 1916**

771 Sugar Ln.

Elyria, OH 44035

ruf-briquetter.com

(440) 779-2747

RUF US, Inc. is the North American subsidiary of RUF GmbH & Co. K in Germany—a global pioneer of advanced industrial briquetting systems for more than 40 years. RUF manufactures recycling equipment aimed at maximizing the value of your waste stream. Our products include Briquetting Systems for grinding sludge, aluminum and other materials. RUF Briquetting Systems can customize a briquetting system for most residual materials. With RUF Briquetting Presses, your metal scrap is compacted to a minimum volume. The result is a high-quality briquette with uniform size, shape and details.

systems help provide optimal operator safety while gaining the most out of production.

Schust * **Booth 2126**

4483 County Road 19, Ste. A

Auburn, IN 46706

schust.com

(800) 408-4820

Schust provides turnkey industrial ventilation systems that clean the air in which employees work in. Schust understands the challenges foundries and metal casters face today, including respirable crystalline silica, and has a flexible approach to project management. We utilize all in-house resources and engineering experts to estimate, design, fabricate, and safely install efficient air pollution control systems that have been tailored to meet customer requirements.

Saint-Gobain **Booth 926**

1 New Bond St.

Worcester, MA 01606

refractories.saint-gobain.com

Saint-Gobain offers a variety of products to the foundry industry. Our Performance Ceramics and Refractories division focuses primarily on providing premium refractory solutions for all foundry applications. And our Abrasives division offers powerful, precise, user-friendly abrasive solutions, which enable customers to cut, shape, blend and finish all materials in the most complex and challenging applications. From abrasive belts and discs to grinding and cut-off wheels, our Norton brand offers a full line of high performance products for the foundry market.

Scientific Dust Collectors * **Booth 903**

4101 W. 126th St.

Alsip, IL 60803

scientificdustcollectors.com

(708) 597-7090

For 40 Years, Scientific Dust Collectors® has been manufacturing 'Best Available Dust Filtration Technology' in a Baghouse dust collector.

The performance superiority of Scientific Dust Collectors is not just an idle claim. It is fact based on sound theory, solid engineering practices, and extensive field experience. Combined with our High Side Inlets, Wide Filter Spacing, and Inlet Baffling, we are able to guarantee performance, efficiency, and filter life. ASHRAE Standard 199 Test Lab audited & Certified by Blue Heaven Technologies.

Saveway USA Corp. **Booth 817**

4305 Mt. Pleasant St. NW, Suite 101

North Canton, OH 44720

savewayusa.com

(330) 966-9300

Saveway is the world leader in Refractory Monitoring Solutions. Saveway specializes in real-time measuring, monitoring, and safety technologies. Keeping safety as a priority our

SELEE Corporation * **Booth 727**

700 Shepherd St.

Hendersonville, NC 28792

selee.com

(800) 438-7274

Silver Needle Inc.**Booth 1909**

1628 Big Creek Rd.

Kellog, ID 83837

silverneedleinc.com

(800) 863-7733

Silver Needle Inc.™ is a manufacturer of safety clothing and personal protective equipment (PPE) proudly owned and operated in the United States of America. We manufacture our PPE for the metal casting, natural gas, electrical utilities industries, and for flash fire and arc flash protection. We also offer PPE for cryogenics, liquefied natural gas (LNG), wildland firefighting, mining, welding, furnace operations, and for many other industries. We have spent years researching, designing, and producing personal protective equipment that prevents serious injury and saves lives.

Simpson Technologies Corp. ***Booth 1549**

751 Shoreline Dr.

Aurora, IL 60504

simpsonsgroup.com

(630) 978-0044

Founded in 1912, Simpson Technologies is a world leader in the foundry and process industry, bringing a full portfolio of continually advancing technologies that can be matched to the specific needs of your foundry. Whether the application is for a small jobbing steel foundry or a high-production automotive iron or alumni foundry, we deliver an optimized, integrated solution in order to maximize the versatility, efficiency, and sustainability within your foundry to effectively increase competitiveness and profitability.

Sintex Minerals & Services Inc. * Booth 1615

29810 Southwest Fwy.

Rosenberg, TX 77471

sintexminerals.com/

(+1) 281-239 x2799

Sintex Minerals distributes the minerals manufactured by Mineral Curimbaba located in Brazil, which are used as raw material in the metalcasting industries, such as the CastBall, a spherical ceramic sand used to produce molds & cores for metalcasting.

Sinto America ***Booth 1325**

150 Orchard St.

Grand Ledge, MI 48837

sintoamerica.com

(517) 371-2460

Sinto America, Inc. is the North American group holding company, of Sintokogio, Ltd., Japan. The Sinto group of companies has an international reputation for excellence in the foundry, manufacturing and surface treatment industry. Sinto America focuses on 6 primary markets: foundry mold & core making, sand processing, bulk material handling, surface treatment, surface technologies and automation. Sinto also provides contract blasting and precision shot peening services through our National Peening and Technical Metal Finishing divisions.

SIR Robotics Inc. ***Booth 1934**

1300 Triad Blvd.

Fort Worth, TX 76131

sir-mo.it

(817) 403-1363

SIR is a Global Robotic System Integrator with more than 3000 applications in operation world-wide: from simple tending and handling units up to large assembly and foundry process plants, SIR's unique aim is to identify the idea, the solution and the technology needed to ROBOTIZE the technological process.

Specific applications for the metal casting industry are:

- Cutting, Deburring, Fettling of aluminum and iron castings
- Cores Handling, Deburring and Gluing
- Plasma Cutting Robotic Systems
- Die Casting Units tending

SolexThermal Science Inc. ***Booth 905**

250-4720 106 Ave. SE

Calgary, Alberta T2C3G5

Canada

solexthermal.com

(703) 254-3500

**Southeastern Foundry
Products & Foundry Coatings Inc.* Booth 804**

42 Longview Cir.
Alabaster, AL 35007
sefp.net

(205) 620-0146

Southeastern Foundry Products & Foundry Coatings, Inc. is one of the leading coating manufacturing companies for water and solvent based coatings, release agents, boron nitride releases, and a distributor for foundry product lines. We are the producer of: Lost Foam Coatings, Water and Alcohol Based Sand Coatings, Permanent Mold Coatings, Ladle Coatings, Die Cast Coatings, Liquid Parting, Mold/Core Paste, Mudding Compounds, Boron Nitride Releases and Mold Releases.

Spectro Analytical Instruments * Booth 1709

91 McKee Dr.
Mahwah, NJ 07430
spectro.com

(201) 642-3000

A Division of the AMETEK Material Analysis Division, SPECTRO is a global leader in Arc/Spark OES spectrometers for the analysis of metals. A complete line of stationary, mobile and handheld XRF analyzers are available to handle any analysis need in the metal industry from primary producers, secondary producers, finished product, incoming/outgoing inspection, casting, forging to name a few. The SPECTROMAXx stationary OES analyzers has become the benchmark instrument in the metal industry. To learn more please visit our website at www.spectro.com or send us a request at spectro.info@ametek.com.

Springer Nature Publishers Booth 714

1 New York Plaza
New York, NY 10013
springer.com
(212) 620-8070

Steel Grip Inc. Booth 902

1501 E. Voorhees St.
Danville, IL 61832
steelgripinc.com
(800) 397-8390

Steel Grip is a manufacturer of personal protective apparel geared toward high heat as well as ferrous and non-ferrous molten metal protection. We offer a variety of stock gloves, secondary apparel, and primary apparel. Steel Grip can customize products to help protect those tasks where finding the right product might be difficult. Steel Grip also offers protection for Arc Flash as well as Liquid Chemical exposure.

StrikoWestofen * Booth 2135

1606 Executive Dr.
LaGrange, GA 30240
strikowestofen.com/en-us
(616) 772-3705

StrikoWestofen is a global manufacturer of thermal processing technology for the light metal casting industry and provides leading energy-efficient solutions for die-casting, as well as gravity, sand, and low-pressure applications. Our 60+ years of experience is the foundation of our extensive expertise and industrial knowledge. With 7,000 melting, holding, and dosing furnaces installed globally – StrikoWestofen offers industry leading experience, performance, up-time, and quality. For quality and efficiency – choose StrikoWestofen.

Summit Foundry Systems Inc. * Booth 735

2100 Wayne Haven St.
Fort Wayne, IN 46803
summitfoundrysystems.com
(260) 749-7740

Summit provides Sand Systems, Automatic Mold Handling Indexing Systems, Casting Handling Systems, and Turnkey Foundry Design Projects from Concept through Installation. Exhibit will highlight various projects for the Foundry Industry. Video Clips will illustrate the latest concepts in operation of Automatic Mold Handling Indexing

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Superior Graphite Co. * **Booth 2115**

10 S. Riverside Plaza, Ste. 1470

Chicago, IL 60606

superiorgraphite.com

(312) 559-2999

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BM Synchro ERP Ltd.

London, WC1N 3XX

United Kingdom

synchroerp.com

+44 845 370 3232

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TEMCO Metal & Chemical Corp. * **Booth 646**

2F-3 No 6 Alley 25, Lane 113, Sec 3

Ming Shang E. Rd.

Taipei, Taiwan

temc.com.tw

Thermafield Power Components **Booth 816**

Block-B/9 Plot No 21/22

Steel Town, Ahmedabad 382213

India

thermafield.com

(828) 450-9655

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Madison, WI 53711

thermofisher.com

(608) 276-6100

Thermo Fisher Scientific Inc., the world leader in serving science, is proud to introduce the Thermo Scientific ARL iSpark and EasySpark OES spectrometer, instruments dedicated to provide precise, accurate and reliable metals analysis. Our OES spectrometers, designed for high-speed, high-throughput analysis, helps metallurgists achieve higher productivity and quality and deliver savings on operational cost.

Tinker Omega Sinto LLC * **Booth 1315**

2424 Columbus Ave.

PO Box 328

Springfield, OH 45503

tinkeromega.com

(937) 322-2272

Tinker Omega Sinto LLC is part of the largest foundry equipment company in the world. We specialize in Equipment and Systems for No-Bake Sand Foundries. Our product lines include Sand Mixers, Sand Temperature Control, Mold Making, Core Making, Pouring & Cooling and all aspects of Sand Reclamation. We also have recently introduced our RSM Robot Sand Milling System that allows a foundry to make a mold directly from a 3D model.

Titan Robotics Ltd. ***Booth 1238**

702 Clark Pl.

Colorado Springs, CO 80915

titan3drobotics.com

(719) 822-1113

Titan Robotics is a production additive manufacturing solutions provider. Titan's large-format, industrial 3D printers provide solutions for making patterns, molds, tools, jigs and fixtures quickly and cost effectively. Specializing in direct pellet fed 3D printing, hybrid additive and subtractive systems and hybrid pellet + filament extrusion systems, Titan's Atlas 3D printers enable the use of engineering grade and affordable pellet materials. Titan provides complete additive manufacturing implementation, from 3D printing services, to consulting and material integration processes.

Top Cat Air Tools**Booth 1822**

38285 Pelton Rd.

Willoughby, OH 44094

tcservice.com

(440) 954-7500

The Top Cat brand of pneumatic power tools are proudly made in Willoughby, OH, USA. We offer a wide range of material removal tools for applications in heavy industries. We serve industries such as steel, iron and aluminum foundries as well as heavy and light steel fabricators. Our products include grinders, sanders and percussive tools in various forms (vertical, horizontal, extended, right angle and die grinders). Our industrial tools help companies increase production and reduce operator strain by optimizing the material removal operation. Distributor inquiries are welcome.

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Columbus, OH 43228

transmet.com

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Chicago Heights, IL 60411

trialco.net

(708) 757-4200

We produce a variety of alloys for key industry leaders and casting professionals. For sand, permanent mold, plaster, die casters as well as investment casters. TriALco produces 98% of all aluminum alloys for a variety of products. Whether to a recognized specification, meet your own specific chemistry or enhance your plant's production and performance. Visit www.trialco.net to explore the options available to you and your team. Solid information for most every casting process. TriALco produces clean, specification, alloyed ingot and sow.

SINCE 1974

U-Metco Inc.**Booth 1719**

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Detroit, MI 48234

u-metco.com

U-Metco Inc. is a supplier of high-quality steel and stainless steel Melting Stock and Cover Steel Punchings for ferrous foundries throughout North America. They offer a wide range of consistent, guaranteed chemistry steel and stainless-steel alloys in the form of punchings, plate and bar. Materials are processed to be clean and dry, and packaged for maximum efficiency in handling in charging. Chemical certificates of analysis are also provided with each shipment.

United Refractories Co.**Booth 916**

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Mc Murray, PA 15317

urc4u.com

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AFS trains the current and future leaders of metalcasting

Building the Next Generation of Metalcasters

Student chapters, Institute training, foundry demonstrations, Melting Point magazine and more attract new talent to the industry

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Only individual members may join AFS regional chapters

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Individual members can network, ask questions and get answers from peers through this metalcasting social network

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Deep discounts on registration for educational and networking events hosted by AFS (Discounts vary)



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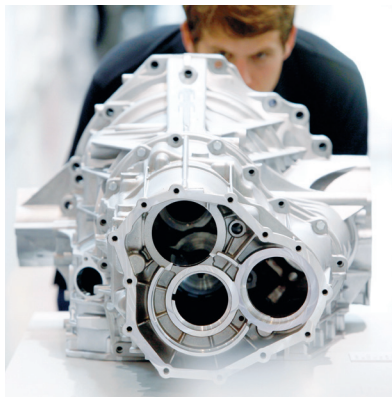
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Student chapters, Institute training, foundry demonstrations, Melting Point magazine and more attract new talent to the industry

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University of Northern Iowa**Booth 616**

027 Gilchrist Cedar Falls
Cedar Falls, IA 50614
mcc.uni.edu

Verder Scientific Inc.**Booth 2003**

11 Penns Tr., Suite 300
Newtown, PA 18940
eltra.com
(267) 757-0351

Verder Scientific Inc., comprised of the Retsch, Carbolite Gero, and ELTRA brands sets the standard in high-tech equipment for quality control, research and development of solid material. The fields of activity cover sample preparation, elemental analysis as well as heat treatment of metals. ELTRA has been one of the leading manufacturers of elemental analyzers for more than 30 years for combustion analysis. Starting with Carbon and Sulfur analyzers ELTRA has expanded its product range successively with analyzers for Oxygen, Nitrogen and Hydrogen in metals like cast iron, pig iron, steel, sup.

Versevo Inc. ***Booth 1743**

1055 Cottonwood Ave.
Hartland, WI 53029
versevo.com
(262) 369-8210

VERSEVO INC, the moniker for VERSatility, SErvice, and EVOLution. Established in 1994, we are a certified service provider to the cast metals industry, with a focus on product diversity, and mission to become the world's premier supplier to the metal casting industries. Supporting part/process/tool design, prototype production tooling/molds/coreboxes, low pressure aluminum castings, production machining, Providing Net Shape Solutions and Delivering First Shot Success for Sand cast, LPDC, HPDC, Lost Foam, Perm-Semi Perm Mold, Trim Dies, LPDC Castings, Production Machining.

VIBROTECH Engineering S L**Booth 1922**

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San Sebastian, Guipuzcoa 20018
Spain
vibrotech-eng.com
34943010811

Vibrotech Engineering, S. L., manufactures vibrating machinery for all kind of ferrous and non-ferrous foundries for the different processes: furnace chargers, ferroalloys dosing installations, metal and sand conveying lines, all kind of shake out systems, shot blasting chargers, etc ... all of them capable of achieving the highest performance and customers' demands.

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(231) 943-1171

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Viking Blast & Wash Systems ***Booth 921**

731 S. Industrial Ct.
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vikingcorporation.com
(316) 634-6699

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Viking Technologies Inc. * **Booth 1008**

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Madison Heights, MI 48071

viking-technologies.com

(248) 548-3038

Viking is a supplier of Automatic Pouring Equipment, Gate and Sprue Crushers, Inoculation Units and Pyrometers The "pourTECH" Automated Pouring System reads real-time level information from the pour cup (using lasers) and controls the flow of metal into the mold - eliminating short- and over-pours The "Crocodile" Gate and Sprue Crusher breaks down iron and aluminum returns from the casting operation to reduce material handling, melt losses, charge times and remelt costs, for higher profits.

VJ Technologies Inc. * **Booth 1839**

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Bohemia, NY 11741

vjt.com

(631) 589-8800

VJ Technologies engineers, designs, and manufactures world-class imaging software and hardware products, solutions, and services for industry, academy, and government. VJT develops and manufactures a complete line of automated, manual, and turnkey X-ray inspection systems. Primary market sectors include: automotive, aerospace, electronics, additive manufacturing, medical, security, remediation, nuclear, oil & gas, and pipe & weld applications.

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Voxeljet America Inc. * **Booth 535**

41430 Haggerty Cir. S

Canton, MI 48188

voxeljet.com

Vulcan Engineering Co. Inc. * **Booth 1648**

1 Vulcan Dr.

Helena Industrial Park

Helena, AL 35080

vulcangroup.com

(205) 663-0732

Vulcan Engineering is the largest in-house engineering, manufacturing, and installation group in North America dedicated to the global metalcasting and heavy industrial market. Vulcan Engineering offers a total concept approach to engineering, manufacturing and installation. This approach focuses on customer productivity and profitability, in addition to the customer's desire for one piece of equipment or a complete facility.

Vulkan Blast Shot Technology **Booth 1139**

2-10 Plant Farm Blvd.

Brantford, Ontario N3S 7W3

Canada

vulkanshot.com

(800) 263-7674

Vulkan Blast Shot Technology A leading manufacturer/distributor of stainless steel abrasives for more than 30 years. Our head office in Hattingen, Germany produces Chronital stainless steel shot, Grittal stainless steel DUST FREE grit and FINAL, our individually customized blends.

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Canada

wabrasives.com

(800) 207-4691

W Abrasives is the world's leading

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walbertgroup.com
(346) 331-6200

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Ada, MI 49301
waltzholst.com

Washington Mills Hennepin Inc. * **Booth 1723**

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Hennepin, IL 61327
washingtonmills.com

Webb-Stiles Co. **Booth 803**

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PO Box 464
Valley City, OH 44280
webb-stiles.com
(330) 225-7761

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Weiler Abrasives Group **Booth 2505**

1 Weiler Dr.
Cresco, PA 18326
weilerabrasives.com
(800) 835-9999

As an industry leader and global manufacturer of surface conditioning solutions, Weiler Abrasives Group is dedicated to forging collaborative relationships with our customers in diverse markets — Foundry; Industrial Production; and Metal Fabrication — to tackle their toughest grinding, cutting, deburring and finishing challenges. Our new foundry abrasives deliver maximum performance in the cleaning room. We offer the right product solutions and expertise to help you find production and process efficiencies and eliminate the bottleneck in your operations.

Wheelabrator * **Booth 2135**

1606 Executive Dr.
Lagrange, GA 30240
wheelabratorgroup.com
(706) 884-6884

Wheelabrator is one of the world's leading providers of surface preparation technology, offering a complete range of airblast and wheelblast solutions. Wheelabrator has been delivering shot blast solutions for more than 100 years. The expertise, competence, and know-how this brings is second to none in the industry, with more than 15,000 active customers in almost 100 countries and an estimated 30,000 machines in the field.

Whiting Equipment Canada Inc. **Booth 2620**

350 Alexander St.
Welland, Ontario L3B 2R3
Canada

whiting.ca

(905) 732-7585 x276

Whiting Equipment Canada is a wholly owned subsidiary of Whiting Corp., Monee, Ill., USA. The company and its subsidiary manufacture meltshop and material handling equipment, including electric arc furnaces, ladles, transfer cars, charge buckets, EAF control upgrades, tilting stands, AOD systems and overhead traveling cranes. The Whiting booth will be staffed with technical specialists ready to discuss the technical aspects of your future projects, along with Whiting's engineering and manufacturing capabilities.

X1 Safety LLC

Booth 1014

1987 Larchwood Dr.

Troy, MI 48083

x1safety.com

(833) 408-0500

ZEISS Industrial Quality Solutions Booth 1908

6250 Sycamore Ln. N

Maple Grove, MN 55369

zeiss.com/metrology

(763) 744-2400

Zerust Corrosion Solutions

Booth 1809

4201 Woodland Rd.

Circle Pines, MN 55434

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(763) 225-6600

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Cast in North America Exhibitor Booth List – Alphabetical *(As of 2/18/22)*

A

Applied Process Inc. * Booth 2740
Atlas Foundry Co. Inc. * Booth 2613

B

Badger Alloys Inc. * Booth 2615
Boose Aluminum * Booth 2708

C

Casting Solutions LLC * Booth 2611
Charlotte Pipe & Foundry Co. * Booth 2617

D

Decatur Foundry Inc. * Booth 2609
Denison Industries Inc. * Booth 2717
Dotson Iron Castings * Booth 2621

E

Eagle Group Manufacturers * Booth 2721

F

FairCast Inc. * Booth 2720

G

Great Lakes Castings LLC * Booth 2746

I

Impro Industries USA Inc. * Booth 2716

K

Kimura Foundry America Inc. * Booth 2723

L

Lethbridge Iron Works Co. Ltd. Booth 2647

M

Monarch Industries Ltd. Booth 2729

N

Northern Iron & Machine * Booth 2749

O

Osco Industries Inc. * Booth 2737

P

Palmer Foundry	Booth 2651
Pier Foundry & Pattern Shop *	Booth 274

R

Rochester Metal Products Corp. *	Booth 2747
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T

TB Wood's Inc. *	Booth 2709
Tooling & Equipment International *	Booth 2727
TPI Arcade *	Booth 2735

W

Waupaca Foundry Inc. *	Booth 2641
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Alloys/Materials - Aluminum

Denison Industries Inc. *	Booth 2717
Eagle Group Manufacturers *	Booth 2721
Tooling & Equipment International *	Booth 2727
TPI Arcade *	Booth 2735

Alloys/Materials - Iron

Charlotte Pipe & Foundry Co. *	Booth 2617
Dotson Iron Castings *	Booth 2621
Impro Industries USA Inc. *	Booth 2716
Kimura Foundry America Inc. *	Booth 2723
Lethbridge Iron Works Co. Ltd. (Leth Iron) *	Booth 2647
Monarch Industries Ltd	Booth 2729
Northern Iron & Machine *	Booth 2749
Pier Foundry & Pattern Shop *	Booth 2741
Rochester Metal Products Corp. *	Booth 2747
Waupaca Foundry Inc. *	Booth 2641

Alloys/Materials - Steel

Badger Alloys Inc. *	Booth 2615
Eagle Group Manufacturers *	Booth 2721
Impro Industries USA Inc. *	Booth 2716
Kimura Foundry America Inc. *	Booth 2723

Alloys/Materials - Superalloys

Impro Industries USA Inc. *	Booth 2716
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Engineering/Capital Equipment - Casting Design

Waupaca Foundry Inc. *	Booth 2641
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Engineering/Capital Equipment - Engineering

Pier Foundry & Pattern Shop *	Booth 2741
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Engineering/Capital Equipment - Heat Treatment

Applied Process Inc. *	Booth 2740
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Engineering/Capital Equipment - Patternmaking & Tooling

Badger Alloys Inc. *	Booth 2615
Charlotte Pipe & Foundry Co.	Booth 2617
Monarch Industries Ltd	Booth 2729

Engineering/Capital Equipment - Permanent Mold Equipment & Accessories

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Engineering/Capital Equipment - Value-Added Services (Machining, Painting, Assembly, etc...)

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Tooling & Equipment International *	Booth 2727
Waupaca Foundry Inc. *	Booth 2641

Melting/Melting Quality - Casting Quality & Testing

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Melting/Melting Quality - Ferrous Melt Quality

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Melting/Melting Quality - Ferrous Melting

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Melting/Melting Quality - Ferrous Pouring

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Melting/Melting Quality - Nonferrous Pouring

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Molding Processes - Centrifugal

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Molding Processes - Chemically-Bound Sand

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Molding Processes - Green Sand

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Osco Industries Inc. *	Booth 2737
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Rochester Metal Products Corp. *	Booth 2747
TB Wood's Inc. *	Booth 2709
Waupaca Foundry Inc. *	Booth 2641

Molding Processes - Investment

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Impro Industries USA Inc. *	Booth 2716

Molding Processes - Permanent Mold

Denison Industries Inc. *	Booth 2717
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Molding Processes - Vacuum Processes (sand or metal mold)

TPI Arcade *	Booth 2735
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Sand Mold/Core Making - Core Machines

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Sand Mold/Core Making - Coremaking

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Pier Foundry & Pattern Shop *	Booth 2741
Rochester Metal Products Corp. *	Booth 2747
TB Wood's Inc. *	Booth 2709

Sand Mold/Core Making - Rapid Prototyping

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Sand Mold/Core Making - Additive Manufacturing

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Livonia, MI 48150
appliedprocess.com
(734) 464-8000

Atlas Foundry Co. Inc. ***Booth 2613**

601 N. Henderson Ave.
Marion, IN 46952
atlasfdry.com

Atlas Foundry is a jobbing and production foundry specializing in Class 25, 30, and 35 Gray Iron Castings weighing less than 50 pounds. We utilize Disamatic Molding Machines to produce molds for our castings. Production volumes range from 100 mold releases to several thousand molds per release. Our foundry is located in Marion, Indiana about 60 miles to the northeast of Indianapolis. Some of the major markets Atlas Foundry serves include trucking, agriculture, construction, pumps, Hydraulic parts, compressors, bearings, stadium seating, marine, and industrial equipment.

Badger Alloys Inc. ***Booth 2615**

5120 W. State St.
Milwaukee, WI 53208
badgeralloys.com


Boose Aluminum ***Booth 2708**

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Charlotte Pipe & Foundry Co. * Booth 2617

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charlottecastings.com

(800) 438-6091

Charlotte Pipe is a family owned and privately held company that has been in the foundry business for over 100 years. We currently serve the motor, valve, pump, drain, material handling, fueling systems, packaging, heating and heavy truck markets. Our modern foundry has Disamatics, HWS cope & drag and Sinto FBO molding equipment. Cupola melt and over 42 core machines. Charlotte Pipe is ISO 9001 certified by LRQA. We have in-house pattern capability which allows us to upfit as well as design and build new patterns and core boxes. Our value-added processes include machining and e-coat.

Decatur Foundry Inc. * Booth 2609

1745 N. Illinois St.

Decatur, IL 62526

decaturfoundry.com

(217) 429-5261

Decatur Foundry, a family-owned company for the past 85+ years, provides a complete line of gray and ductile iron castings including pumps, valves, motor housings and compressors using the no-bake molding process.

With a casting range from 150 pounds to 6 tons, DFI is known for providing highly technical, short-run castings from design to prime painting and includes a full-service pattern shop for customer revisions, rigging and repairs.

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Denison Industries Inc. * Booth 2717

22 Fielder Dr.

Denison, TX 75020

denisonindustries.com

(903) 786-6500

Quality Certs: AS/EN/JISQ9100 REV. B, ISO 9001:2000

We specialize in 319 & 350 series aluminum alloys, precision sand castings; semi-permanent & permanent mold castings, range of product poured is ounces to 2,800 lbs. pour weight. CAD modeling & casting solidification simulation, 3D Process, heat treat, assembly, impregnation, radiographic, metallurgical testing, sandblast, DCC & laser inspection capabilities.

Dotson Iron Castings * Booth 2621

200 W. Rock St.

Mankato, MN 56001

dotson.com

(507) 345-5018

Dotson Iron Castings is a leading manufacturer of ductile iron castings to various markets, including agriculture, construction, heavy truck, railroad, oil & gas, and industrial. Our capabilities include in-house tooling and machining, painting, heat treatment, and assembly. Dotson supplies the industry's shortest lead times, an award-winning engineering, and a dedicated account team. If you are tired of unstable suppliers and inconsistent quality, it's time to come experience the "Dotson Difference."

Eagle Group Manufacturers * Booth 2721

5142 Evanston Ave.

Muskegon, MI 49442

*eaglegroupmanufacturers.com***FairCast Inc. * Booth 2720**

905 W. Depot Ave.

Fairfield, IA 52556

faircastinc.com

(641) 209-4100

Great Lakes Castings LLC * Booth 2746

800 N. Washington Ave.

Ludington, MI 49431

(231) 843-2501

Impro Industries USA Inc. * Booth 2716

21660 E. Copley Dr. Ste. 100

Diamond Bar, CA 91765

improprecision.com

(909) 396-6525

Impro is a leading global manufacturer of high-precision, high-complexity, mission-critical castings and machined components for diverse end markets. Our manufacturing plants are located in Mexico, China, and Germany. Impro integrated business model enables us to provide one-stop solutions to customers for their precision component needs. We produce investment castings with complex design criteria, ranging from a few oz. to 200 lbs. Our iron sand casting technologies include green sand and resin sand casting processes, producing castings from a few lbs to 20 tons. Contact us today!

Kimura Foundry America Inc. * Booth 2723

789 W. Boomer Way

Shelbyville, IN 46176

kimurafoundry.com

(317) 604-5158

Lethbridge Iron Works Co. Ltd. (Leth Iron) Booth 2647

720 32nd St. N.

Lethbridge, Alberta T1H 5K5

Canada

lethiron.com

(403) 329-4242

Monarch Industries Ltd. Booth 2729

51 Burmac Rd.

Winnipeg, Manitoba R2J 4J3

Canada

monarchindustries.com

(800) 665-0247

Founded in 1935, Monarch Industries is a privately owned, vertically integrated manufacturer of hydraulic cylinders and custom iron castings with expertise in weld-to-cast conversions. Gray and ductile iron sand castings ranging from 1 to 1000 pounds are manu-

factured in North America on our greensand (16x20, 26x20, and 32x30) and nobake (45x66) molding lines and are marketed throughout NA as well as globally. ISO 9001 and 14001 registered, Monarch is committed to providing outstanding products, services, and support to our customers.

Visit us at *www.monarchindustries.com*.**Northern Iron & Machine * Booth 2749**

867 Forest St.

St. Paul, MN 55106

northernim.com

(651) 778-3300

Osco Industries Inc. * Booth 2737

734 11th St.

PO Box 1388

Portsmouth, OH 45662

oscoind.com

(740) 354-3183

Osco Industries Inc has 3 Gray Iron foundries located in Southeastern Ohio. - 2 Green Sand foundries and 1 Shell Mold foundry. - 4 week lead time - Casting weights up to 40 pounds - Medium / high volume - 3D printed sand molds for prototypes / low volume production - In house core shop - Vertical integration - Inventory Management Systems.

Palmer Foundry Booth 2651

22 Mount Dumplin Rd.

Palmer, MA 01069

palmerfoundry.com

(413) 283-296

Pier Foundry & Pattern Shop * Booth 2741

51 State St.

Saint Paul, MN 55107

pierfoundry.com

(651) 222-4461

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Rochester Metal Products Corp. * Booth 2747

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PO Box 488

Rochester, IN 46975

rochestermetals.com

(574) 223-3164

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TB Wood's Inc. *

Booth 2709

440 N. Fifth Ave.

Chambersburg, PA 17201

tbwoods.com

(717) 264-7661

For generations, TB Wood's has developed the technical expertise and staff to design, mold, and machine gray and ductile iron castings that have held up in some of the most demanding environments. From military to industrial, marine to machine tool and far beyond, TB Wood's castings are found worldwide. TB Wood's ISO 9001 registered foundry

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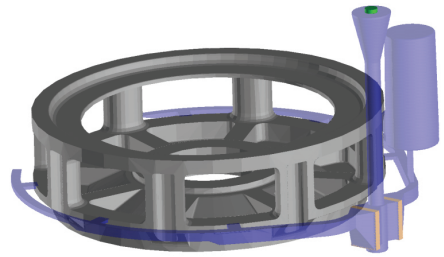
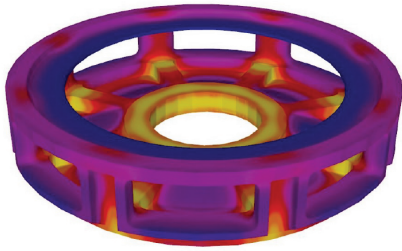
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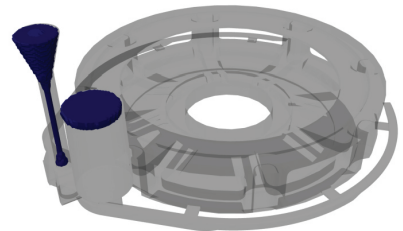
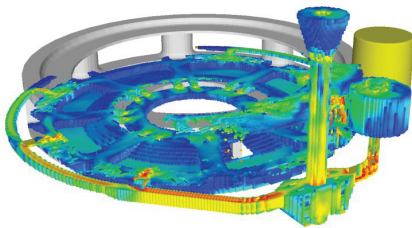
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teintl.com

TEI builds prototype and low volume production castings for a wide variety of industries. We have extensive experience in casting a range of aluminum alloys, including alloys for aerospace castings. Furthermore, we also are able to machine prototypes from billets when applicable. We specialize in the rapid manufacture of prototype castings; our state of the art foundry is highly equipped to make accurate castings in the least amount of time. TEI's major advantage is having all required technologies on one site.

TPI Arcade *

Booth 2735

7888 Route 98

Arcade, NY 14009

tpicast.com

(585) 492-0122

TPI Arcade utilizes an innovative technology called vacuum casting or V-Process. TPI Arcade provides cast samples in 2 weeks and

production parts a week after approval. Compared to traditional sand casting, V-Process allows for lower tooling costs, unlimited pattern life and produces castings with smoother surface finish, tighter tolerances, near net shape, draft and thinner walls. TPI provides turnkey aluminum cast product solutions including casting, machining, finishing and sub-assembly.

Waupaca Foundry Inc. *

Booth 2641

PO Box 249

Waupaca, WI 54981

waupacafoundry.com

(715) 258-6611

Waupaca Foundry, a Hitachi Metals group company, has a reputation as solid as the castings we create. With headquarters and three foundries in Waupaca, WI, as well as operations in Marinette, WI, Tell City, IN, Etowah, TN, and Lawrenceville, PA. Machining and assembly operations are located in Effingham, IL, and Waupaca, WI. Combined, seven foundries and two machining/assembly operations employ more than 4,500 people. Waupaca produces gray and ductile iron casting components for global markets including the automotive, commercial vehicle, agriculture, construction, and other sector.

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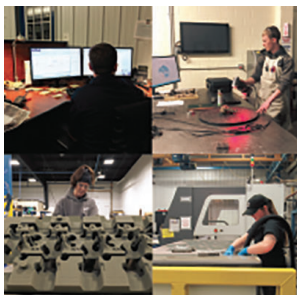
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www.hoosierpattern.com

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Booth 1334



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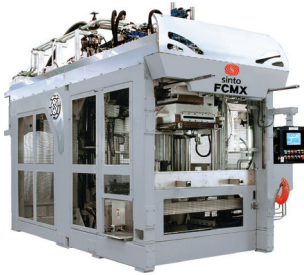
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SINTO AMERICA

517-371-2460

www.sintoamerica.com

Booth 1325

Hunter HTBB



The Hunter HTBB's single-station molding machine has lower investment requirements and high operating flexibility to meet the volume and variety of molding requirements. Featuring adjustable hydraulics to deliver higher squeeze pressure for more consistent and uniform mold surface hardness, improving casting finishes significantly, eliminating the shadow effect common in side-blowing machines, and reducing the requirements for finish machinery to increase your productivity and profitability. This allows foundries to produce more complex castings with deeper products.

HUNTER FOUNDRY MACHINERY CORP.

847-397-5110

www.hunterfoundry.com

Booth 649

Aluminum Alloy MFG LLC



Aluminum Alloys MFG LLC, has built its foundation on 4 pillars holding our business to a higher standard and exceeds our customers requirements. These four pillars are focused on Safety, Quality, Productivity and Customer service. We are growing everyday with our customers and employees. Our vision on moving forward is focused on the future of Aluminum growth and meeting the global demand with only the best product in the market while being the number 1 preferred supplier.

ALUMINUM ALLOY MFG LLC

717-501-5277

www.aluminumalloysllc.com

Booth 603

REFCOTEC



REFCOTEC, a second-generation family-owned company has been a proud supplier to the North American metal casting industry for over 30 years. In our Ohio and Texas facilities, we manufacture the highest quality foundry products available on the market including, refractory coatings, sand additives, resin systems, pastes, partings, and many more. We specialize in custom product formulation, outstanding technical service, and short lead-times. We have products for every metal alloy and all molding methods. Bring us your casting challenges!

REFCOTEC INC.

330-683-2200

www.refcotec.com

Booth 1035

Can-Eng Furnaces International Ltd



CAN-ENG Furnaces International Limited, established in 1964, is a leading designer and manufacturer of thermal processing equipment for ferrous and non-ferrous products for automotive, aerospace, forging and foundry manufacturing industries. CAN-ENG focuses on the development of high volume continuous industrial furnaces for challenging applications. For over 58 years, CAN-ENG has had an international reputation for design innovation, quality workmanship, and a dedication to service.

CAN-ENG FURNACES INTERNATIONAL LTD

905-356-1327

www.can-eng.com

Booth 2012

Carbo Ceramics, Inc.



CARBO provides a versatile line of precision-engineered ceramic casting media that deliver outstanding performance and excellent value for the various casting processes. Our products are engineered to deliver high strength to support recycled use that lower the environmental footprint and increased thermal stability that promote improved final casting quality, capability and process efficiency all while lower operational cost. The products are environmentally safe, having no quartz silica. Our engineered ceramics range from flours, bedding and ladle backing media, high temperature, low and intermediate density casting media.

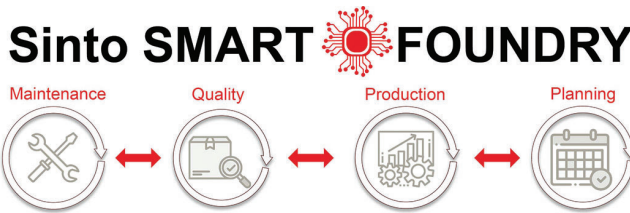
CARBO CERAMICS, INC.

800-551-3247

www.carboceramics.com

Booth 726

Sinto Smart Foundry



INDUSTRY
4.0



Sinto Smart Foundry (SSF), a truly scalable solution, can grow with you on your data analytics journey. It offers a toolbox of products and services that can help achieve improvements in these four major areas: Maintenance, Quality, Production and Planning. From capturing simple cycle counts to tracking every movement in your plant, we can tailor a solution that fits your needs, team, and budget. Website <https://sintoamerica.com/sinto-smart-foundry/>

SINTO AMERICA

517-290-4527

www.sintoamerica.com

Booth 1325

Hill and Griffith



Our commitment to quality since 1896 has been rooted in the statement: "...the integrity of the company must be represented in the products and services bearing our names and labels." This tradition lives on through Hill and Griffith's ongoing investment in research and development of its' people, products, and services, making H&G a recognized leader in the industries we serve.



HILL AND GRIFFITH

800-543-0425

www.hillandgriffith.com

Booth 1543



Engis Corporation



Engis specializes in Electroplated Superabrasive Diamond & CBN grinding wheels. We manufacture a variety of forms and shapes as standards and are manufactured to precision print specifications. Designed primarily for grinding ferrous and non-ferrous material such as carbon steels, ferrites, tungsten carbide, ceramic, aluminum oxide, aluminum, gray and ductile iron, and aerospace materials. Contact us at info@engis.com

ENGIS CORPORATION

847-808-9400

www.engis.com

Booth 2015

LECO Corporation



LECO has been providing technologically advanced products and solutions for inorganic, organic, and metallographic analysis for over 85 years, including determinators for carbon, sulfur, hydrogen, nitrogen, and oxygen, and glow discharge spectrometers. Our metallographic product line features a variety of sectioning machines, grinders/polishers, mounting equipment and supplies, microscopes, and hardness testers.

LECO CORPORATION

800-292-6141

www.leco.com

Booth 2016



LAEMPEARSM



When being there soon is not soon enoughSM

You rely on your LAEMPE CoreCenter. And you're skilled at keeping it running at peak performance. But when you need us, you need us now...and sometimes that can't wait until tomorrow. With one of the largest technical staff of experts in our market, standing-by to support you, you can now have us there virtually in a matter of minutes. Through technology, we can be with you, seeing what you see, supporting you in real-time. We can guide you in a way that has never been seen in our industry, without ever getting on a plane, regardless of where we are.

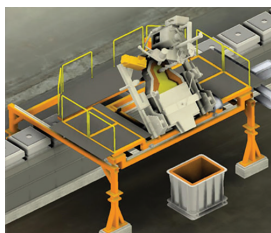
LAEMPE REICH

205-655-2121

www.LAEMPEAR.com

Booth 1535

ABP Induction



ABP Induction offers a new generation automated pouring system: UPT. The UPT is suitable for all molding lines providing reliable and flexible solutions for automatic pouring. The new pouring design provides great reproducible pouring accuracy, easy installation and requiring minimum space for installation. UPT in tandem with the ABP OptiPour; control system provides the most economical and technology available in today's market. Visit our booth to see why ABP Induction has been providing reliable and efficient solutions for over 115 years!

ABP INDUCTION, LLC

732-932-6400

www.abpinduction.com

Booth 1515

Equipment Manufacturers International, Inc.



SERIOUS FOUNDRY CHALLENGES DEMAND SERIOUS FOUNDRY

Solutions. Add EMI to your team and let's engineer solutions that provide labor savings, increased performance, reduced downtime, and improved safety for your foundry. Since 1982 we've been providing innovative solutions that deliver real results. Stop by our booth and let's talk about your unique challenges.

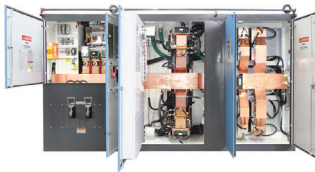
EQUIPMENT MANUFACTURERS INTERNATIONAL, INC.

216-651-6700

www.emi-inc.com

Booth 2325

Inductotherm Corp.



INDUCTOTHERM

Our IGBT-based VIP-I® and SCR-based VIP® units are legendary. They use the lowest kWh/ton to ensure you melt more metal faster, with less energy and kVA of demand. Regardless of changing furnace conditions, these units provide full power—start to finish—for the fastest melting times. When equipped with digital EZ-controls offering advanced diagnostics, these units are the most reliable. Contact us at sales@inductotherm.com

INDUCTOTHERM CORP.

800-257-9527

www.inductotherm.com

Booth 1334

The Future of Castings



ASKCHEMICALS



ASK Chemicals is one of the world's leading suppliers of foundry chemicals and consumables. In R&D centers in Europe, North America, South America, Asia and Africa we systematically develop solutions for environmentally and workplace-friendly applications that at the same time enhance efficiency and productivity along the entire production process.

We offer our customers first-class technical service and tailored solutions to today's challenges.

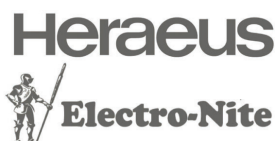
ASK CHEMICALS LLC

800-848-7485

www.ask-chemicals.com

Booth 2307

MeltControl 2020



An affordable way for any Foundry to capture and organize critical Molten Metal temperature information from across their Shop. MeltControl 2020 gives foundry engineers and managers access to foundry data that originates with molten metal sensors. A Database capable of allowing access at up to 10 different client computers at once, specially designed with the easy connection of a wide range of instruments from Heraeus Electro-Nite; DigiTemp E, Digilance, Sensor Lab Foundry, Datacast®, the E-line Celox® and QuiK-Lab®

HERAEUS ELECTRO-NITE CO., LLC

800-558-9008

www.heraeus-electro-nite.com

Booth 2427

LAEMPE REICH CoreRoom



We sell em. We use em. When we started the CoreRoom, a core supply company, we chose the same machine we want you to buy. Laempe. And for the same reasons. Quality cores, at high efficiency, at a reasonable price.

LAEMPE REICH

205-655-2121

www.TheCoreRoom.com

Booth 1535



LAEMPEREICH

Flexovit USA, Inc.



Flexovit is proud to announce the launch of Capstone™! Capstone™ is a brand new, patent pending, grinding wheel designed as an alternative to Type 6 and Type 11 cupwheels. With four full layers of fiberglass reinforcement, a built-in 20 degree grinding angle, a spin on zinc hub, and its unique shape, Capstone™ is a safer and more versatile option than standard cupwheels. Flexovit USA, Inc. is a manufacturer of high productivity abrasive products for the professional. Contact Jeff Franke, Foundry & Applications Manager, at jfranke@flexovitabrasives.com to schedule an evaluation and demo.

FLEXOVIT USA, INC.

800-689-3539

www.flexovitabrasives.com

Booth 1722



LAEMPE REICH



At the core of great foundries. Laempe's CoreCenter is a cores shooter, sand mixer, and gas generator – all under a single controller. Use vertical and horizontal tooling, or combination up to 6 parts with no machine changes, or use your existing tooling with a simple conversion. LAEMPE REICH is unique that we have a research, complete testing, and core production facility.

LAEMPE REICH

205-655-2121

www.LAEMPEREICH.com

Booth 1535

ABP Induction



The FS Furnace Series is the High Quality Solution for Small Capacity Applications. FS furnace capacities range from 500 lbs to 6 tons, which make it ideal for a wide range of applications. The open cage and segmented coil designs are some of the advanced features that improve electrical efficiency and maximize productivity satisfying your production requirements. Visit our booth to see why ABP Induction has been providing reliable and efficient solutions for over 115 years!

ABP INDUCTION, LLC

732-932-6400

www.abpinduction.com

Booth 1515

Casting of the Year



The annual AFS/Casting Source Casting Competition showcases to the engineering and purchasing community what a metal casting can accomplish. The 2022 winners, along with the Casting of the Year winners from 2020 and 2021 will be on display at CastExpo2022.

CASTING OF THE YEAR

AFS/Casting Source

www.castingsource.com

Booth 2627

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AFS And The Institute

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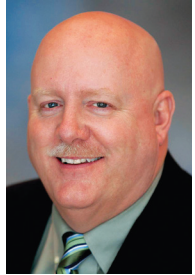


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2022 Awards

Gold Medal

Thomas E. Prucha

President, MetalMorphasis LLC,
and Editor-in-Chief, *International Journal of Metalcasting*
Rochester Hills, MI

The **WILLIAM H. MCFADDEN GOLD MEDAL** ... For his outstanding achievements, service, and contributions to the metalcasting industry and his visionary leadership steering the industry toward new technological horizons on the global level.



Award Of Scientific Merit

Sairam Ravi

Project Manager
University of Northern Iowa
Cedar Falls, IA

The **AFS AWARD OF SCIENTIFIC MERIT** ... For his exemplary record of metalcasting research and publication authorship as well as service as an instructor for the AFS Institute.



James H. Michel

Manager-Technical Services and UNS Administrator
Copper Development Association
McLean, VA

The **AFS AWARD OF SCIENTIFIC MERIT** ... For his outstanding contributions to the development and promotion of antimicrobial cast copper alloys, managing the UNS copper alloys registration, and contributing to the promotion of unleaded cast copper alloys and recycling of the copper alloy scrap stream.



AFS Service Citation

Scott Giese

Professor
University of Northern Iowa
Cedar Falls, IA

The **AFS SERVICE CITATION** ... For his sterling record of service and industry research consortia, student development, AFS Technical Committees and Chapters, and advancement of technologies in the metalcasting industry.



Mike Bartol

Vice President Metalcasting–Americas
American Colloid Company–Division of Minerals Technologies Inc.
Bethlehem, PA

The **AFS SERVICE CITATION** ... For his 40 years of distinguished leadership to the foundry industry and AFS on the local and national levels, especially in the areas of green sand molding methods and materials.



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AFS Millionaires Safety Award

AFS congratulates the following **AFS Corporate Member** for achieving a million or more safe-hours worked without incurring a lost time injury or illness during the calendar year 2021:

MetalTek International

Wisconsin Centrifugal Division
(Waukesha, WI)

1 million safe-hours



APRIL 23-26, 2022

COLUMBUS, OHIO

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Aalberts Integrated Piping Systems

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 H Kramer & Co.
 Hodge Foundry Inc.
 Hodge International
Hoosier Pattern Inc.
 Howell Foundry LLC
 Hsin Lien Machinery Parts Co. Ltd.

Humtown Products

Hunter Foundry Machinery Corp.
 Huttenes-Albertus GmbH

I

I2r Power
 ID Castings LLC
 IMERYS
 Impro Industries Mexico S de RL de CV
 Impro Industries USA Inc.
 Indquip Co LLC
 Induction Iron Inc.
 Induction Technology Corp.
Inductotherm Corp.
Inductotherm Group Canda Ltd.
 Industrial Ceramic Products Inc.
 Industrias John Deere SA de CV
 Industry 63
 Iron Age Designs
 I Schumann & Co.
 Itaipresse Gauss
 Itaipresse Industrie Spa
 IVI Inc. *
 IVI South Inc.

J

Jackson Die Cast LLC
 Jingang New Materials Co. Ltd.
 JOEST Inc.
 John Deere
 John Deere Co.
 John Deere Coffeyville Works Inc.
 John Deere Des Moines Works
 John Deere Dubuque Works
 John Deere Foundry
 John Deere Foundry East Moline
 John Deere Foundry Waterloo
 John Deere Harvester Works
 John Deere Iberica SA
 John Deere India Pvt. Ltd.

John Deere Ottumwa Works
 John Deere Power Systems
 John Deere Turf Care
 John Deere Waterloo Works
 Joy Mark Inc.
 Joyworks LLC
 J R Hoe & Sons Inc.
 Juggernaut 3D

K

Kenosha Steel Castings Inc.
 Keramida Inc.
 Kimura Foundry America Inc.
 King Tester Corp.
 Kirsh Foundry Inc.
 Klein Palmer Inc.
 Kloster Foundry Products
 Kodiak Group
 Kohler Co.
 Kolene Corp.
 KT-Grant LLC
 Kurtz Bros Inc.
 Kurtz Ersu Inc.
 Kuttner North America

L

LA Aluminum Casting Corp.
LAEMPE REICH
 Lake Foundry 2020 Ltd.
 Lakeshore Sand Co.
 Larpin Metallurgical Service
 Lebanon Tool Co. Inc.
 LeClaire Manufacturing Co.
 LECO Corporation
 Lemco Inc.
 LeSueur Incorporated
 Lethbridge Iron Works Co. Ltd.
 Liberty Casting Co. LLC
 Liberty Pattern Company
 Liberty Technology Co. LLC

LightSpeed Concepts Inc.
 Ligon Industries LLC
 Lincoln Electric Automation Inc.
 Lindberg/MPH
 Littlestown Foundry Inc.
 Lodge Mfg. Co.
 Louis Meskan Foundry Inc.

M

MacKenzie Castings LLC
 Magaldi Technologies LLC
MAGMA Foundry Technologies Inc.
 Magneco/Metrel Inc.
 Magnus Metal
 Magretech LLC
 Mancuso Chemicals Ltd.
 Manley Bros of Indiana Inc.
 Matthews International Corp.
 McConway & Torley LLC
 McHenry Brass Inc.
 McWane Ductile
 McWane Inc.
 Melling Engineered Aluminum Castings
 Mercer Forge Corporation
 Mercury Castings
 Mercury Marine
 Metalcasting Design LLC
 Metal Technologies Auburn LLC
 Metal Technologies Components
 S De RL De CV
 Metal Technologies Inc.
 MetalTek International
 MIA Manufacturing Inc.
 Michigan Pneumatic Tool Inc.
 Mid City Foundry Co.
 Midland Manufacturing Co.
 Midland Technologies Inc.
 Midvale Industries Inc.
 Miller and Company
 Minerals Technologies

Minerals Technologies Inc.
 Modern Equipment Co. LLC
 Monett Metals Inc.
 Morgan Advanced Materials
 Morgan AM&T
 Morgan Molten Metal Systems
 Morris Bean & Co.
 Mossner Reich
 Mostardi Platt
 MPM Infosoft Pvt. Ltd.
 MT Systems Inc.
 Mueller Canada
 Mueller Co.
 Mueller Water Products
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N

Naval Foundry & Propeller Center
 Naval Foundry & Propeller Shop
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 Neenah Foundry Co.
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 New London Engineering
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 Non-Ferrous Cast Alloys Inc.
 Norican Group
 Northern Foundry LLC
 Northern Iron & Machine
 Northfield Manufacturing Inc.
 NorthStar Products
 North Star Products
 Norwood Foundry Ltd.
 NovaCast Solutions USA Inc.
 NovaCast Systems AB
 Novis Works LLC
 NRB Metals LLC

O

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 Olson Aluminum Castings Inc.
 Osco Industries Inc.
 Otto Junker (Junker Inc.)

P

P&W Foundry Inc.
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 Palfinger NAM
 Palmer Engineered Products
 Palmer Foundry Inc.
 Palmer Mfg. & Supply Inc.
 Pangborn Corp.
 Patriot Foundry & Castings
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 Pentair Water - Brookfield
 Pentair Water Casting Center
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 Perkins Engine Co. Ltd.
 Perma-Cast Co.
 Pier Foundry & Pattern Shop
 Pillar Induction
 Pittsburgh Foundry & Machine
 Plymouth Foundry Inc.
 Poitras Foundry Ltd.
 Porter Warner Industries Inc.
 Precision Gage LLC

Precision Rail and Mfg. Inc.
 Premier Aluminum LLC
 Premier Thermal Solutions
 PRL Industries Inc.
 Product Development & Analysis LLC
 Production Pattern & Foundry Co.
 ProfitGuard LLC
 Progressive Foundry Inc.
 Progress Rail, a Caterpillar Company
 Prototype Casting Inc.
 P W Gillibrand Co.

Q

Quad City Safety Inc.
 Quaker City Castings Inc.
 Quality Castings Co.
 Quality Non-Ferrous Foundry

R

Rapid Cast Technologies LLC
 Ravenna Casting Center LLC
 Redford Carver
REFCOTEC Inc.
 Refractory & Insulation Supply Inc.
 Regal Cast Inc.
 Reliability Concepts
 Resource Recovery Corp.
 Rheocast Co.
 Rice Industries Inc.
 Richmond Industries Inc.
 RimRiser
 Rio Tinto Alcan
 Rio Tinto Aluminum Group
 Rio Tinto Iron & Titanium Inc.
 Roberts Sinto de Mexico
 Rochester Metal Products Corp.
 Rock Island Arsenal Joint Mfg.
 & Tech Cntr. (RIA-JMTC)
 Rolls Royce Marine North America
 Rolls Royce North America Inc.

Roloff Manufacturing Corp.
 Romac Industries Inc.
 RoMan Manufacturing Inc

S

Sandmold Systems Inc.
 Sandusky International Inc.
 Scheuch
 Schust
 Scientific Dust Collectors
 Scott Sales Co.
 Seabee Cast Steel Foundry
 SELEE Corporation
 Seneca Foundry Inc.
 Sigma Electric Manufacturing Corp.
 Simpson Technologies Corp.
 SinterCast Inc.
 SinterCast Ltd.
 Sintex Minerals & Services Inc.
Sinto America
 SIR Robotics Inc.
 SIR Spa
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 Sloan Valve Co.
 Smart Sand Inc.
 Smith & Richardson Mfg. Inc.
 Smith Castings LLC
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 Solar Turbines Inc.
 Solex Thermal Science Inc.
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 & Foundry Coatings Inc.
 Southland Metals Inc.
 Spectro Analytical Instruments
 SP Foundry
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 Spuncast Inc.
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 Standard Manufacturers Services Limited

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 SunCoke Energy Inc.
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 Superior Aluminum Castings Inc.
 Superior Graphite Co.
 Supreme Cores Holdings LLC
 Sure-Cast Alum Foundry Co.
 Swedish Foundry Association
 SYNCHRO ERP LTD

T

TASSCO
 Taylor Foundry Co.
 TB Wood's Inc.
 TDJ Group Inc.
 Technetronix LLC
 TechniSand Inc.
 TEMC Metal & Chemical Corp.
 Tennetec Inc.
 Terves Inc.
 Textron Defense Systems
 Textron Inc.
 The Federal Metal Co.
 The Hill & Griffith Co.
 The Nugent Sand Co. Inc.
 The Raymond Corp.
 The Raymond Corporation
 The Schaefer Group
 The Schaefer Group Inc.
 The Wasmer Company LLC
 TH Mfg. Co.
 Thomas Machine & Foundry Inc.
Tinker Omega Sinto
 Titan Metallurgy LLC

Titan Robotics Ltd.
 Tonkawa Foundry Inc.
 Tooling & Equipment International
 Torrance Casting Inc.
 Toscelik Granul Sanayi AS
 Townley Foundry & Machine Co. Inc.
 TPI Arcade Inc.
 Transvalor Americas Corp.
 TRC
 Tromley Industrial Holdings Inc.
 Tyler Pipe Co.

U

Ultraseal America Inc.
 Ultraseal International
 United Brass Works Inc.
 Universal Electric Foundry Inc
 Urick Ductile Solutions
 Urschel Laboratories Inc.
 US Aluminum Castings
 US Foundry & Mfg. Co.
 US Pipe & Foundry Co.

V

Valmet Inc.
 Van Hydraulics Inc.
 Verichek Technical Services Inc.
 Vermont Castings
 Versevo Inc.
 Victaulic Co.
 Victaulic Co. of America
 Victaulic Co. of Canada
 Victaulic De Mexico S de RL de CV
 Victaulic Technical Center
 Viking Blast & Wash Systems
 Viking Pump Inc.
 Viking Technologies
 Virginia Industries Inc.
 Viridis3D an EnvisionTEC Co.
 VJ Technologies Inc.

voestalpine Railway Systems Nortrak
Voxeljet AG
Voxeljet America Inc.
Voxeljet China Co. Ltd.
Vulcan Engineering Co. Inc.

W

Wabash Castings Inc.
Wabtec
Ward Manufacturing LLC
Washburn Iron Works Inc.
Washington Mills Hennepin Inc.
Waterous Company
Watry Industries LLC
Waupaca Foundry Inc.
WDC Acquisition LLC
Wear-Tek
Weaver Materiel Service Inc.

Webb Wheel Products Inc.
Weil McLain
Western Foundries Inc.
West Salisbury Fdry. & Machine Co.
Wexford Sand Co.
WGB Industries Inc.
WGS Global Services LLC
Wheelabrator
Whibco Inc.
William Goetz and Associates
Wirco Inc
Wisconsin Aluminum Foundry Co.
Wisconsin Oven Corporation
Wolf Steel Foundry Inc.
Woodland/Alloy Casting Inc.

X

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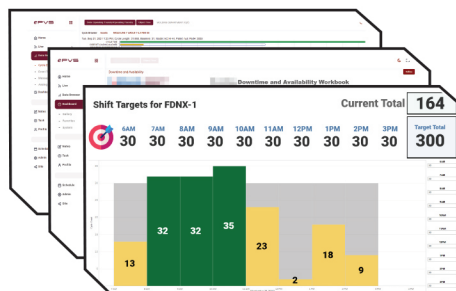
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AFS Upcoming Events

2022 Management Training and Development Summit

May 18 - 20, 2022 | Schaumburg, IL

Advance your skills and discover your strengths as a leader at the prime event for metalcasting supervisors and human resources professionals. The 2022 Management Training and Development Summit is where the industry's current and rising leaders come to grow as managers, motivators, talent-spotters, and more.

2022 Government Affairs Fly-In

June 7 - 8, 2022 | Washington, D.C.

Advocate for the \$44 billion metalcasting industry in Washington, D.C., at the premier government affairs event for metalcasters. Connect with policy experts, regulators, and peers on Capitol Hill as we stand together for our industry. AFS encourages all U.S. foundries and suppliers to send one employee to participate in this important event.

2022 Aluminum Casting Conference

June 14 - 16, 2022 | St. Louis, MO

Discover the newest developments, trends, and best practices in aluminum casting at the 2022 Aluminum Casting Conference. Expert presenters will cover every major aluminum casting topic, with a special emphasis on melt quality and casting process control.

Conference topics include new and emerging technologies, best practices for thermal management of permanent molds, and heat treatment of castings. Attendees will leave with practical tools to improve process control and quality in their foundries. This event includes a tour of O'Fallon Casting in O'Fallon, MO, on June 16.

2022 Foundry Industry 4.0 Conference

July 26 - 27, 2022 | Itasca, IL

Industry 4.0 is no longer just about the future. Smart, proactive manufacturers are using innovation and technology to improve productivity, profitability, and worker safety. Evaluating and implementing technology today is the key to remaining competitive and sustainable into your tomorrow.

2022 Sand Casting Conference

September 12 - 14, 2022 | Milwaukee, WI

Hear from leading experts on green sand casting and chemically bonded molds and cores. This conference will cover the latest advances in sand casting technologies as well as practical information that will help attendees improve their foundry processes. Learn how others are perfecting their sand casting operations and benchmark your operation against what others have done.

2022 Foundry Leadership Summit

September 18 - 20, 2022

**White Sulphur Springs, WV
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Recharge in White Sulphur Springs, WV, at the 2022 Foundry Leadership Summit, where leaders from all corners of the metalcasting industry will gather in an energizing setting for highly rated speakers, thought-provoking discussions, and rich networking opportunities.

Explore the profound changes sweeping the worlds of manufacturing, technology, economics, trade, and politics. You'll emerge refreshed, renewed, and ready to embrace the future.

Safety 101 Seminar

October 2 - 3, 2022 | Milwaukee, WI

This two-day seminar is for people who are relatively new to the safety and health field. This includes those with three or fewer years of experience, those with three or fewer years in the metalcasting industry, and those who have multiple roles in addition to the safety and health field. The seminar will introduce basic safety and health terminology and concepts relevant to the safety field. It will cover some specific OSHA regulatory topics such as electrical safety, arc flash, lockout/tagout (hazardous energy), machine guarding, respirable silica, emergency planning, and fire protection. We'll also present information about safety theory, including the OSHA hierarchy of controls, incident investigation practices, general industrial hygiene concepts, dealing with drugs in the workplace, how to handle an OSHA visit, and tips for safety training.

34th Environmental, Health & Safety Conference

October 4 - 6, 2022 | Milwaukee, WI

The annual AFS Environmental, Health & Safety Conference is the singular event for foundry industry EHS professionals to network, benchmark and learn from each other.

Attendees will share case studies of successful EHS projects, hear about cutting-edge issues from EHS and regulatory experts, and meet with vendors of EHS equipment and services. Join your fellow EHS peers in Milwaukee, WI for the 34th AFS Environmental, Health & Safety Conference.

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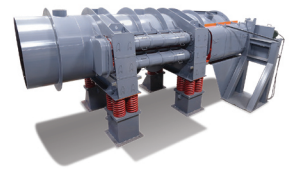
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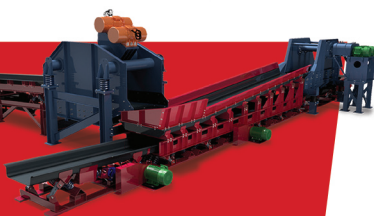
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AFS Institute Courses

Green Sand Molding 101

Live Online | May 11 - 12, 2022 | Noon - 4 p.m.

This course is an introduction to the green sand molding process used within a metal-casting facility. Discussion will include terminology, types of sands used, the mold making process, using and maintaining equipment, and considerations for preventing casting defects during the mold making process. Participants will leave the course with a basic foundation of the green sand molding process and techniques used in established facilities.

Aluminum Metalcasting 101

Live Online | May 17 - 18, 2022 | Noon - 4 p.m.

This course covers the characteristics and properties of aluminum, alloying elements and their general applications and considerations for working with aluminum cast parts. Participants will learn about melting and foundry casting technology, and the decision making process behind specific technologies.

Introduction to Metalcasting

AFS Headquarters, Schaumburg, IL

June 1 - 2, 2022 | Noon - 4 p.m.

This course introduces the process of metalcasting. It provides a broad picture of what happens in a casting production facility, while illustrating the technology, variables and complexity involved in producing a casting. It covers casting design, alloy selection, process selection, design of the gating system, pouring and shakeout methods, cleaning and finishing methods, quality assurance, and key safety and environmental regulations.

A Selling Framework Bootcamp

AFS Headquarters, Schaumburg, IL

June 9 - 10, 2022 | 8 a.m. - 3 p.m.

Those who are responsible for managing sales and the continued development of business should attend this bootcamp. Insights as to why “sales” should not be a dirty word by sharing a framework and process for identifying the right behaviors, attitudes and techniques to maximize your chances of

success. It’s a no nonsense, ethical, let’s get to the truth philosophy that creates the right kind of long term valuable customers and mutually beneficial partnerships. The bonus part of the bootcamp is reserved for attendees to receive on the spot advice and guidance on current sales frustrations.

Iron Melting 201

Live Online | June 14 - 16, 2022 | Noon - 4 p.m.

This course provides a detailed coverage of iron melting and related processes. Topics include charge materials selection; the understanding of cost, value, and risk; information covering electric and cupola melting procedures; the relationship between molten metal and refractory lining; sampling and checks to determine iron quality; common effects of key major element adjustments; iron refining technology/treatment practices; and safety procedures.

Casting Cost Estimating

Live Online | June 20 - 22, 2022 | Noon - 4 p.m.

Cost estimating is a critical factor in ensuring a manufacturing company continues to acquire customers and to be profitable. This course examines the various cost components and methods used to arrive at an accurate estimate of the casting production costs. It also provides information on common traps in casting estimates and measures that can be used to avoid them.

Green Sand Molding 201

AFS Headquarters, Schaumburg, IL

June 23 - 24, 2022 | 8 a.m. - 3 p.m.

This course provides participants with the next level of knowledge related to the sand molding processes used within green sand foundries. The first day will focus on an introduction to applications requiring specialty sands; types of sand additives and their effects on green sand; equipment; sand handling and storage; sand reclamation and re-use; and green sand process variables and methods to make adjustments to ensure a quality mold is made. The second day will address green sand quality control tests for

ferrous and non-ferrous alloys, reviewing the types, purpose, frequency, and typical result ranges for each, and finish with an introduction to statistical process control for sand systems.

Gating and Riser Design 101

AFS Headquarters, Schaumburg, IL

July 13 - 14, 2022 | 8 a.m. - 3 p.m.

Casting quality and yield are directly impacted by gating design. This course guides participants through the basic functions of gating and risers to provide clean, sound and functional castings. An introduction to fluid flow and solidification will serve to guide participants through key design concepts of various function elements of a good gating and riser design. Emphasis will be placed on hands-on activities, animations, and simulations to enhance understanding of the filling and solidification processes in a foundry. Focus will be on practical examples in iron, steel, aluminum, and copper castings. The goal will be to introduce the participants the basics of gating and riser design, common industry norms and troubleshooting.

Aluminum Metallurgy 201

AFS Headquarters, Schaumburg, IL

July 20 - 21, 2022 | 8 a.m. - 3 p.m.

The purpose of this course is to provide target audience participants with knowledge and skills regarding the nomenclature, terminology, principles, and techniques for the metallurgy of aluminum base casting alloys. This course makes clear the reasons why foundry personnel 'do what they do' in relation to aluminum casting metallurgy. This course examines aluminum structure and properties, the effects of alloying elements and the influence of melting operations on impurities; how to interpret (read) phase diagrams and recognize characteristics from microstructures; how grain refinement and modification work in foundry operations, how they are measured and the benefits of both; inclusion formation and filtration techniques; and much more.

For more information and to register, visit afsinc.org/courses.

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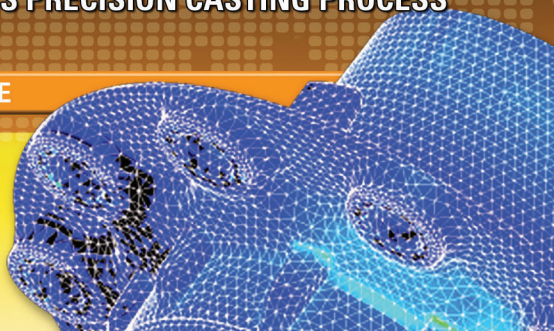
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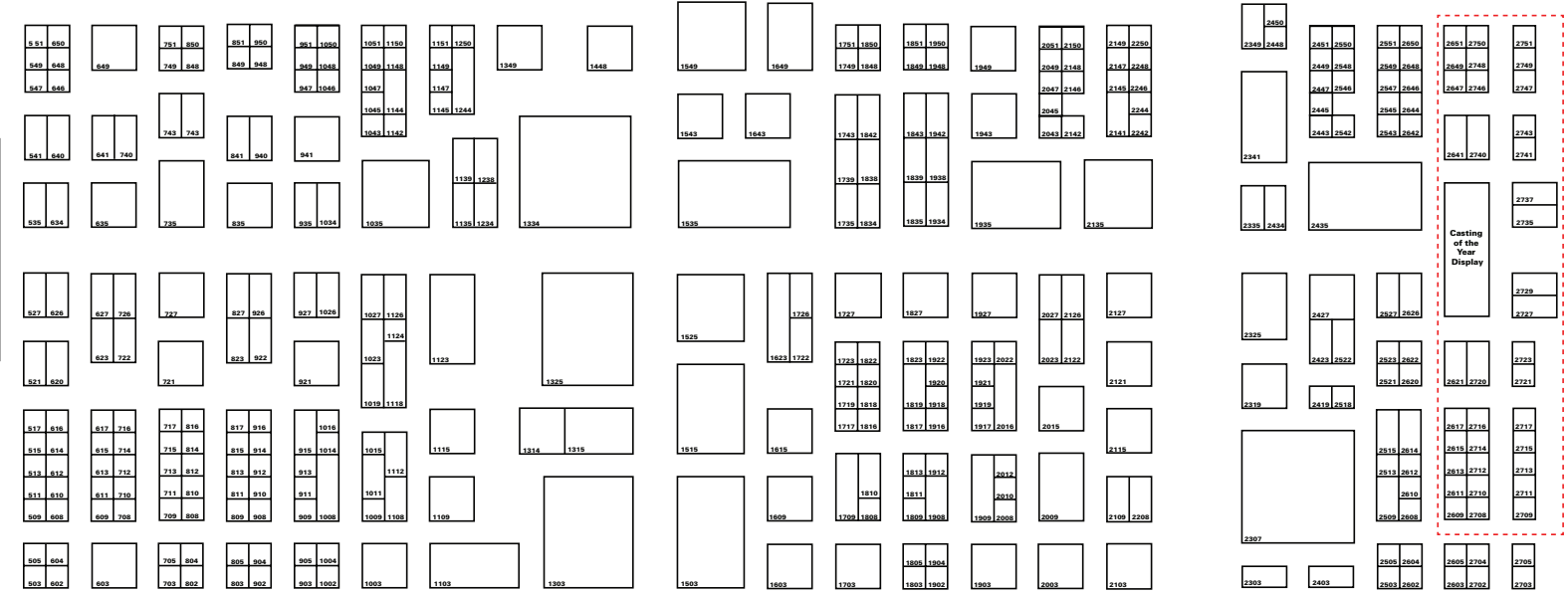
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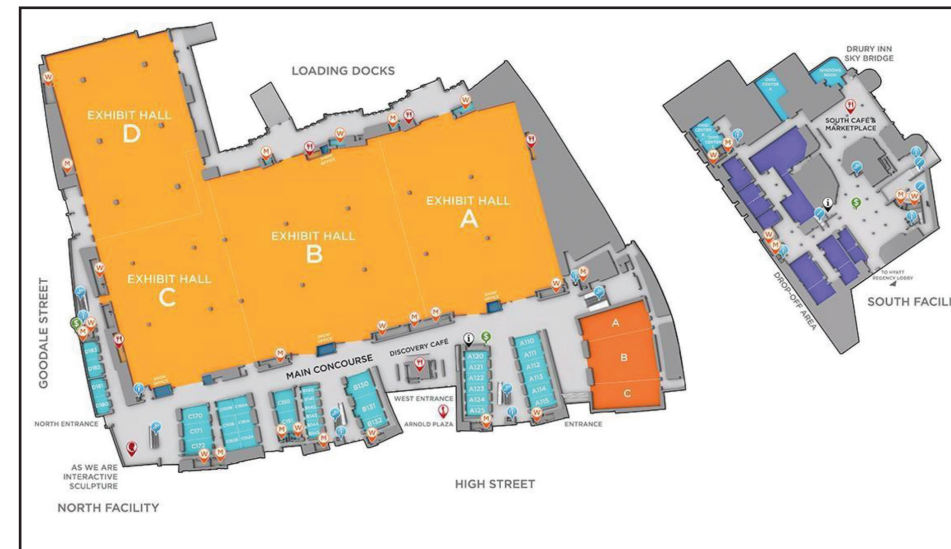
AFS
HUB
222

Seating

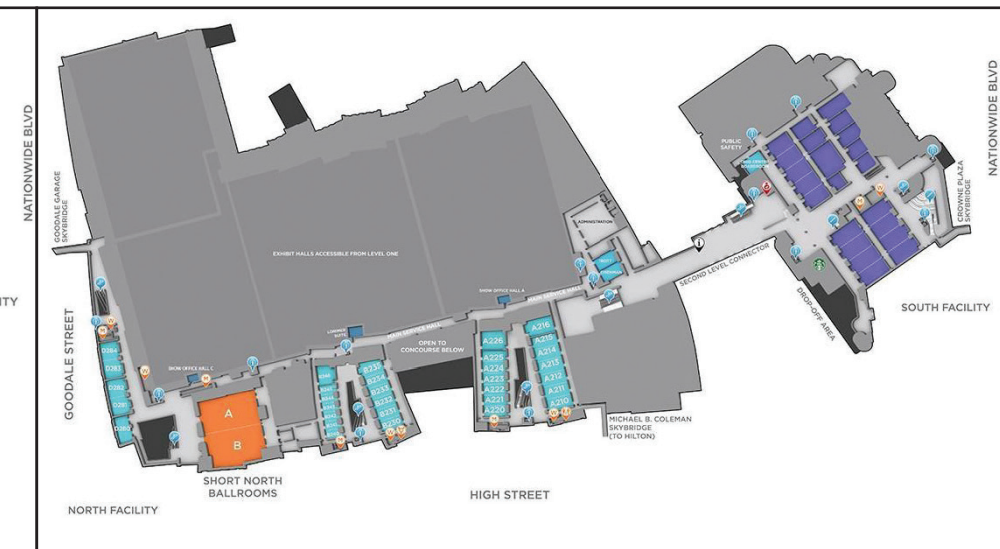


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Level Two



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Our systems are customized to your application to ensure you get the most out of each kilowatt hour. They are proven to melt more metal faster and with less power.



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We offer the most advanced controls and diagnostic tools you need to access nearly every detail of your induction melting equipment in one place.



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Excellent customer service is our ongoing goal. Available 24/7/365, we set the world standard for “Global yet Local” service and support.



Aftermarket & OEM Repairs

As your OEM, we are best equipped to keep your equipment in top condition whether it be for an upgrade, repair, rebuild or preventive maintenance.

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