FIRST QUARTER 2025 | VOLUME 32

SPRAYTIME

INTERNATIONAL THERMAL SPRAY ASSOCIATION

AWS American Welding Society

A Cold Spray Solution for Pumped Hydropower

ITSA Annual Meeting Recap

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On the cover: The Cold Spray and Rapid Deposition (ColRAD) Laboratory's high pressure cold spray manufacturing system ready to spring into action at Florida International University. Photo credit: ColRAD, Florida International University.

[DEPARTMENTS]

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.

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ITSA MEMBER NEWS

Kirk Fick
Chair

It's hard to believe that we are already a quarter of the way through 2025. The year has been off to a promising start, and the ITSA Executive Board has been working hard, with promising results.

Our membership subcommittee has been successful in signing up new members; I would like to welcome three of our newest: BryCoat (*brycoat.com*), Revesteel (*revesteel.com.br/en*), and INDO-MIM (*indo-mim.com*). Thank you for joining, and I look forward to working with you!

Planning is underway for the 2025 ITSA symposium, which will center on heavy equipment, mining, agriculture, and overhaul. We are in discussions with the venue and coordinating a facility tour as well. We expect to send out a save the date shortly.

In the meantime, you can meet ITSA members at our booth at the AMPP Annual Conference and Expo from April 6 to 10 at the Music City Center in Nashville, Tenn. ITSA members will be staffing the booth to answer questions about our association and to hand out educational materials.

Three $2000 ITSA graduate scholarships have been awarded. The recipients are Anil Lama (Florida International University), Tyler Kleinsasser (South Dakota Mines), and Proches Mkawe (SUNY Binghamton). Congratulations on your awards, and best wishes for your studies. You will learn more about these amazing students in the Q2 issue of *SPRAYTIME*.

Lastly, I would like to remind the community that submitting articles and updates to *SPRAYTIME* is free. If you have article ideas, company updates, or announcements, please consider submitting them for one of the upcoming issues. Topics will include education and job shops (Q2/June), thermal spray in aerospace (Q3/September), and thermal spray powders (Q4/December). Submission due dates are approximately two months prior to the publication dates. Please contact Cindy Weihl at *cweihl@aws.org* for additional information.

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.

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Kirk Fick, chair, Cincinnati Thermal Spray Inc.
Ashley Hunsaker, vice chair, HTS Coatings

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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*.

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ITSA Names New Vice Chair

Ashley Hunsaker brings her expertise in the thermal spray industry to her role as vice chair of ITSA.

The International Thermal Spray Association (ITSA) has elected Ashley Hunsaker as its new vice chair. Hunsaker has been the CEO of HTS Coatings LLC, Madison, Ill., a thermal spray, machining, and grinding company she founded and has operated alongside her husband, Jason, since 2015. HTS Coatings has been a member of ITSA for two years.

Hunsaker earned a bachelor of science degree in accounting from Pensacola Christian College in 2004. She is a member of C12 Group, an organization for Christian business leaders, and the Illinois Manufacturing Association. She is also on the board of the National Tooling and Machining Association St. Louis Chapter.

Feintool and SITEC Team Up with Impact Coatings for Fuel Cell Component Production

Feintool, Lyss, Switzerland, a manufacturer of metallic high-precision components, and partner SITEC, Chemnitz, Germany, are collaborating with Swedish coating specialist Impact Coatings AB. This nonexclusive cooperation enables Feintool to offer customers a comprehensive solution for producing ready-to-install metallic bipolar plates and interconnects for fuel cells and electrolyzers, covering the entire process, from early development to high-volume production.

Impact Coatings specializes in physical vapor deposition (PVD), a clean coating process for modifying and enhancing surface properties with minimal environmental impact. PVD, along with the corresponding quality control, complements Feintool's coating capability, which is an integral step in the production of bipolar plates and interconnects.

Metallic bipolar plates and interconnects constitute the cores of fuel cells and electrolyzers. These high-precision components enable efficient gas flow, cooling, and electrical connection at low production costs. Several hundred plates are layered to form the fuel cell or electrolyzer stack.

This collaboration supports Feintool and SITEC's strategic goal of becoming a leading supplier of metallic bipolar plates and interconnects.

Feintool and SITEC partnered with Impact Coatings to enhance the production of metallic bipolar plates and interconnects for fuel cells and electrolyzers, supporting the growth of the hydrogen industry.

Kymera International Acquires Coating Center Castrop GmbH

Kymera International, Research Triangle Park, N.C., a global specialty materials and surface technologies company, has acquired Coating Center Castrop GmbH (CCC), a comprehensive thermal spray and precision machining company providing complete design, fabrication, and finish machining solutions for the aerospace, marine propulsion, pharmaceutical, and general industrial markets. Located in Castrop-Rauxel, Germany, CCC provides its European customers with advanced engineering and thermal spray service applications that mitigate the impact of extreme wear on high-value components.

This acquisition strengthens Kymera's position in the thermal spray services market and benefits both companies through the expansion of technological capabilities and a broadened global footprint that now includes the United States, Canada, and Germany. The addition of CCC brings advanced component engineering, fabrication, and CNC machining capabilities to Kymera's Surface Technologies business and a European HaloJet ID HVOF™ service center, enabling localized aerospace landing gear service to regional customers.

"Kymera's Surface Technologies business is differentiated by our ability to provide high-performing, comprehensive, and customized thermal spray solutions with superior service and support," said Barton White, CEO of Kymera International. "The acquisition of CCC further solidifies our ability to provide regional service on a global scale and support our strategic growth initiatives in the aerospace industry with our HaloJet ID HVOFTM technology."

Researchers Uncover Breakthrough in Thermal Barrier Coatings to Boost Gas Turbine Efficiency and Sustainability

Researchers at the University of Virginia (UVA), Charlottesville, Va., and Harvard University, Cambridge, Mass., have made a discovery in thermal barrier coatings (TBCs) that could significantly enhance the performance and efficiency of gas turbines, key components in power plants, and jet engines.

The study, titled "Optical Absorption Study of Iron-Substituted Zirconia and Yttria-Stabilized Zirconia Using Experimental Measurements and Many-Body Perturbation Theory," was conducted by Shunshun Liu and Prasanna V. Balachandran from the Department of Materials Science and Engineering at UVA, along with Victor K. Champagne III and David R. Clarke from the Harvard John A. Paulson School of Engineering and Applied Sciences.

Their study examines how substituting iron into yttria-stabilized zirconia (YSZ) impacts the material's ability to absorb radiative heat in the near-infrared region of the electromagnetic spectrum, potentially leading to innovations that improve the efficiencies of energy systems we rely on every day.

"Our research shows that by substituting iron into YSZ, we can fine-tune the material's optical absorption properties, which has direct implications for controlling heat transfer," said PhD student and lead researcher Liu. "This could lead to turbines that run cooler, last longer, and operate more efficiently, contributing to a more sustainable energy future."

For the average person, this advancement could translate into lower fuel costs for airlines, resulting in more affordable flights and a smaller environmental footprint. It could also lead to cheaper electricity bills as power plants become more efficient and require less maintenance.

Professor Prasanna V. Balachandran, coauthor from the Department of Materials Science and Engineering at UVA and Liu's adviser, highlighted the broader applications of this work.

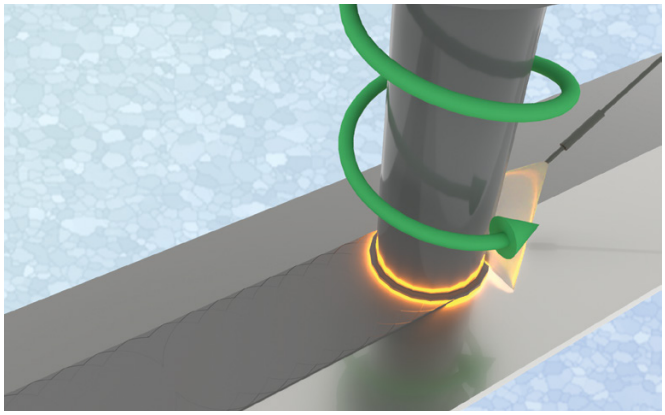
"This work opens exciting possibilities for thermal, environmental, and, now, radiation barrier coatings in everything from energy systems to advanced manufacturing, where precision heat control is critical for innovation," he said.

The discovery has promising implications for extending the lifespan of critical infrastructure. Managing heat more effectively could reduce wear and tear on turbines, resulting in fewer costly repairs and minimizing downtime in power generation.

An Alternate Approach to Fabricating Strengthened Steel

Researchers from Pacific Northwest National Laboratory, Richland, Wash., and Ames National Laboratory, Ames, Iowa, have developed a new, more efficient method for fabricating oxide-dispersion-strengthened (ODS) steel, a critical material for fusion power plants. By combining cold spray deposition and friction stir processing, the team has produced fully dense ODS steel plates with practical strength and ductility, significantly improving manufacturing efficiency and material quality.

Traditional ODS steel production is labor intensive and costly, involving multiple steps that often lead to inconsistent microstructures. This new approach simplifies the process, eliminating the need for complex rolling and thermal treatments, and produces a material with a uniform microstructure and enhanced physical properties. The combination of cold spray deposition and friction stir processing results in a refined material with a high density of nano-sized oxide particles known to strengthen the steel.



Combining cold spray and friction stir processing results in an oxide-dispersion-strengthened steel plate with uniform, refined grains and nanosized particles. (Image by Ben Watson, Pacific Northwest National Laboratory.)

This breakthrough could reduce the overall cost of producing ODS steel and make it easier to scale up for large-scale applications in fusion power plants, which require materials that can withstand extreme conditions. The team's findings provide a promising alternative to current manufacturing methods and open the door to more affordable, durable materials for future energy systems.

For more information, see "Manufacturing Oxide Dispersion Strengthened (ODS) Steel Plate via Cold Spray and Friction Stir Processing" by Wang, X., Zhang, D., Darsell, J. T., et al. in the *Journal of Nuclear Materials* Vol. 596.

Aalberts Adds Steel Goode Products

Aalberts N.V., Utrecht, Netherlands, a hydronic flow control and treatment system manufacturer, has acquired Steel Goode Products LLC (SGP), generating an annual revenue of approximately $15 million with 75 full-time-equivalent employees.

SGP operates two facilities in Texas and one in Ohio. The company provides thermal spraying and finishing services, specializing in enhancing wear resistance and corrosion protection for a wide range of critical components.

This acquisition aligns with Aalberts's group strategy to expand its presence in the United States, strengthen its service network in the Southern region, and expand its geographic footprint in the Northeast.

A COLD SPRAY SOLUTION for Pumped Hydropower

BY VICTOR K. CHAMPAGNE JR., KYLE JOHNSON, AARON NARDI, KEN ROSS, AND SETH SMITH

Cold spray (CS) is a materials consolidation process whereby micron-sized particles of a metal, ceramic, and/or polymer are accelerated through a spray gun fitted with a de Laval rocket nozzle to form a coating or a near-net-shaped part by means of ballistic impingement (Refs. 1,2). The feedstock powder particles are carried within a heated high-pressure gas (i.e., air, nitrogen, helium) such that they exit at supersonic velocities and consolidate upon impacting a suitable surface. The cold spray process has been developed to deposit a wide variety of engineering materials, including metals, steels (carbon and stainless), titanium, aluminum, magnesium, nickel alloys, zinc, tin, copper, tantalum, niobium, monel, brasses, and bronzes. Even gold and silver have been used in the cold spray process. Cermets, carbides, polymers, and/or combinations of these materials are routinely cold sprayed, including CrC-Ni, WC-Co, and many more with near theoretical density. It is important to note that CS is considered an additive manufacturing (AM) process and has been adapted to produce 3D-printed parts as well as coatings (Refs. 3–5).

Background on Repair and Maintenance Needs at Hydropower Facilities

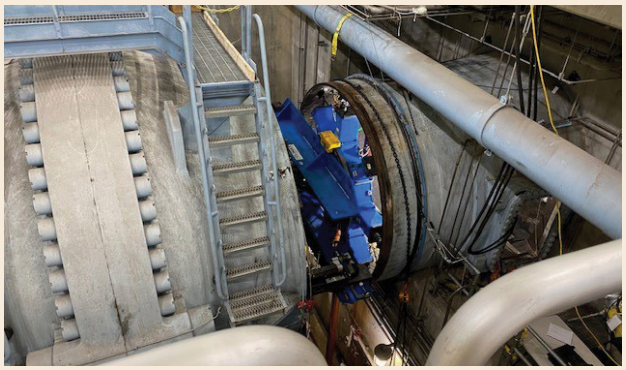
Stabilizing the grid using pumped hydroelectric stations enhances the efficiency of baseload power plants (coal, natural gas, and, to a lesser extent, nuclear), enables the storage of energy from renewable technologies (wind, solar) for future use, and allows the utility to better match storage and generation with off-peak and peak energy demand. When there are many large structural components moving around in a feedwater environment, wear and corrosion can occur, requiring constant monitoring and frequent maintenance. Pumped hydropower plants generally have additional problems due to the bidirectional water flow through the facility, requiring complex components like reversible turbine/impellers with vibration modes and bidirectional valves that require frequent actuation. Maintenance outages of a pumped hydropower plant not only eliminate the utility's revenue from on-peak/off-peak energy trading; they also reduce the utility's ability to capture excess baseload, wind, and solar generation in its footprint, resulting in energy wastage and potentially massive losses. Prompt remediation of damage is critical to maintaining the operational capacity of the pumped hydropower facility and, therefore, minimizing the cost to the generating utility and, eventually, the rate payer.

A complicating issue is the overall size of the components involved and the massive scale of generation, which often requires these components to be remediated in the powerhouse. Owing to its highly portable nature, cold spray technology can be used to repair these components in the field and provide the utility with a fast, expeditionary repair solution.

Case Study: Rocky Mountain Hydroelectric Primary Valve Repair

The Rocky Mountain Hydroelectric Plant is a 1095 MW pumped hydroelectric storage facility located in Northwestern Georgia and operated by Oglethorpe Power. The facility supports three reversible generator/turbine units, each with its own supporting systems, including primary valves and other equipment. Wear on the primary valve seat from frequent operation can cause leaks and, based on the movable seat design, could lead to self-oscillation of the seat, which accelerates the wear. To mitigate this issue, traditionally, weld overlays of aluminum bronze were used to rebuild the seat and seals of the valve assembly. While aluminum bronze has great corrosion resistance and metal-on-metal bearing wear resistance, its resistance to abrasion from particulate and abrasive materials, such as high-strength seals and packing materials, is less than optimum, and the use of a higher-performance hardfacing coating in this area would be beneficial.

Cold spray coatings can be tailored to have the unique property of high compressive surface stresses, dramatically increasing the hardness of the coating even when the coating material is ductile and highly corrosion resistant. Additionally, cold spray metal powders with different properties (hardness, strength, corrosion resistance, galling resistance) can be blended, agglomerated, and processed such that a mixed surface functionality is obtained in the coating, resulting in a hard, wear-resistant, galling-resistant, and corrosion-resistant overlay.



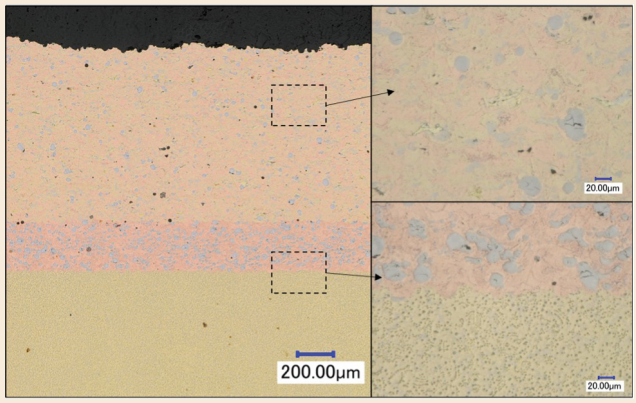
The primary valve at the Rocky Mountain Hydroelectric Plant with in-place machining equipment (blue/yellow) is visible on the right. Valve scale is 11 ft. I.D. (Photo courtesy of Voith and Oglethorpe Power.)

Coating Qualification

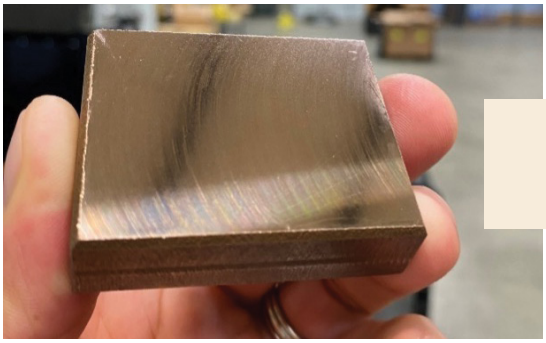
Cold spray was used to repair a sliding seat surface of a primary shutoff valve at the Rocky Mountain Hydroelectric facility. The valve is the largest of its kind on the East Coast. In collaboration with Pacific Northwest National Laboratory (PNNL), Richland, Wash.; Voith, York Springs, Pa.; and Oglethorpe Power Co., Tucker, Ga., VRC Metal Systems developed, optimized, and qualified a cold spray coating using nitrogen process gas to replace an aluminum bronze overlay. The development resulted in an aluminum bronze coating with a small amount of free (unalloyed) tin and zinc to act as a metal-on-metal lubricant, preventing galling damage. The coating was also embedded with a significant metal-carbide concentration to provide good wear and abrasion resistance. The coating density was excellent, with an average porosity of < 0.50% and hardness of approximately 250 HV, which is roughly double the hardness of the aluminum bronze weld overlay. A bond layer was used and provided very high adhesion strength to 1018 steel, with all ASTM C633 bond strength test results > 10,500 lb/in.^{2} (glue failures). Wear resistance of the cold spray coating and the aluminum bronze material were evaluated side by side in the lab using ASTM G77 block-on-ring testing with an SAE 4620 steel ring in distilled water following the testing standards. The cold spray coating showed 99.7% less wear than the aluminum bronze, almost completely eliminating any measurable wear. The coatings also met all machinability and inspection metrics set forth in the qualification criteria and were approved for application in the powerhouse.

Field Repair

The qualified coating was selected for application at the Rocky Mountain facility on a valve component that could be removed from the valve assembly. The valve component was a seat retention ring, 11 ft. in diameter and roughly 4 in. tall, that experienced wear from the seat seal. The valve component was placed on a turntable, and a spray area was set up around the valve component, including a portable frame and tarp assembly, a portable robotic arm, portable dust collection equipment, and the VRC Raptor portable cold spray system. The component was rotated while the spray nozzle was robotically controlled to apply a uniform coating across the wear surface to a thickness of 0.130 in. The field application process took 17 hours of spray time, which was accomplished over the course of two to three days. Compared to two to three weeks for a similar weld overlay, the CS application provided significant time and cost savings for the utility. The ring was postmachined and reinstalled on the primary valve assembly and has been operational since July 2024.

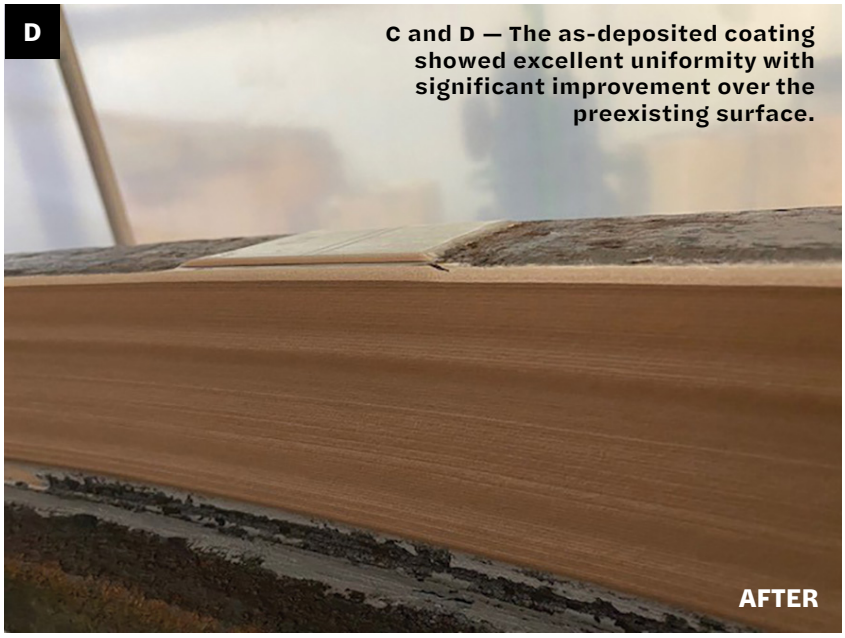


Cross-sectional metallography of the cold spray coating showing 1018 steel substrate (left bottom), VRC BC02 bond coat (left mid), and VRC CU03 coating with coating microstructures (upper right) and interface detail (lower right).



Cold-sprayed aluminum-bronze-based wear coating after postmachining.

Cold spray field application on-site at the Rocky Mountain Hydroelectric Plant. A and B — A dust collection spray area was established, containing the ring component on a turntable, spray system, and robot arm.



C and D — The as-deposited coating showed excellent uniformity with significant improvement over the preexisting surface.

Conclusion

The valve repair project from conception to qualification to field repair was completed in only one month, which demonstrates the ability for high-performance CS coatings to be rapidly fielded to solve wear and corrosion issues in demanding applications.

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VICTOR K. CHAMPAGNE JR. (*vchampagne@wpi.edu*) is with Cold Spray Innovations International, **KYLE JOHNSON** and **AARON NARDI** are with VRC Metal Systems, Box Elder, S.Dak., **KEN ROSS** is with Pacific Northwest National Labs, Richland, Wash., and **SETH SMITH** is with Voith, York Springs, Pa.

The authors would like to acknowledge the Pacific Northwest National Labs (PNNL), Voith, and Oglethorpe Power for their support in the planning and execution of this project.

2024 ITSA ANNUAL MEETING
Brings Members Together in Miami

Attendees and presenters at the 2024 ITSA Annual Meeting posed for a group photo at AWS World Headquarters in Miami, Fla.

The International Thermal Spray Association (ITSA) welcomed attendees of the 2024 ITSA Annual Meeting to AWS World Headquarters in Miami, Fla., on November 6 and 7.

The annual event featured a series of impactful discussions, forward-thinking presentations, networking opportunities, and a visit to Florida International University's (FIU's) Cold Spray and Rapid Deposition (ColRAD) laboratory.

Day one, planned in coordination with AMPP, featured a series of presentations from diverse thermal spray sectors. Topics included robotic automation, thermal spray challenges, performance, certification, field applications, and quality control — Fig. 1. The day concluded with a cocktail reception and dinner for all presenters and attendees.

On the second day, Daniel Hayden, chair of the AWS C2 Committee on Thermal Spray, kicked off the session with an update on recent committee activity, including the release of AWS C2.26/C2.26M:2025, *Specification for Thermal Spray Powder*, and C2.27/C2.27M-2025, *Guide to Thermal Spray Masking*, which are both now available at the AWS Bookstore (*pubs.aws.org*). Hayden encouraged ITSA members to get involved and have an active hand in writing the standards that affect their work. He also thanked AWS Program Manager Jennifer Rosario for her work with the AWS C2 committee for the past 11 years and welcomed the committee's new program manager, Ady Celaya.

Following Hayden's presentation, two member companies — Imperial Systems, Mercer, Pa., and Cincinnati Thermal Spray Inc., Cincinnati, Ohio — gave updates on recent projects and capabilities.

ITSA Chair Kirk Fick called the 2024 ITSA Annual Business Meeting to order following the member update and a brief break. Fick then led meeting attendees into discussions on ITSA's membership, new subcommittees, scholarships, and future meetings. Ashley Hunsaker was also named as ITSA's new vice chair.

At the conclusion of the business meeting, attendees were transported to the FIU College of Engineering, where they had the opportunity to tour the ColRAD lab and learn about the program's capabilities and the research being conducted in cold spray and additive manufacturing — Fig. 2.

ITSA's planning committee is now working on the 2025 Annual Meeting, which is scheduled for November. Details will be announced in the Q2 issue of *SPRAYTIME*.

Fig. 1 — (Far left) ITSA annual meeting attendees listened to various presentations.

Fig. 2 — (Left) ITSA members toured FIU's ColRAD lab.

CINDY WEIHL (*cweihl@aws.org*) is editor of *SPRAYTIME*.

HVOF Tungsten Carbide Powders Optimize Coating Performance

WallCarb™ HVOF tungsten carbide powders are specifically designed for thermal spray applications, offering dense, hard coatings with wear and corrosion resistance. The high-velocity oxygen fuel (HVOF) powders are ideal for oil and gas, mining, steel, and power generation industries. These advanced powders, featuring a spherical, spray-dried, and sintered design, ensure high deposit efficiency and consistent application parameters. This leads to smooth coatings with minimal porosity, reducing the need for extensive finishing and grinding while improving overall process efficiency. The powders come in 5-kg (11-lb) bottles with particle size distributions of –45+15 or –38+10 µm, tailored for various HVOF systems. Additional grades and particle size distributions are available upon request.

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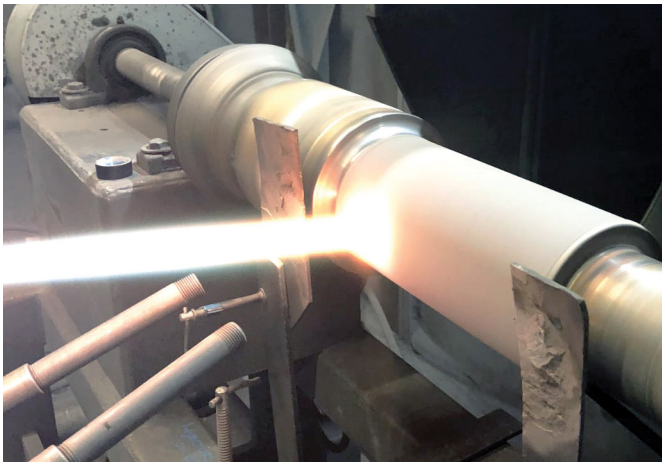

Report Shows Thermal Spray Coatings Market Is Projected to Reach $18.41 Billion by 2032

Global Thermal Spray Coatings Market offers a comprehensive market analysis, providing strategic insights into future trends, growth factors, compound annual growth rate (CAGR), pricing analysis, and more. The report indicates that the market size was valued at $11.87 billion in 2023 and is expected to grow from $12.46 billion in 2024 to $18.41 billion by 2032, with a CAGR of 5.0% during the forecast period from 2025 to 2032. This report highlights market opportunities by region and segment, identifying potential areas for vendors to explore. The market size was calculated using top-down and bottom-up approaches, validated through industry interviews. The report shows the growth of thermal spray coatings is driven by their increasing use across industries such as automotive, aerospace, medical, industrial gas turbines, printing, steel, and pulp and paper. The rising demand for gas turbines in applications like helicopter engines, tanks, ships, and locomotives is expected to further propel the market's growth.

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New AWS Standard Classifies Powders for Thermal Spray Processes

AWS C2.26/C2.26M:2025, *Specification for Thermal Spray Powder*, establishes the requirements for the classification of powders for various thermal spraying processes. The requirements include particle size distribution, apparent density, flow characteristics, and chemical composition. Requirements for manufacturing, labeling, and packaging are also included. This standard designates the chemical and physical properties of the powders commonly used in the production of thermally sprayed coatings. Liquid suspension feedstock is not included at this time.

AWS Bookstore
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Report Highlights Profitable Trends and Opportunities in the Global Thermal Spray Sector

Global Thermal Spray Coating Market reports the market accounted for $8.0 billion in 2019 and is anticipated to gather a revenue of $12.7 billion by 2027, a compound annual growth rate of 5.9% during 2020–2027. The report sheds light on the different growth drivers, investment opportunities, and market restraints in the industry to help companies understand the evolving dynamics of the sector. The advent of innovative thermal spray coatings like plasma coatings is one of the latest trends in the industry. Advancements in nanotechnology have further opened new avenues for growth in the industry. Along with growth drivers and investment opportunities, the report highlights the competitive scenario in the thermal spray coating industry. For this, the profiles of the top businesses in the market are also included in the report. The report puts forth a comprehensive overview of the major drivers and opportunities in the industry to aid companies in formulating their expansion strategies. The latest trends and advancements covered in the study help businesses gain a competitive advantage over their peers in the sector.

Allied Market Research
alliedmarketresearch.com / (503) 894-6022

2025

AMPP Annual Conference and Expo
April 6–10
Nashville, TN
ace.ampp.org/home

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

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

ITSC 2025 International Thermal Spray Conference & Exposition
May 5–8
Vancouver, Canada
www.asminternational.org/itsc-2025

51st International Conference on Metallurgical Coatings & Thin Films (ICMCTF 2025)
May 11–16
San Diego, CA
icmctf2025.avs.org

Cold Spray Action Team
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Coatings Science International Conference
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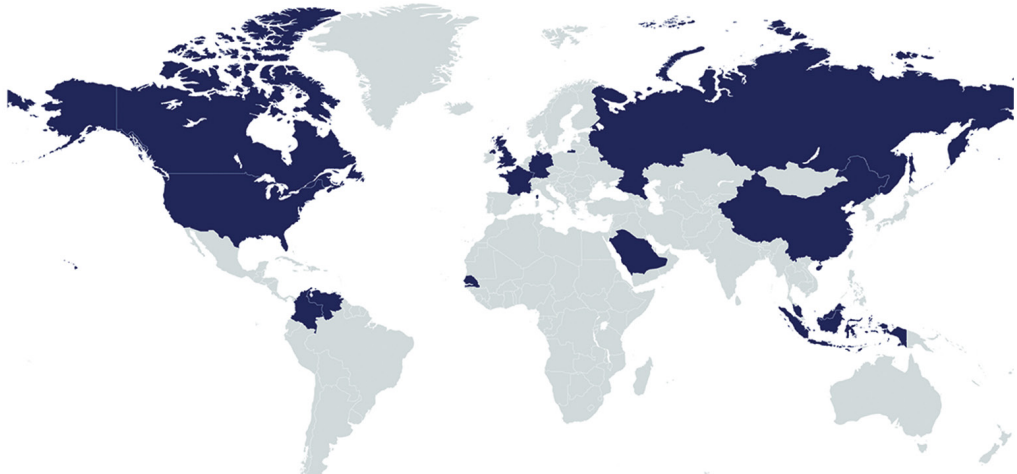

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