THIRD QUARTER 2024 | VOLUME 31

SPRAYTIME

AWS American Welding Society
INTERNATIONAL THERMAL SPRAY ASSOCIATION

Removing HVOF Coatings

ACS
ALLOY COATING SUPPLY

ACS is a COMPLETE solutions provider for the Thermal Spray Industry representing some of the best-manufactured brands in the industry. We are a one-stop shop offering the highest quality products from new spray systems through diamond abrasives to final NDT materials.

Complete Thermal Spray Coating SYSTEMS for all applications, HVOF (Gas & Liquid Fueled) SPRAY GUNS and SPARE PARTS for most popular brands

3M · NORTON SAINT-GOBAIN · AVSM WE KNOW ABRASIVES · DYNABRADE · rpb · KENNAMETAL · BINKS A CARLISLE BRAND · SAINT-GOBAIN

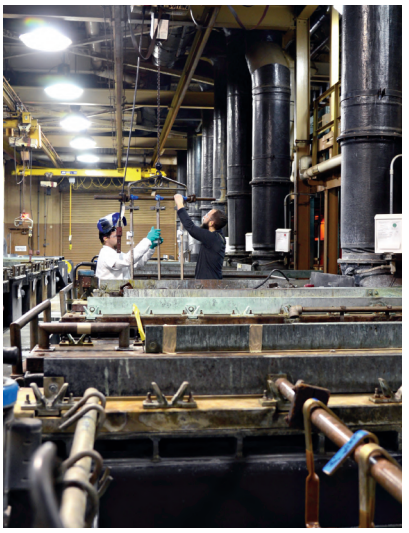
AlloyCoatingSupply.com • (281) 528-0980

1219 Wunsche Loop, Spring, Texas 77373

CONTENTS

[FEATURE]

[DEPARTMENTS]



On the cover: Dean Sims and Ed McLaughlin prepare fixtures to attach flaps for electrochemical stripping with a Rochelle salt solution. Sims is an electroplater and McLaughlin is a process engineer, both with the 76th Propulsion Maintenance Group. (Air Force photo by Kelly White.)

Published by the International Thermal Spray Association, a Standing Committee of the American Welding Society

Mission: To be the flagship thermal spray industry publication providing company, event, personnel, product, research, and membership news of interest to industrial leaders, engineers, researchers, scholars, policymakers, and the public thermal spray community.

SPRAYTIME® (ISSN 1532-9585 Print) (ISSN 2689-0518 Online) is a quarterly publication of the International Thermal Spray Association. Printed on recycled paper.

Article submissions (subject to acceptance and editing), advertising insertions, address correspondence, subscription requests, back issue copies, and changes of address should be sent to:

American Welding Society
Attn: *SPRAYTIME*
8669 NW 36 St., #130, Miami, FL 33166-6672
(800/305) 443-9353 | *spraytime.org*

A subscription to ***SPRAYTIME***® is free for individuals interested in the thermal spray and coatings industry. Visit *spraytime.org* to subscribe.

AWS Claims Policy: All hard copy editions are shipped FOB Origin. Publisher reserves the right to investigate and make a determination on all claims submitted for missing editions not received by a subscribing member or institution. Any claim request determined to be valid will be fulfilled with a digital copy of the edition. Publisher will NOT send any hard copy replacement issues for any reason.

Kirk Fick
Chair

As I begin my term as chair of the International Thermal Spray Association (ITSA), I look forward to working with the ITSA board, committee members, and AWS to advance and promote ITSA and the thermal spray industry.

I have been a part of ITSA for several years, serving on the planning and scholarship committees and, for the past two years, as vice chair.

I have also been involved in thermal spray for the entirety of my professional career, and it has been a great choice. The industry has grown considerably in that time, but there are still new, interesting, and challenging opportunities that come across my desk daily. I expect these opportunities to continue to grow well into the future as multiple industries discover thermal spray coatings and come to rely on them to protect their products.

I believe in ITSA's objectives to bring value to its members by improving and promoting the thermal spray industry. ITSA will have its annual meeting November 6 –7 at the AWS World Headquarters in Doral, Fla. There will be keynote and technical presentations, networking opportunities, and a tour of Florida International University's (FIU's) Cold Spray and Rapid Deposition (ColRAD) Laboratory. I hope to meet you there!

ITSA MISSION STATEMENT

The International Thermal Spray Association (ITSA), a standing committee of the American Welding Society, is a professional industrial organization dedicated to expanding the use of thermal spray technologies for the benefit of industry and society. ITSA invites all interested companies to talk with our officers and company representatives to better understand member benefits.

OFFICER

Kirk Fick, chair, Cincinnati Thermal Spray Inc.

EXECUTIVE COMMITTEE (above officer plus the following)

Mollie Blasingame, Superior Shot Peening & Coatings
Ana Duminie, North American Höganäs
Jim Ryan, TechMet Alloys
David A. Lee, David Lee Consulting LLC
Bill Mosier, Polymet Corp.

ITSA SCHOLARSHIP OPPORTUNITIES

ITSA offers annual graduate scholarships. Since 1992, the ITSA scholarship program has contributed to the growth of the thermal spray community, especially in the development of new technologists and engineers. ITSA is very proud of this education partnership and encourages all eligible participants to apply. Visit *thermalspray.org* for criteria information and a printable application form.

ITSA *SPRAYTIME*

Since 1992, ITSA has been publishing *SPRAYTIME* for the thermal spray industry. The mission is to be the flagship thermal spray industry publication providing company, event, personnel, product, research, and membership news of interest to the thermal spray community.

JOIN ITSA

Membership is open to companies involved in all facets of the industry — equipment and materials suppliers, job shops, in-house facilities, educational institutions, industry consultants, and others.

Engage with dozens of like-minded industry professionals at the Annual ITSA Membership Meeting, where there's ample time for business and personal discussions. Learn about industry advancements through the one-day technical program, participate in the half-day business meeting, and enjoy your peers in a relaxed atmosphere complete with fun social events.

Build awareness of your company and its products and services through valuable promotional opportunities: a listing in *SPRAYTIME*, exposure on the ITSA website, and recognition at industry trade shows.

Plus, ITSA Membership comes with an AWS Supporting Company Membership and up to five AWS Individual Memberships to give to your best employees, colleagues, or customers. Visit *aws.org/membership/supportingcompany* for a complete listing of additional AWS benefits. For more information, contact Adrian Bustillo at (786) 937-9595, or *itsa@thermalspray.org*.

For an ITSA Membership application, visit the membership section at *thermalspray.org*.

North American Cold Spray Conference 2024
Sept. 10, 11
Boucherville, Canada
www.asminternational.org/nacsc-2024

International Materials, Applications & Technologies: IMAT 2024
Sept. 30–Oct. 3
Cleveland, OH
www.asminternational.org/imat-2024

International Thermal Spray Association Annual Meeting
Nov. 6, 7
Miami, FL
thermalspray.org

2025

Powder Coating Week 2025
April 14–16
Orlando, FL
conference.powdercoating.org/

Surfaces, Interfaces and Coatings Technologies International Conference
April 23–25
Albufeira, Portugal
setcor.org/conferences/sict-2025

ITSC 2025
May 5–8
Vancouver, Canada
www.asminternational.org/itsc-2025

51st International Conference on Metallurgical Coatings & Thin Films (ICMCTF)
May 11–16
San Diego, CA
icmctf2025.avs.org

Coatings Science International Conference
June 30–July 3
Noordwijk, The Netherlands
coatings-science.com

ITSA's Annual Meeting Scheduled for November

The International Thermal Spray Association (ITSA) will hold its annual meeting on November 6 and 7 at AWS World Headquarters in Miami, Fla.

The Association for Materials Protection & Performance and Florida International University (FIU) will cohost the event, which focuses on the latest advancements in arc spray and thermal spray technologies, with an emphasis on infrastructure solutions.

Participants can expect to learn about the impacts of arc spray and thermal spray technologies on infrastructure durability and longevity, explore real-world applications and new solutions in infrastructure maintenance and enhancement, connect with industry leaders and peers at the forefront of infrastructure technology, and tour FIU's engineering campus and the Cold Spray and Rapid Deposition (ColRAD) Laboratory. The event also offers the opportunity to participate in discussions with the AWS C2 Committee on Thermal Spray and ITSA Executive Committee, including a formal ITSA business meeting.

Visit *thermalspray.org* to register and for more information about the event.

SPEE3D Builds U.S.-Based Manufacturing Facility and Applications Center

SPEE3D, a metal additive manufacturing company, opened its first U.S.-based manufacturing facility and applications center at the John Olson Advanced Manufacturing Center at the University of New Hampshire (UNH), Durham, N.H. The new location will enable the company to collaborate more closely with clients in the United States, including the U.S. Department of Defense.

Printers will be manufactured at the new facility while SPEE3D will maintain its manufacturing headquarters in Melbourne,

SPEE3D celebrated the opening of its first U.S.-based facility with a ribbon-cutting ceremony. Pictured are (left) Byron Kennedy, SPEE3D CEO, and Steven Camilleri, SPEE3D chief technology officer.

Australia. The company will also staff an applications center, work with customers to identify new applications, and tailor solutions based on customers' needs. Additionally, the company will leverage UNH's resources, facilities, and talent pool to drive additive manufacturing innovation and adoption while providing technical support for existing and future advanced 3D printing initiatives.

"Establishing our first U.S.-based location at the Olson Center brings together a world-class manufacturing center at UNH with SPEE3D's leading cold spray additive manufacturing technology to a region known for its innovation and advancements," said Byron Kennedy, CEO at SPEE3D. "Although we are an Australian company, we have partners worldwide and a strong presence in America, so it made perfect sense to expand our footprint to address the needs of our partners."

Wall Colmonoy Buys Indurate Alloys Ltd.

Wall Colmonoy Corp., Madison Heights, Mich., a global provider of brazing, surfacing, and engineered materials, has acquired Indurate Alloys Ltd., a supplier of hardfacing products located in Edmonton, Alberta, Canada. This acquisition will strengthen the company's position in the Canadian market and provide customers with a wider range of products and expertise to meet their wear resistance and corrosion protection needs.

Indurate Alloys supplies metallic and carbide powders in high-velocity oxygen fuel, plasma spray, thermal spray, laser, and plasma-transferred arc forms, as well as wires and electrodes. It also provides additive manufacturing powders and collaborates with companies utilizing the latest 3D printing technologies, such as powder bed fusion and direct energy deposition.

Wall Colmonoy recognizes the value of Indurate's customer base, thermal spray products, and vendor relationships, which will add new products to complement its portfolio.

"Wall Colmonoy stood out as the right partner for us, thanks to its extensive history in the hardfacing industry and its shared commitment to strong customer relationships," said Lorne Chrystal, founder and CEO of Indurate Alloys Ltd. "We are excited to merge the expertise and experience of both companies and eagerly anticipate expanding opportunities together."

Liebherr-Aerospace Inaugurates Building for Surface Treatment

Liebherr-Aerospace Lindenberg GmbH, Lindenberg, Germany, an aircraft equipment manufacturer, has started operations in its newly built extension. The facility features a coating center that focuses on more sustainable surface treatments.

The company uses high-velocity oxygen fuel (HVOF) spraying to replace the currently used chrome-plating process without jeopardizing the quality or safety of aircraft components. The new extension building is equipped with the latest technology for implementing this coating method to increase capacities for the HVOF process. The company is thus securing its expertise at the site in Lindenberg and reducing transport routes within the production process.

Liebherr-Aerospace is already using the HVOF process in series production for exteriors and the interiors of components. The manufacturer claims it is currently the only company in the aerospace industry to offer this technology.

The latest HVOF technology is applied in Liebherr-Aerospace Lindenberg's new building for surface treatment. (Photo copyright of Liebherr.)

"We are very aware of our responsibility towards nature and the environment," explained Martin Wandel, managing director and chief operating officer at Liebherr-Aerospace & Transportation SAS. "Our center of excellence for coatings in Lindenberg takes us another step further in our efforts to establish more environmentally friendly production methods. Simultaneously, we are expanding our skilled workforce needed to continuously pursue our goals."

Woodside Energy to Use Titomic's System on Offshore Gas Platform

Titomic Ltd., Mount Waverley, Australia, a provider of cold spray solutions, will supply Woodside Energy, a global energy company based in Perth, Australia, with a D523 low-pressure cold spray system to use on an oil and gas project. The work will be conducted via Monadelphous Group, an Australia Securities Exchange-listed service provider to the oil and gas industry.

Woodside has engaged Monadelphous to deploy the system to combat corrosion at Woodside's offshore gas platform in the Indian Ocean near Karratha, Western Australia. Titomic claims this on-site application of cold spray technology is the first of its kind in the Australian oil and gas industry. Additionally, it marks Titomic's first foray into the oil and gas sector, which the company considers to be a significant future market for its technology.

Titomic Managing Director Herbert Koeck commented, "We are thrilled to see our technology being recognized and implemented by industry leaders like Woodside Energy and Monadelphous. This partnership not only validates the effectiveness of our cold spray solutions but also opens the door to further opportunities in the oil and gas sector."

The system will be used to deposit corrosion-resistant materials like aluminum directly onto steel and other metals without heat and structure disassembly.

Oerlikon Opens Advanced Coating Technology Center, Elevating Aerospace and Gas Turbine Industries

Oerlikon, a global provider of surface and additive manufacturing solutions and services, has established the Advanced Coating Technology Center in Westbury, N.Y., dedicated to advancing technologies for the aerospace and gas turbine industries. Located at the existing Oerlikon Metco brand headquarters, it integrates thermal spray with physical vapor deposition (PVD) expertise from the Oerlikon Balzers brand. By combining thermal spray, PVD, and testing capabilities under one roof, the company aims to accelerate the development of high-temperature materials and coatings, enhancing efficiency in these critical sectors.

The integration of thermal spray and PVD technologies enables the company to develop coating solutions tailored to the specific needs of aerospace and gas turbine industries. This approach enhances efficiency, durability, and performance, addressing key challenges such as high-temperature operation and corrosive environments.

Inside Oerlikon's new Advanced Coating Technology Center, the INNOVENTA kila and Surface One™ coating machines offer PVD and thermal spray capabilities, respectively.

One focus area is environmental barrier coatings for ceramic matrix composite aerospace components. By developing advanced coatings that protect components from environmental degradation, Oerlikon contributes to the longevity and reliability of aerospace systems while reducing environmental impact.

The facility's location in the United States enhances collaboration with aerospace and industrial gas turbine original equipment manufacturers. This proximity to stakeholders enables the company to better understand market needs and deliver solutions.

GET YOUR COMPANY AT THE FOREFRONT OF THE THERMAL SPRAY INDUSTRY

When you become an International Thermal Spray Association (ITSA) member, you join an organization with ties to major advances in thermal spray technology, equipment and materials, industry events, and much more. Whether you're a service shop, supplier, end-user, or academia, you can count on your ITSA membership to add value to your organization with its many member benefits.

Why ITSA?

" The benefits of my membership have allowed me to be engaged in the thermal spray industry, at a high level, by learning the latest technologies, safety concerns and assist in expanding the use of thermal spray technologies which has enriched my career and understanding of the industry in many different ways, through information, networking and participation.**"**

Jim Ryan
Business Development Manager, TechMet Alloys, LLC.

" I have been my company's representative to the ITSA for the past 38 years. The technical meetings are very informative and the perfect way to stay abreast of the latest developments in thermal spray technology. But most important, is the networking with other ITSA members and guests. When I need to reach out to an industry expert on a subject, it is usually to another ITSA member. I highly recommend joining the ITSA for any company or individual involved in thermal spray.**"**

Bob Unger
Sales Manager, Polymet Corp.

2024 ITSA ANNUAL MEETING

- We are excited to announce that the International Thermal Spray Association (ITSA) Annual Meeting will take place November 6 – 7 at AWS World Headquarters in Miami.
- This premier event is a must-attend for professionals in the thermal spray industry, offering you the opportunity to discover the impact of arc-spray and thermal spray technologies on infrastructure durability and real-world applications.
- Connect with industry leaders and peers in infrastructure technology.
- Join AWS C2 and ITSA Executive Committee discussions, including a formal ITSA meeting.
- It's also a great opportunity to learn more about ITSA membership and the valuable benefits it provides to its members.
- Visit **thermalspray.org** for more information.

BY RUSTY TOWNSEND

Removing HVOF Coatings:

Best Practices for Preserving Substrates

In surface engineering, high-velocity oxygen fuel (HVOF) coatings stand out for their exceptional properties, such as high wear and corrosion resistance, which are essential in aerospace and industrial applications. However, removing these durable coatings, particularly tungsten and chromium carbide types, is a common challenge during equipment overhaul or recoating. This article delves into the complexities of HVOF coating removal, focusing on methods like chemical stripping, grinding, and water jetting, and outlines best practices to ensure the preservation of the substrate while maintaining optimal surface finishes.

Understanding HVOF Coatings and Their Impact

HVOF thermal spray coatings are applied using a high-velocity oxygen fuel process, creating a dense, hard layer of materials such as tungsten carbide or chromium carbide on various substrates, including steel and stainless steel. These coatings are characterized by their low porosity, superior adhesion to the substrate, and exceptional wear and corrosion resistance performance, especially under high-temperature and corrosive environments.

The hardness and thickness of HVOF coatings, typically much greater than traditional coatings like hard chrome plating, pose distinct challenges during removal. The thickness can vary significantly, often requiring different approaches for effective removal without damaging the substrate material. Additionally, the hardness of these coatings, coupled with their strong adhesion to the substrate, demands careful consideration of removal techniques to preserve the integrity and desired properties of the underlying material.

Comparative Analysis: Plasma Spray vs. HVOF

While both plasma spray and HVOF are thermal spray processes used in coating applications, they have distinct differences and are suited to different types of coatings and applications. Plasma spray operates at higher temperatures and is ideal for applying oxide coatings. It allows for a broader range of coating materials and is typically used for coatings that require a higher degree of porosity or specific electrical or thermal properties.

In contrast, HVOF utilizes a high-velocity jet to produce denser, harder coatings with better adhesion and lower porosity. These characteristics make HVOF coatings more suitable for applications that demand high wear resistance, such as aerospace components and heavy industrial machinery. HVOF coatings are also known for their superior high-temperature performance and corrosion resistance, making them an excellent choice for harsh operational environments.

Comprehensive Overview of HVOF Coating Removal Techniques

Chemical Stripping: This method employs strong chemical solutions to dissolve the coating material without damaging the substrate. It is particularly effective for removing certain types of coatings, such as chromium, and is favored for its minimal impact on the mechanical and structural integrity of the substrate. However, chemical stripping necessitates strict adherence to safety and environmental protocols due to the hazardous nature of the chemicals involved.

Grinding with Diamond Wheels: The physical removal of coatings through abrasive grinding with diamond wheels is effective for harder, thicker coatings. Unlike cubic boron nitride (CBN), diamond wheels are better suited for the high hardness of HVOF coatings. This method offers control over the final surface finish but generates heat, possibly inducing residual stresses.

Water Jetting: Water jetting is a nondestructive method that employs high-pressure water streams to erode the coating. This technique is particularly suitable for removing softer, more ductile coatings and ensures that the substrate remains unaffected. However, its effectiveness diminishes with harder or thicker coatings. Additionally, water jetting is advantageous when heat-induced changes to the substrate material are a concern, as it generates no heat.

Best Practices for Safe and Effective Removal of HVOF Coatings

Comprehensive Assessment: Before initiating the removal process, it is critical to thoroughly assess both the coating material and the substrate. Understanding the specific properties of the coating, such as its hardness, thickness, and adhesion to the substrate, is vital in selecting the most appropriate removal technique. Similarly, evaluating the substrate material, its mechanical properties, and any potential sensitivities to heat or mechanical stress is essential to prevent damage during the removal process.

Heat Treatment Considerations: For substrates sensitive to thermal effects, such as certain alloys or stainless steel, carefully considering pre- and post-removal heat treatments is necessary. These treatments can help mitigate any adverse effects of the removal process, such as thermal distortion or the induction of residual stresses.

Safety and Environmental Compliance: Ensuring adherence to safety and environmental regulations is paramount, especially when dealing with hazardous materials like chromium in chemical stripping processes. Proper handling, containment, and disposal of hazardous materials are essential to protect workers and the environment.

Conclusion

Removing HVOF coatings is a complex task requiring a nuanced understanding of the coatings and substrates they are applied to. Whether through chemical stripping, grinding, or water jetting, each method has unique advantages and challenges. The choice of technique should be tailored to the application's specific requirements, considering factors such as coating thickness, substrate material, and the desired final surface finish. Employing these best practices not only ensures efficient and safe removal of hard coatings but also preserves the integrity and performance of the underlying substrate, which is crucial in high-stakes applications like aerospace and industrial machinery.

RUSTY TOWNSEND (*rusty@eaglesuperabrasives.com*) is an applications engineer at Eagle Superabrasives, Hickory, N.C.

Corrosion-Resistant Alloy Enables Rapid Production of Cold Spray Additive Manufacturing Parts

Nickel Aluminium Bronze Expeditionary (NAB Expeditionary) is designed to be field-deployed and enable the rapid production of parts for cold spray additive manufacturing. NAB Expeditionary is a high-strength, corrosion-resistant alloy known for its lubricity and resistance to cavitation damage and stress corrosion cracking. It is predominantly composed of copper, but it also has significant amounts of aluminium, nickel, and iron. Its strength and corrosion resistance in seawater and similar aggressive environments make it well suited for maritime applications. The material is also suitable for the defense, oil and gas, and mining industries, and the parts can reportedly be field-produced and delivered in under 24 hours.

SPEE3D
spee3d.com / (877) 908-9369

Thermal Spray Coatings Market Projected to Reach above $14.15 Billion by 2029

Global Thermal Spray Coatings Market Research Report 2024–2030 provides an industry overview with growth analysis and historical and future cost, revenue, demand, and supply data. This report also analyzes the impact of the COVID-19 pandemic on the industry. The report posits that the thermal spray coatings market is expected to grow at a 7.1% compound annual growth rate from 2022 to 2029. It is expected to reach above $14.15 billion by 2029, up from $7.63 billion in 2020. The research includes historical data from 2019 to 2024 and forecasts to 2030, making the report a valuable resource for industry managers; marketing, sales, and product managers; consultants; analysts; and others looking for key industry data in easily accessible documents with clearly presented tables and graphs. The report provides information on the principal location, economic conditions, item value, benefits, capacity, production, supply, demand, and market growth rate and forecast.

Exactitude Consultancy
exactitudeconsultancy.com / (704) 266-3234

Cold Spray Technology Market Expected to Hit $1.75 Billion by 2030

Cold Spray Technology Market by Offering (Cold Spray Systems, Services), Material (Aluminum, Copper, Magnesium), End-Use-Global Forecast 2024–2030 reports the market size was estimated at $1.12 billion in 2023, is expected to reach $1.20 billion in 2024, and, at a compound annual growth rate of 6.49%, is expected to reach $1.75 billion by 2030. The cold spray technology market in the Americas, particularly in the United States and Canada, is experiencing steady growth. This growth is driven by the aerospace and defense sectors, where there is a high demand for repairing and manufacturing components. Increasing investments in technological advancements and the presence of major industry players also contribute to the market dynamics. In Europe, the Middle East, and the Africa region, there is a significant adoption rate of cold spray technology, particularly in countries with strong automotive and aerospace industries, such as Germany, France, and the UK. The market in the Middle East and Africa is largely influenced by the burgeoning energy sector and industrial revitalization efforts. Asia-Pacific is witnessing robust growth in the cold spray technology market, supported by the increasing industrial base, rising automotive production, and substantial government investments in research and development.

360iResearch
360iresearch.com / (530) 264-8485

Report Highlights Thermal Spray Future Development, Top Trends, and Leading Players Analysis to 2031

Thermal Spray Market 2024 offers a comprehensive understanding of the thermal spray market's dynamics. The report includes an in-depth analysis of the global thermal spray market and provides market size (US$ million) and compound annual growth rate for the forecast period (2024–2030), considering 2022 as the base year. It profiles key players in the global thermal spray market based on the following parameters: company details (found date, headquarters, manufacturing bases), product portfolio, thermal spray sales data, market share, and ranking. The report also provides a panoramic overview of the thermal spray market's evolution across diverse geographical regions globally, capturing the nuances of regional variations in market trends and developments. It also aims to conduct a granular examination of micromarkets within the thermal spray domain, scrutinizing their contributions to the overarching market landscape and elucidating their growth trajectories and distinctive trends. Also provided are insights regarding North America, the United States, Canada, Europe, Germany, and France and the key players operating in each region, along with value and sales data of each region and country for the period 2024–2031.

DataM Intelligence
datamintelligence.com / (877) 441-4866

FABTECH

Innovation. Inspiration. Impact.

OCT 15-17, 2024 | ORLANDO, FL

Experience the most comprehensive showcase of sheet metal manufacturing processes under one roof at FABTECH 2024, North America's preeminent event for metal forming, fabricating, welding, and finishing. Discover innovation, find inspiration, and make connections that will impact your career or business.

Event Partners

AWS FMA sme PMA

Platinum Sponsors

AMADA MITSUBISHI LASER TRUMPF

REGISTER TODAY AT FABTECHEXPO.COM

ITSA MEMBERSHIP DIRECTORY

JOB SHOP MEMBER COMPANIES

Accuwright Industries Inc.
Gilbert, AZ
David Wright | *dave@accuwright.com*
(480) 892-9595 | *accuwright.com*

Atlas Machine & Supply Inc.
Louisville, KY
Richie Gimmel | *richie@atlasmachine.com*
(502) 584-7262 | *atlasmachine.com*

Bender CCP
Vernon, CA
Doug Martin | *dmartin@benderus.com*
(323) 232-2371 | *benderccp.com*

Byron Products
Fairfield, OH
Keith King | *kking@byronproducts.com*
(513) 870-9111 | *byronproducts.com*

Cincinnati Thermal Spray Inc.
Cincinnati, OH
Kirk Fick | *kfick@cts-inc.net*
(513) 699-3992 | *cts-inc.net*

Curtiss-Wright Surface Technologies
Windsor, CT
Peter Ruggiero | *peter.ruggiero@cwst.com*
(860) 623-9901 | *cwst.com*

Exline Inc.
Salina, KS
Brent Hilbig | *b.hilbig@exline-inc.com*
(785) 825-4683 | *exline-inc.com*

Fusion Inc.
Houston, TX
Jeff Fenner | *jfenner@fusionhouston.com*
(713) 691-6547 | *fusionhouston.com*

Hayden Corp.
West Springfield, MA
Dan Hayden
daniel.hayden@haydencorp.com
(413) 734-4981 | *haydencorp.com*

HFW Industries Inc.
Buffalo, NY
Matt Watson | *mwatson@hfwindustries.com*
(716) 875-3380 | *hfwindustries.com*

H&M Plating Co. Inc.
Houston, TX
Kevin Crenshaw | *kcrenshaw@hmplating.com*
(713) 643-6516 | *hmplating.com*

Kermetico Inc.
Benicia, CA
Andrew Verstak | *averstak@kermetico.com*
(707) 745-3862 | *kermetico.com*

Linde Advanced Material Technologies Inc.
Indianapolis, IN
Michael Brennan
michael.brennan@linde.com
(317) 240-2500 | *linde-amt.com*

Metcut Research Inc.
Cincinnati, OH
Triratna Shrestha | *tshrestha@metcut.com*
(513) 271-5100 | *metcut.com*

Nation Coating Systems
Franklin, OH
Pat Pelzer | *patp@nationcoating.com*
(937) 746-7632 | *nationcoatingsystems.com*

Spraywerx
North Vancouver, BC, Canada
Alan Burgess | *aburgess@spraywerx.com*
(604) 306-2061 | *spraywerx.com*

Sulzer
La Porte, TX
Garret Haegelin | *garret.haegelin@sulzer.com*
(281) 848-3700 | *sulzer.com*

Superior Shot Peening Inc.
Houston, TX
Mollie Blasingame
mmb@superiorshotpeening.com
(281) 449-6559
superiorshotpeening.com

SUPPLIER MEMBER COMPANIES

AAF International
Louisville, KY
David Kolstad | *dkolstad@aafintl.com*
(800) 477-1214 | *aafintl.com*

Alloy Coating Supply
Spring, TX
Jeffrey Noto | *jnoto@alloycoatingsupply.com*
(281) 528-0980 | *alloycoatingsupply.com*

Ametek Inc.
Eighty Four, PA
Cindy Freeby | *cindy.freeby@ametek.com*
(724) 225-8400 | *ametekmetals.com*

ARC Specialties
Houston, TX
Daniel Allford | *dan@arcspecialties.com*
(713) 631-7575 | *arcspecialties.com*

Ardleigh Minerals Inc.
Beachwood, OH
Ernie Petrey | *epetrey@ardleigh.net*
(216) 464-2300 | *ardleigh.net*

Arzell Inc.
Cypress, TX
Mark Zinsky | *mark@arzell.com*
(281) 213-4085 | *arzell.com*

Carpenter Powder Products
Pittsburgh, PA
Jason Simmons | *jsimmons@cartech.com*
(412) 257-5102 | *carpentertechnology.com*

CenterLine (Windsor) Ltd.
Windsor, ON, Canada
Julio Villafuerte
julio.villafuerte@cntrline.com
(519) 734-8464 | *supersonicspray.com*

DeWAL Industries Inc.
Narragansett, RI
Rebecca Auger
rebecca.auger@rogerscorp.com
(401) 789-9736 | *rogerscorp.com*

Donaldson Torit
Minneapolis, MN
Paul Richard | *paul.richard@donaldson.com*
(603) 343-2448 | *donaldsontorit.com*

Global Tungsten & Powders Corp.
Towanda, PA
Laura Morelli
laura.morelli@globaltungsten.com
(570) 268-5182 | *globaltungsten.com*

Haynes International
Mountain Home, NC
Brandon Furr | *bfurr@haynesintl.com*
(713) 937-7597 | *haynesintl.com*

IKH USA-Inc.
Wellford, SC
Richard Bajan | *richard.bajan@ikh-usa.com*
(864) 431-4134 | *ikh-usa.com*

Imerys Fused Minerals
Greeneville, TN
Mitch Krieg | *mitch.krieg@imerys.com*
imerys.com

Imperial Systems
Mercer, PA
Tomm Frungillo
tfrungillo@isystemsweb.com
(724) 662-2801 | *imperialsystemsinc.com*

Lincoln Electric
Cleveland, OH
Thomas Brown
thomas_brown@lincolnelectric.com
(216) 383-2951 | *lincolnelectric.com*

Lineage Metallurgical LLC
Baytown, TX
Landon Hendricks | *lhendricks@lineagemet.com*
(281) 731-7358 | *lineagemet.com*

Metallisation Ltd., Dudley
West Midlands, United Kingdom
Stuart Milton | *sales@metallisation.com*
+44 1384 252464 | *metallisation.com*

Metallizing Equipment Co. Pvt. Ltd.
Jodhpur, India
Ankur Modi | *ankur@mecpl.com*
+91 0291 2747601 | *mecpl.com*

Midwest Thermal Spray
Farmington Hills, MI
Alex Pocket | *ap@midwestthermal.com*
(248) 442-6540 | *midwestthermal.com*

North American Höganäs
Hollsopple, PA
Ana Duminie | *ana.duminie@hoganas.com*
(814) 361-6875 | *hoganas.com*

Oerlikon Metco (US) Inc.
Westbury, NY
Daniel De Wet
daniel.dewet@oerlikon.com
(516) 338-2504 | *oerlikon.com/metco*

Polymet Corp.
West Chester, OH
Bob Unger | *runger@polymet.us*
(513) 874-3586 | *polymet.us*

Praxair Surface Technologies
Concord, NH
(603) 224-9585
praxairsurfacetechnologies.com

Rockwell Carbide Powders Ltd.
Ontario, Canada
Frank Shao | *sales@rockwellpowders.ca*
(905) 470-8885 | *rockwellpowders.ca*

Saint-Gobain Ceramic Materials
Worcester, MA
Shari Fowler-Hutchinson
shari.fowler-hutchinson@saint-gobain.com
(508) 795-2351
coatingsolutions.saint-gobain.com

TechMet Alloys LLC
Sealy, TX
James Ryan | *j.ryan@techmet-alloys.com*
(979) 885-7180 | *techmet-alloys.com*

Thermach LLC
Appleton, WI
Tim Vanden Heuvel
timvandenheuvel@thermach.com
(920) 779-4299 | *thermach.com*

Thermion
Silverdale, WA
Dean Hooks | *dhooks@thermioninc.com*
(360) 692-6469 | *thermioninc.com*

ASSOCIATE MEMBER ORGANIZATIONS

Advanced Materials and
Technology Services Inc.
Simi Valley, CA
Robert Gansert | *rgansert@adv-mts.com*
(805) 433-5251

David Lee Consulting
Ligonier, IN
David Lee | *dlee@daltsc.com*
(574) 849-3636

Florida International University
Department of Mechanical and
Materials Engineering
Miami, FL
Arvind Agarwal | *agarwala@fiu.edu*
(305) 348-1701 | *mme.fiu.edu*

Florida Tech
Melbourne, FL
Frank Accornero | *faccornero@fit.edu*
(386) 506-6900 | *fit.edu*

Mason Global Management LLC
Killingworth, CT
Richard P. Mason
rmason@masonglobalmanagementllc.com
(724) 554-9439
masonglobalmanagementllc.com

State University of New York at
Stony Brook
Stony Brook, NY
Sanjay Sampath
ssampath@ms.cc.sunysb.edu
(631) 632-8480 | *ctsr-sunysb.org*

Stronghold Coating Systems
Franklin, OH
Larry Grimenstein | *strongholdone@cs.com*
(937) 704-4020

The Mozolic Group
Londonderry, NH
Jean Mozolic | *jean.mozolic@comcast.net*
(508) 254-4375

SUPPORTING MEMBER SOCIETIES

DVS, The German Welding Society
Jens Jerzembeck
jens.jerzembeck@dvs-hg.de
dvs-home.de/en

GTS E.V., The Association of
Thermal Sprayers
Werner Kroemmer
werner.kroemmer@gts-ev.de
+49 89 31001 5203 | *gts-ev.de*

Institute of Materials, Malaysia (IMM)
Johar Juhari | *johar_juhari@petronas.com.my*
+6018 911 3480 | *iomm.org.my*

Japan Thermal Spray Society (JTSS)
Nick Yumiba | *jtss@mb8.seikyou.ne.jp*
+81 6 6722 0096 | *jtss.or.jp*

Metal Powder Industries
Federation (MPIF)
James R. Dale | *jdale@mpif.org*
(609) 452-7700 | *mpif.org*

Surface Engineering for Advanced
Materials (SEAM)
Christopher Berndt | *cberndt@swin.edu.au*
+61(0)4 28 237 638 | *arcseam.com.au*

Thermal Spraying Committee of
China Surface Engineering
Association (TSCC)
Huang Xiao | *xiaoou@chinathermalspray.org*
+86 10 64882554 | *chinathermalspray.org*

ADVERTISER INDEX

Your *SPRAYTIME*® publication is provided to you at no charge by our advertisers. We encourage you to thank these advertisers by using and referring their products and services at every opportunity.

VETERAN OWNED BUSINESS

Arzell, Inc.

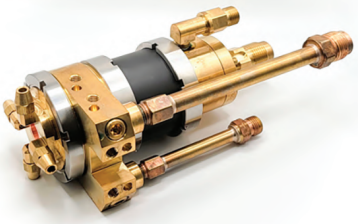
THERMAL SPRAY INTEGRATION & ROBOT AUTOMATION

NEW OFFERING

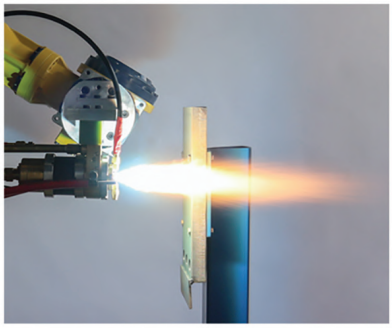
In addition to our in-house manufactured Multus combustion, plasma and HVOF systems, Arzell is proud to announce that we are the exclusive US distributor of the highest technology arc spray system available, the Elmatech MIDI LDS 400.

The standard package is PPG (Push Pull Gun), but can be configured as a pull system, or push with individual pull motors. Additionally, we can update existing SmartArc systems while maintaining the original torch. A PPG ID torch is also available.

Elmatech TWAS Torch & ID Torch



Arzell Multus C+



CALL US TODAY
281 213 4085

13622 KLUGE RD. CYPRESS, TX 77429
WWW.ARZELL.COM

ELMATECH Welding & Spraying

SCAN ME