SPRAYTIME®

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Robot Basics
The Importance of the Tool Center Point

by Richard S. Brunhouse, Peter Foy, Dale Moody

Many of the robots used for thermal spray operations are of the articulated type, configured much like the human arm and wrist where motions are via joints as opposed to slides. Such robots offer a lot of versatility but could be a problem to program if it were not for advanced robot programming and control software.

This paper provides a brief review on one important programmable parameter for articulated robots, the Tool Coordinate System. Even if you are not involved with robot programming, the information can be of benefit in understanding the basic principles used in automated Thermal Spray operations along with an understanding as to what can be achieved using a properly programmed robot.

To assist the programmer/operator, robot programs offer a number of coordinate systems that define the position and the attitude of the robot and of the tool being used.

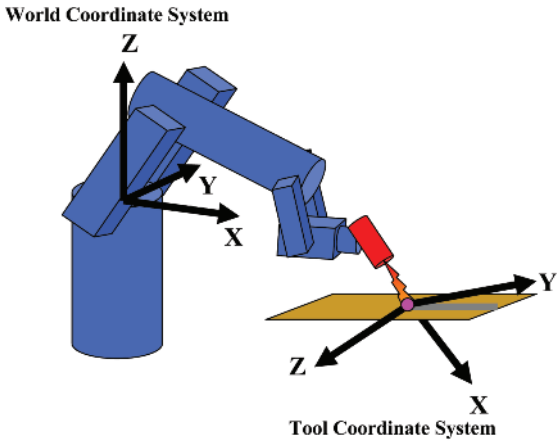

Fig. 1 Two coordinate systems for articulated robots.

Two of these are the World Coordinate System and the Tool Coordinate System (Figure 1). These coordinate systems use Cartesian nomenclature carried over from aircraft. The "X" axis is the forward direction while rotation about this axis is "R" or roll. Horizontal or side-to-side motion is along the "Y" axis and rotation about this axis is "P" or pitch. Vertical motion is along the "Z" axis and rotation about this axis is "W" or yaw.

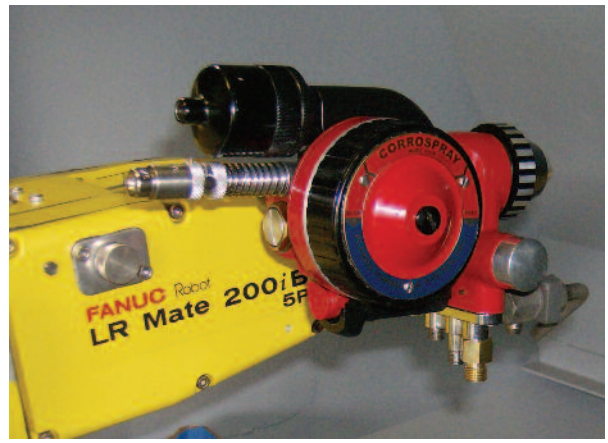

Fig. 2 Plasma Powders Corrospray Wire Spray Gun.

Notice that, in this example, the gun is mounted next to the wrist and at an angle to limit the gun and cable load on the robot wrist. Also, this is a configuration that avoids singularities, a condition where two axes of the robot line up, causing program interpretation problems that could lead to an inadvertent shutdown. Figure 2 is of a Plasma Powders Corrospray Wire Spray Gun with offset mount in an RM-1000 Hood.

The Tool Coordinate System consists of two components, the Tool Frame and the Tool Center Point or TCP. The Tool Frame is made up of the three axes just discussed and the

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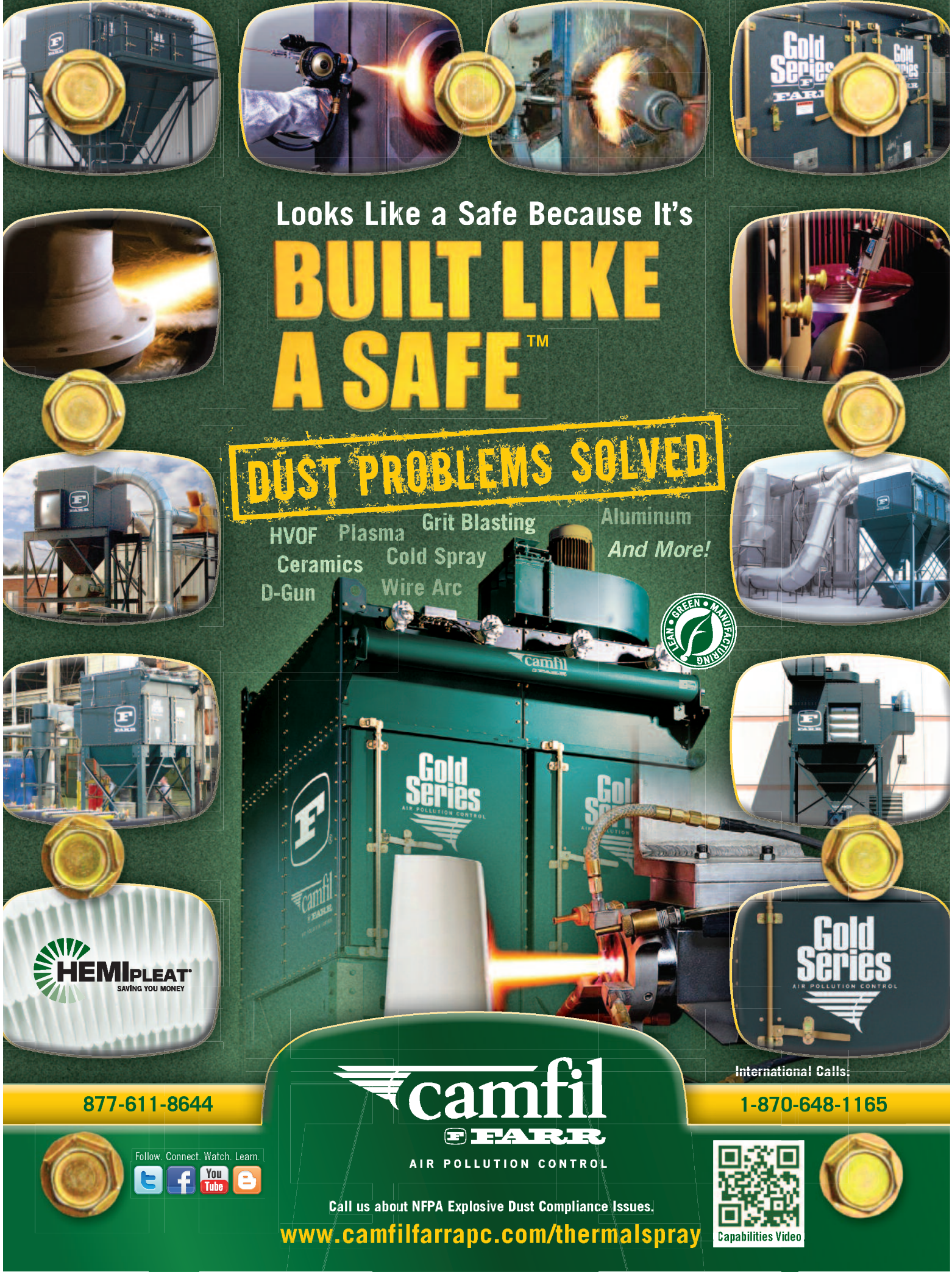
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INDUSTRY NEWS

PEOPLE IN THE NEWS

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TCP is the origin of that frame. When the robot is instructed to move at a certain speed, it is the speed of the TCP that is controlled.

The World Coordinate System is fixed with respect to the robot and is not programmable. However, the Tool Coordinate System is programmable and can be "taught" for each "tool" or gun attached to the robot. In the past, a number of robot programmers used only the World Coordinate System or a default Tool Coordinate System. One instructor for thermal spray robot operations even stated that teaching the Tool Coordinate System was a waste of time. The purpose of this paper is to explain why that thinking is in error and to summarize the benefits of working with a properly set-up Tool Coordinate System. There are at least three benefits realized in using the Tool Coordinate System.

First, it speeds up programming

Consider a Tool Frame and TCP for a thermal spray operation. As noted in Figure 1, the TCP is programmed to be the spot or the deposit point of the spray process. This is at the stand-off distance from the face of the thermal spray gun. This distance can very from an inch for a plasma operation to feet for an arc process.

In developing a robot program, the programmer is interested in the relationship of the gun and the work-piece. Using the Tool Frame as shown for the Thermal Spray Gun, the programmer can easily jog the gun along the gun axis to reach the proper standoff. The programmer only has to move the gun along the "X" Axis (single button control). If the World or default Tool coordinate system were used, the programmer would have to alternately jog between the three axes in order to position the gun.

Second, programming is simpler

In multiple pass coating a sheet as shown in Figure 1, each pass of the gun is offset from the previous path. One way to achieve this is to program each path, i.e. a separate motion instruction for each path. An easier way is to use only one motion instruction in a repetitive loop and incrementally introduce an offset in the "Z" direction after each pass. This is only possible if the Tool Frame has been defined.

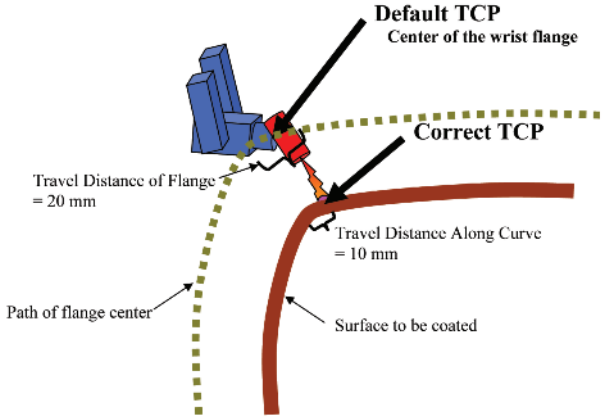

Fig. 3 Robot motion of TCP.

Third, the build is more accurate

A more important argument for using the correct TCP has to do with the build. Figure 3 is an example where a coating is required on a curved surface. To achieve the required thickness, assume that the gun needs to traverse across the plate at a speed of 10 mm/sec. Where the plate is flat, this is easily understood. However, where a curve is encountered such as in figure 3, the gun is moving at a different rate than the speed of the spot or point of application. In this figure, the center of the wrist flange travels 20 mm while the spray plume or spot travels only 10 mm along the curve. If the default TCP (center of the wrist flange) was used by the programmer, the robot would be controlling the speed of the flange and not the speed at the point of application. The spot travel speed in the area of the curve would drop by half, resulting in a build double of that in the flat sections of the sheet. This would produce an unsatisfactory build.

Programming the Tool Coordinate System

Is it difficult to program a Tool Coordinate System? Not really. Modern articulated robots step the operator through

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the program for a Tool Coordinate System. Programming the Tool Frame and TCP is achieved by placing a straw or other object in the gun to represent the stand-off distance. The robot is then jogged to a cause the tip of the straw to touch a singular point from three different positions, and by pressing an "accept" key, it records the gun coordinates for each. The robot can then calculate the TCP for the gun being used. The frame is then defined by moving the gun from the given spot in the "X" direction and then in the "Z" direction and recording the result for each motion. The robot uses that information whenever that tool frame is selected.

As indicated, the Tool Coordinate System can be a powerful tool. It is worth while to become familiar with it and to use it regularly for each Thermal Spray Gun used in a robotic process.

For more information, contact author Dale Moody via email DaleRMoody@aol.com.

INDUSTRY NEWS

LinkedIn
Has 1700+ Member Thermal Spray Group

The business social network "LinkedIn" has a group titled "Thermal Spray Coating" ***currently with 1700+ members*** and some discussions.

If you are interested, please visit www.linkedin.com and join the network and then join the group.

Free DIN Standards Poster

GTS – the Association of Thermal Sprayers – has produced this spectacular new poster of "***Thermal Spraying: Standards and Technical Bulletins***".

The poster identifies DIN Standards for Thermal Spraying and the DVS Technical Bulletins. The standards/bulletin names are in German and in English.

The poster provides contact information for obtaining the complete version Standards and Bulletins.

The International Thermal Spray Association is proud to be one of the sponsors of this project.

Send request for poster to itsa@thermalspray.org.

Curtiss-Wright Acquires F.W. Gartner Thermal Spraying, Ltd.

January 3, 2013 - Curtiss-Wright Corporation announced today that it has acquired the assets of F.W. Gartner Thermal Spraying, Ltd., ("Gartner") of Houston, TX; a leading provider of wear and abrasion resistant coatings for energy and power generation applications. Established in 1923, Gartner has been a pioneer in the application of thermal spray protective coatings that extend the life and improve the performance of severe service industrial components. Gartner also provides laser cladding, PTA weld repair and machining/finishing services to complement its thermal spray coating capabilities.

"The acquisition of FW Gartner strengthens our position within the highly engineered thermal spray coatings market. Its location in the center of the United States energy market and expertise in the application of wear resistant coatings complements our existing thermal barrier spray coating business which serves the aerospace and power generation OEM markets", said Martin R. Benante, Chairman and CEO of Curtiss-Wright Corporation. "We intend to leverage the significant cross synergies that exist between Gartner and our existing thermal spray facilities, and also capitalize on worldwide growth opportunities for Gartner's technologies."

Thermal spray coatings are utilized to protect and enhance a broad variety of critical components used in demanding industries such as aerospace, energy exploration, petrochemical processing, mining and power generation. Gartner applies its thermal spray coatings using a variety of techniques, including high velocity oxygen fuel (HVOF), plasma spray and flame spray, to tailor the coatings for specific end use properties.

Gartner has approximately 115 employees at two ISO 9001 accredited facilities in the Houston, TX area and had sales of approximately $24 million in 2012. Going forward, the facilities will continue to do business as F.W. Gartner Thermal Spraying and operate within the Curtiss-Wright Surface Technologies business segment.

About Curtiss-Wright Surface Technologies Segment:

The Curtiss-Wright Surface Technologies ("CWST") business segment provides precision shot peening, laser peening, engineered coating and analytical testing services to the aerospace, power generation, transportation and other demanding general industrial markets through a global network of 70 locations. ***For more information***, visit www.cwst.com.

About Curtiss-Wright Corporation:

Curtiss-Wright Corporation is an innovative engineering company that provides highly engineered, critical function products, systems and services in the areas of flow control, motion control and surface treatment technologies to the defense, energy and commercial/industrial markets. The legacy company of Glenn Curtiss and the Wright brothers, Curtiss-Wright has a long tradition of design and manufacturing innovation along with long-standing customer relationships. The company employs approximately 9,700 people worldwide. ***For more information***, visit www.curtisswright.com.

About F. W. Gartner Thermal Spraying:

A leading, global provider of surface engineering solutions, FW Gartner is certified to ISO 9001:2008

FW Gartner has built its reputation by providing unsurpassed surface engineering solutions to respond to the challenges facing its clients and partners. Since 1923, the FW Gartner name has stood for quality, innovation, skill, integrity, reliability. These qualities, along with their vast experience and appetite for evaluating and adopting cutting-edge technologies, are now available through their global network of partner companies, providing a no-compromise solution to difficult coating applications anywhere in the world.

FW Gartner thermal spray, laser cladding and kinetic spray solutions can greatly reduce downtime, wear and component replacement cycles.

FW Gartner's team of industry professionals is dedicated to providing the industry's best in quality, performance and cost efficient surfacing technology services.

Message from F.W. Gartner representative: "*FW Gartner will continue to provide their long standing (since 1923!) industry leading quality and service, from their Houston Texas facilities, with their familiar and growing team of experienced surface technology professionals.*"

For more F.W. Gartner information, visit www.fwgts.com

Join the ASM Thermal Spray Society Online Community Forum

ASM TSS members welcome visitors to register and access the new ***searchable*** forum, as well as explore the new online community.

To subscribe, visit http://tss.asminternational.org, choose networking and forum for instructions.

Finishing Online Website Now Includes Thermal Spray

The website "Finishing Online" (www.finishingonline.com) now includes "thermal spray" in an "industries" area. Go to their website to register and get your free listing.

Become a Member of the International Thermal Spray Association

Your company should join the International Thermal Spray Association (ITSA) now! As a company-member professional industrial association, our mission is dedicated to expanding the use of thermal spray technologies for the benefit of industry and society.

ITSA members invite and welcome your company to join us in this endeavor. ***See pages 14-16***.

Thermal Spray Jobs listed at "For Hire" **www.thermalspray.org**

Free Poster

From Linde and the GTS (Association of Thermal Sprayers) illustrates the different thermal spray processes (suitable for framing).

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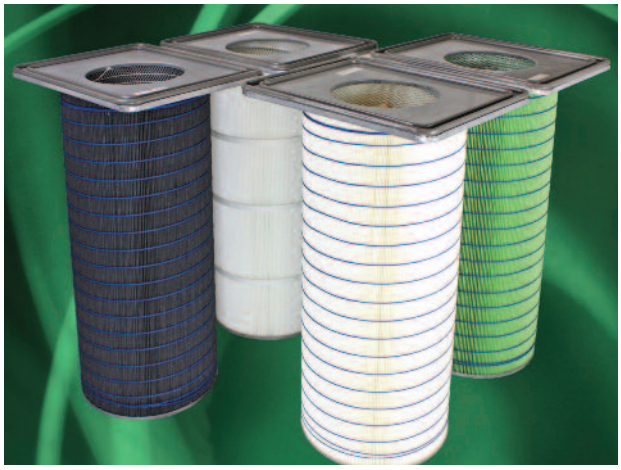
New Hemipleat® eXtreme Dust Collector Filter Offers Higher Efficiency and Durability, Lower Pressure Drop

A new HemiPleat® eXtreme nano fiber filter from Camfil Farr Air Pollution Control (APC) offers higher filtration efficiencies, greater durability, and better resistance to pulse-cleaning than competitive products. These advantages can extend filter life and reduce operating and energy costs associated with industrial cartridge dust and fume collectors.

The standard eXtreme media delivers MERV 15 efficiency – higher than the base media rating of MERV 10 and the MERV 13 rating of competitive nano fiber products. Also available is a high efficiency (HE) MERV 16 eXtreme media that delivers tested efficiency of 99.999 percent on 0.5 micron and larger particles by weight. A proprietary tri-layered technology is used to apply two layers of fine-pored nano fibers that act as a pre-filter to the base media, capturing most of the dust at the surface before it imbeds in the filter. This technology increases the filter's cleaning ability and allows the base material to have larger pore sizes than standard cellulose media – reducing pressure drop while allowing the eXtreme fibers to provide a superior efficiency layer.

The HemiPleat eXtreme coating is so thick and durable that, unlike most nano fiber coatings, it is visible to the eye. It delivers long-term low pressure drop on difficult dust challenges such as laser and plasma cutting, welding and thermal spray; and it can bring longer service life and



lower operational costs to many dry dust applications. The eXtreme filters come in a choice of media to meet special performance needs, with models available for both new and retrofit applications.

Like all HemiPleat products, the eXtreme filter has a

INDUSTRY NEWS

North America's largest metal forming, fabricating, welding and finishing event will be held at the North and South Halls of McCormick Place, Chicago, Illinois, USA, November 18-21, 2013. The upcoming event is expected to cover more than 500,000 net square feet and anticipates over 35,000 attendees and 1,200 exhibiting companies.

Thermal Spray Pavilion

Join the International Thermal Spray Association at the Fabtech Thermal Spray Pavilion this year in Chicago.

To reserve your booth space, contact Joe Krall, 800.443.9353 x 297 or email jkrall@aws.org.

For event information, visit www.fabtechexpo.com.

patented open-pleat design that allows better utilization of the media pack, resulting in better airflow through the cartridge for enhanced performance. A new patent-pending double gasket around the perimeter of the filter prevents any dust from accumulating on top of the pan. All HemiPleat filters come with a written performance guarantee.

Visit www.farrapc.com/products/hemipleat/nano ***for product information***.

For general company information in the United States and Canada, contact Camfil Farr APC at (800) 479-6801 or (870) 933-8048; e-mail filterman@farrapc.com; web www.farrapc.com. For general information outside the United States and Canada, visit www.camfilfarrapc.com.

Kennametal Stellite™ — New Business Unit Expands Kennametal Solutions Portfolio

With the acquisition of UK-based Deloro Stellite, Kennametal´s newest business unit, Kennametal StelliteTM, brings industry-leading wear-resistant solutions in alloys-based science, cast and machined components, hardfacing materials, and coating services that excel in wear-resistance in extreme temperatures and applications.

A global manufacturer and provider of alloy-based critical-wear solutions for extreme environments involving high temperature, corrosion, and abrasion, Kennametal Stellite employs approximately 1,300 people across seven primary

Kennametal Stellite™ provides critical-wear solutions including coatings, hardfacings, castings and even component development, such as these used in glass container manufacturing.

operating facilities globally, including locations in the U.S., Canada, Germany, Italy, India and China. It combines proprietary metal alloys and materials expertise with specialized engineering design and fabrication capabilities to deliver value-added, tailored wear solutions for customers in oil and natural gas, power generation,

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automotive, aerospace/defense, medical/dental, and process and general engineering segments.

Deloro Stellite has a longstanding history of providing exceptional value to customers in demanding environments and we are pleased they have agreed to join the Kennametal team,» commented Carlos Cardoso, Kennametal Chairman, President and CEO. »The addition of this world-class surface technology and materials science expertise will enhance the range of productivity solutions provided to our customers in extreme wear environments.»

History: Stellite is recognized around the world as being synonymous with cobalt-based alloys. In 1907, Deloro Smelting and Refining Company was set up by Michael John O'Brien and Elwood Haynes in the small Canadian cobalt mining village of Deloro. When Haynes left in 1912 to focus on nickel-based components, O'Brien formed Deloro Stellite to produce cobalt-based Stellite alloys.

Stellite products include:

-StelliteTM: Cobalt-based alloys with the best ´all-round´ wear properties. They combine exceptional wear and heat resistance and are used across a wide range of applications.

-DeloroTM: Nickel-based alloys which cover a broad range of hardness'. They tend to have lower melting points which make well suited for powder welding or spray and fuse.

-TribaloyTM: Intermetallic-phase alloys which can be either nickel- or cobalt-based. They perform exceptionally well in metal-to-metal wear at high temperatures.

-NistelleTM: Nickel-based, corrosion-resistant, high-melting-point alloys. Developed for protection against aggressive chemicals or other corrosive media.

-StelcarTM: Nickel or cobalt-based alloys with carbide particles. Only available in powder form for coating applications.

-Jet KoteTM: Carbide and metal combination powders specifically designed for thermal spraying.

-DelcromeTM: Iron-based alloys designed for abrasive wear resistance at lower temperatures.

-DuraStellTM: High-performance metal claddings for use in critical applications where corrosion and wear limit part life and reliability. A metallurgical bond is formed with the substrate material, making the process of particular value where conventional alloys and application methods cause excessive part distortion or degradation of high-performance base metals.

Kennametal Stellite also provides such value-added services as rapid product development of cast components, final assembly of power generation steam valves, fully machined parts, and coating services. Parts are produced through different processes such as investment casting and finish machining, and are custom-engineered to meet individual customer needs. In addition, Kennametal Stellite offers its expertise and experience in coating services in the form of HVOF (High-Velocity Oxy Fuel) coatings and weld hardfacings.

Keeping Power Flowing: Recently, a major US-based power company experienced new challenges with their supercritical steam drain and vent lines in one of their plants. Kennametal Stellite was engaged by a large OEM of severe-service valves to resolve the issue. MSBVs (metal-seated ball valves) are being used on drain and vent lines to extract large quantity of condensate during plant start-up in order to get dry superheated steam rapidly. MSBVs must remain steam-tight to prevent energy loss and maximize plant efficiency. This particular fossil-fuel power station runs continuously from May to October due to high power demand to run air-conditioning systems. For the balance of the year, the plant only runs when the demand called for more power during peak usage times. Every time

the plant shuts down or starts up, MSBVs are operated and exposed to supercritical steam operating conditions.

The MSBVs in question were of a floating ball design with a fixed seat, manufactured from forged Inconel® 718 PH and coated with a HVOF 80% Cr_3C_2 + 20% NiCr coating. This coating failed after 1 year and less than 500 mechanical cycles in service on balls exposed to supercritical steam, with deterioration extending to regions where there is no contact between ball and seats. Visual examination of damaged components revealed minor frictional wear and typical stress/fatigue pattern.

Testing revealed the dominant failure mechanism to be coating embrittlement due to chrome carbide precipitation in-service across coating binder. Brand new samples were produced with three new Kennametal Stellite coatings. A battery of tests was performed to assess their behavior for this specific application.

Once the cause was known, further tests revealed a spray-and-fuse NiWCrBSi coating more suitable to support high bearing load when facing thermal shock. This coating is less sensitive to ageing at high temperatures and therefore more durable under these very specific conditions.

An enhanced HVOF coating, produced from a mixed (W,Cr)C and WC carbides in a nickel matrix, also emerged successful from the tests. While it showed similar ductility compared to the original HVOF Cr_3C_2-NiCr coating, it consistently provided longer in-service life in service under 540 ºC (1,000 ºF).

Armed with these new coating technologies, new valves were installed in the plant. They have worked flawlessly for the past year. As a result, the valve manufacturer´s MSBV line for the power industry now features two coatings: one designed for regular service - HVOF (W,Cr)C-Ni and one specially designed for applications involving severe thermal shocks - S&F NiWCrBSi.

For more information, visit http://stellite.com

Kennametal Inc. (NYSE: KMT) delivers productivity to customers seeking peak performance in demanding environments by providing innovative custom and standard wear-resistant solutions. This proven productivity is enabled through our advanced materials sciences and application knowledge. Our commitment to a sustainable environment provides additional value to our customers. Companies operating in everything from airframes to coal mining, from engines to oil wells and from turbochargers to construction recognize Kennametal for extraordinary contributions to their value chains. In fiscal year 2012, customers bought approximately $3 billion of Kennametal products and services - delivered by our approximately 13,000 talented employees doing business in more than 60 countries - with more than 50 percent of these revenues coming from outside North America.

Visit us at www.stellite.com and www.kennametal.com

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Eastern Metallizing Company Signs a Technical Collaboration Agreement With ASB Industries

Shantanu Newar, Director of Eastern Metallizing Company and Charles Kay, ASB Industries.

India-based Eastern Metallizing Company signed a Technical Collaboration Agreement with ASB Industries, Inc. This joint agreement aligns the two companies' coating systems, procedures, and materials for a variety of applications in the growing Indian market. Eastern Metallizing's thermal spray processes and machine tools complement ASB Industries' technology to deliver high

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performance surfacing capabilities, adaptable to unique production requirements specific to plant operating conditions, equipment, and product quality standards. The exchange included visitation by key personnel to both companies during the past months with the goal of developing a long-term relationship. ASB Industries, Inc., is a single-source provider of advanced surfacing technologies.

Eastern Metallizing Company has over 60 years' experience in thermal spray coatings. Based in Kolkata, West Bengal, India, Eastern Metallizing's strict quality standards have made them one of their nation's leading providers of surface engineering and coating services. The company aims to be India's largest thermal spray services provider by 2020. Eastern Metallizing Company of Kolkata, India.

For more information, visit asbindustries.com

Scholarship Opportunities

Since 1991, the ***International Thermal Spray Association Scholarship Program*** has contributed to the growth of the thermal spray community. ITSA offers up to three Graduate Scholarships of **$2,000.00 each**.

Applications accepted April 15 through June 30 ONLY.

Visit www.thermalspray.org scholarship area for details.

Bodycote Opens New Surface Technology Facility in Houston, Texas

The new Bodycote facility will enable Houston's large oil and gas market to access Bodycote's specialist expertise in high velocity oxy fuel (HVOF) spraying of tungsten carbide and the K-Tech® family of thermochemically-formed ceramic treatments, which are particularly suited to treat components operating in severe service applications.

The new plant complements Bodycote's heat treatment facilities in Texas, and the surface technology facility in neighbouring Arkansas, which provides ceramic treatments. Bodycote has a total of 43 facilities in the USA providing the full range of Bodycote's services.

About Bodycote

With more than 170 accredited facilities in 27 countries, Bodycote is the world's largest provider of thermal processing services. Through heat treatment, metal joining, surface technology and Hot Isostatic Pressing (HIP), Bodycote improves the properties of metals and alloys, extending the life of vital components for a wide range of industries, including aerospace, defence, automotive, power generation, oil and gas, construction, medical and transportation. Customers in all of these industries have entrusted their products to Bodycote's care for more than 30 years.

For more information, visit www.bodycote.com.

INDUSTRY NEWS

Metallisation
Thermal spray equipment and consumables

Global Engineering Coating Equipment

Mass Flow Control Systems

Metallisation's Plasma, HVOF and automated flame spray systems all have mass flow control for ease of operation and optimum repeatability. The systems are PLC controlled with a familiar Windows interfaced touch screen that users find easy to operate. All of Metallisation's systems are high quality, compact and easy to use.

METJET 4L -
Liquid Fuel HVOF system

Plasma PS50M-PC -
50kW Plasma Spray system

PCC - Pistol Control Console

Our proven mass flow control system that can be configured to operate a range of plasma or HVOF pistols, powder feeders and power supplies commonly used in the industry. The system can operate liquid fuel or gas fuel HVOF pistols and plasma pistols up to 80kW.

MK74-PC -
Powder Flame Spray system

MK66E-PC -
Wire Flame Spray system

Manual Spray Systems

Metallisation's manual systems are suitable for engineering coatings where a combination of manual and tool post mounted spraying is required. Our range includes oxy-acetylene flame spray systems and a full range of hand held or automated arc spray systems from 250A to 1,500A.

Excellent Customer Service

Metallisation's customer service is second to none, including an exceptional after sales service. With a network of distributors around the globe, and a team of fully qualified and highly experienced service engineers, customers can rely on the highest standard of care, wherever they are in the world.

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ITSA Mission Statement

The International Thermal Spray Association, 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.

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Mr. Renato Drexel, renato@drexel.com.mx

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www.globemetal.com 450.645.9397
Mr. Adam Rubin, adam@globemetal.com

Harper Corporation of America - DePere, WI USA
www.harperimage.com 704.588.3371
Mr. Lee Kluttz, lkluttz@harperimage.com

Hausner Hard-Chrome - Owensboro, KY USA
www.hausnerinc.com 270.684.2279
Mr. Bruce Dulin, bruce.dulin@hausnerinc.com

Hayden Corporation - West Springfield, MA USA
www.haydencorp.com 413.734.4981
Mr. Dan Hayden, daniel.hayden@haydencorp.com

Nation Coating Systems - Franklin, OH USA
www.nationcoatingsystems.com 937.746.7632
Mr. Larry Grimenstein, ncslgrimen@aol.com

New England Plasma Development Corp. - Putnam, CT
www.neplasma.com 860.928.6561
Ms. Maureen M. Olshewski, molshewski.nep@snet.net

Plasma Coatings - Union Grove, WI USA
www.plasmacoatings.com 262.878.2445
Mr. Daniel Cahalane, info@plasmacoatings.com

Plasma Technology, Inc. - Torrance, CA USA
www.ptise.com 310.320.3373
Mr. Robert D. Dowell, salespti@ptise.com

St. Louis Metallizing Company - St. Louis, MO USA
www.stlmetallizing.com 314.531.5253
Mr. Joseph P. Stricker, jpstricker@stlmetallizing.com

Southwest United Industries, Inc. - Tulsa, OK USA
www.swunited.com 918.587.4161
Mr. Bill Emery, aandoe@swunited.com

Spraymetal, Inc. - Houston, TX USA
www.schumachercoinc.com 713.924.4200
Mr. Andrew Schumacher, ars@schumachercoinc.com

Superior Shot Peening, Inc. - Houston, TX USA
www.superiorshotpeening.com 281.449.6559
Mr. Albert Johnson, ajsspi@aol.com

Technetics Group - Daytona Beach, FL USA
www.taratechnologies.com 386.253.0628
Ms. Amy Davis, amy.davis@techneticsgroup.com

Thermal Spray Technologies, Inc. - Sun Prairie, WI USA
www.tstcoatings.com 608.825.2772
Mr. Bill Lenling, blenling@tstcoatings.com

United Surface Technologies - Altona, Melbourne Australia
61.393.98.5925
Mr. Keith Moore, keith.moore@ust.com.au

SUPPLIER MEMBER COMPANIES

3M Abrasive Systems Division - St. Paul, MN USA
www.mmm.com 800.362.3550 or 651.736.4970
Mr. Nick Orf, naorf2@mmm.com

Advanced Material Services - West Chester, OH USA
513.907.8510
Mr. Jim Ryan, jryan-ams@cinci.rr.com

ArcMelt - Bridgeton, MO USA
www.arcmelt.com 314.801.6900
Mr. David Urevich, durevich@arcmelt.com

AMETEK, Inc. - Eighty-Four, PA USA
www.ametekmetals.com 724-225-8400
Ms. Cindy Freeby, cindy.freeby@ametek.com

Ardleigh Minerals, Inc. - Shaker Heights, OH 44122 USA
www.ardleigh.net 216.464.2300
Mr. Ernie Petrey, epetrey@ardleigh.net

Bay State Surface Technologies, Inc. - Auburn, MA USA
www.baystatesurfacetech.com 508.832.5035
Mr. Jay Kapur, jkapur@aimtek.com

Camfil Farr APC - Jonesboro, AR USA
www.farrapc.com 800.479.6801
Mr. Dale Gilbert, gilbertd@farrapc.com

INTERNATIONAL THERMAL SPRAY ASSOCIATION

INTERNATIONAL THERMAL SPRAY ASSOCIATION

Carpenter Powder Products - Pittsburgh, PA USA
www.carpenterpowder.com 412.257.5102
Mr. Chip Arata, warata@cartech.com

Centerline Windsor Limited - Windsor, ON Canada
www.supersonicspray.com 519.734.8464
Mr. Julio Villafuerte, julio.villafuerte@cntrline.com

Donaldson Torit - Minneapolis, MN USA
www.donaldson.com/en/industrialair 800.365.1331
Ms. Lori Lehner, llehner@mail.donaldson.com

Flame Spray Technologies, Inc. - Grand Rapids, MI USA
www.fst.nl 616.988.2622
Mr. Terry Wilmert, twilmert@fstincusa.com

Fujimi Inc. - Arlington Heights, IL USA
www.fujimico.com 847.398.6544
Mr. Michael Akiyoshi, makiyoshi@fujimico.com

Genie Products, Inc. - Rosman, NC USA
www.genieproducts.com 828.862.4772
Mr. Richard Grey, rwgrey@genieproducts.com

Global Tungsten and Powders Corp - Towanda, PA USA
www.globaltungsten.com 570.268.5393
Mr. Paul Sedor, Paul.Sedor@globaltungsten.com

Green Belting Industries LTD - Mississauga, ON, Canada
www.greenbelting.com 905.564.6712
Mr. Tim Connelly, tconnelly@greenbelting.com

H.C. Starck North American Trading LLC - Newton, MA USA
www.hcstarck.com 617.407.9960
Ms. Ana MacKendrick, ana.mackendrick@hcstarck.com

HAI Advanced Material Specialists - Placentia, CA USA
www.hardfacealloys.com 877.411.8971
Mr. Daren Gansert, dgansert@haiams.com

Haynes International - Mountain Home, NC USA
www.haynesintl.com 828.692.5791
Mr. Richard Hoskinson, rhoskinson@haynesintl.com

Kennametal Stellite Company, Inc. - Goshen, IN USA
www.stellite.com 574.534.8631
Mr. David A. Lee, dlee@stellitecoatings.com

Linde Gas USA LLC - Murray Hill, NJ USA
www.us.linde-gas.com 908.771.1353
Dr. Joe Berkmanns, joachim.berkmanns@us.linde-gas.com

Lineage Alloys - Baytown, TX USA
www.lineagealloys.com 281.426.5535
Mr. Gordon Jones, gjones@lineagealloys.com

MesoCoat, Inc. - Euclid, OH USA
www.mesocoat.com 216.453.0866
Mr. Anupam Ghildyal, aghildyal@mesocoat.com

Metallisation Limited
Dudley West Midlands, United Kingdom
www.metallisation.com +44.1384.2524646
Dr. Terry Lester, rd@metallisation.com

North American Höganäs - Hollsopple, PA USA
www.hoganas.com 814.361.6875
Mr. Andy Hoffman, andy.hoffman@nah.com

PM Recovery, Inc. - Harrison, NY USA
www.pmrecovery.com 860.536.5396
Mr. Paul Sartor, paul@pmrecovery.com

Polymet Corporation - Cincinnati, OH USA
www.polymet.us 513.874.3586
Mr. Bob Unger, runger@polymet.us

Praxair Surface Technologies - Concord, NH USA
www.praxair.com/thermalspray 603.224.9585
Mr. Richard Thorpe, richard_thorpe@praxair.com

Progressive Surface - Grand Rapids, MI USA
www.ptihome.com 800.968.0871
Mr. Bill Barker, wnb@ptihome.com

Saint-Gobain Ceramic Materials - Worcester, MA USA
www.coatingsolutions.saint-gobain.com 508.795.2351
Mr. Howard Wallar, howard.wallar@saint-gobain.com

Sulzer Metco (US) Inc. - Westbury, NY USA
www.sulzermetco.com 516.334.1300
Ms. Mae Wang, mae.wang@sulzer.com

Thermach, Inc. - Appleton, WI USA
www.thermach.com 920.779.4299
Mr. David Lewisen, davelewisen@thermach.com

Thermion, Inc. - Silverdale, WA USA
www.thermioninc.com 360.692.6469
Mr. Dean Hooks, dean@thermioninc.com

ASSOCIATE MEMBER ORGANIZATIONS

Advanced Materials and Technology Services, Inc.
Simi Valley, CA USA
www.adv-mts.com - 805.433.5251
Dr. Robert Gansert, rgansert@adv-mts.com

ASM Thermal Spray Society - Materials Park, OH USA
http://tss.asminternational.org 440.338.5151
Randall S. Barnes, randall.barnes@asminternational.org

State University of New York at Stony Brook
Stony Brook, NY USA
www.ctsr-sunysb.org 631.632.8480
Prof. Sanjay Sampath, ssampath@ms.cc.sunysb.edu

SUPPORTING MEMBER SOCIETIES

DVS, The German Welding Society
www.die-verbindungs-spezialisten.de
Mr. Jens Jerzembeck, jens.jerzembeck@dvs-hg.de

GTS e.V., The Association of Thermal Sprayers
www.gts-ev.de +49.89.31001.5203
Mr. Werner Kroemmer, werner.kroemmer@gts-ev.de

IMM, Institute of Materials Malaysia
www.iomm.org.my 603.5882.3584
Mr. Johar Juhari, johar_juhari@petronas.com.my

JTSS, Japan Thermal Spray Society
+81.6.6722.0096 www.jtss.or.jp
Mr. Nick Yumiba, jtss@mb8.seikyou.ne.jp

MPIF, Metal Powder Industries Federation
www.mpif.org 609.452.7700
Mr. James R. Dale, jdale@mpif.org

TSCC - Thermal Spraying Committee of China Surface Engineering Association
www.chinathermalspray.org +86.10.64882554
Prof. Huang Xiaoou, Xiaoou@chinathermalspray.org

Visit us at www.thermalspray.org

INTERNATIONAL THERMAL SPRAY ASSOCIATION

Bringing Technology and Technique Together

A standing committee of the American Welding Society®

The ***International Thermal Spray Association*** is closely interwoven with the history of thermal spray development in this hemisphere. Founded in 1948, and once known as Metallizing Service Contractors, the association has been closely tied to most major advances in thermal spray technology, equipment and materials, industry events, education, standards and market development.

Chairman Wright

A company-member association, ITSA invites all interested companies to talk with our officers, and company representatives to better understand member benefits. A complete list of ITSA member companies and their representatives can be found at www.thermalspray.org

ITSA Mission Statement

The International Thermal Spray Association, 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.

Officers

Chairman: ***David Wright***, Accuwright Industries, Inc.
Vice-Chairman: ***Jason Falzon***, FW Gartner Thermal Spraying
Treasurer: ***Bill Mosier***, Polymet Corporation
Corporate Secretary: ***Kathy Dusa***
Executive Committee (above officers plus the following)
Dan Hayden, Hayden Corporation
Joseph Stricker, St. Louis Metallizing Company

ITSA Scholarship Opportunities

The International Thermal Spray Association 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. Please visit www.thermalspray.org for criteria information and a printable application form.

ITSA Thermal Spray Historical Collection

In April 2000, the International Thermal Spray Association announced the establishment of a Thermal Spray Historical Collection which is now on display at their headquarters office in Fairport Harbor, OH and the State University of New York at Stony Brook in the Thermal Spray Research Center, USA.

Growing in size and value, there are now over 30 different spray guns and miscellaneous equipment, a variety of spray gun manuals, hundreds of photographs, and several historic thermal spray publications and reference books.

Future plans include a virtual tour of the collection on the ITSA website for the entire global community to visit.

This is a worldwide industry collection and we welcome donations from the entire thermal spray community.

ITSA *SPRAYTIME* Newsletter

Since 1992, the International Thermal Spray Association has been publishing the ***SPRAYTIME*** newsletter for the thermal spray industry. The mission is to be the flagship thermal spray industry newsletter providing company, event, people, product, research, and membership news of interest to industrial leaders, engineers, researchers, scholars, policy-makers, and the public thermal spray community. This newsletter is free and can be viewed online at www.spraytime.org.

ITSA Headquarters

NEW ADDRESS

Post Office Box 1638, Painesville, OH 44077 USA
voice/cell: 440.357.5400 • fax: 440.357.5430
itsa@thermalspray.org • www.thermalspray.org

Become a Member of The International Thermal Spray Association

Your company should join the International Thermal Spray Association (ITSA) now! As a company-member, professional industrial association, our mission is dedicated to expanding the use of thermal spray technologies for the benefit of industry and society.

ITSA members invite and welcome your company to join us in this endeavor.

New - All ITSA company members are now also Supporting Members of the American Welding Society which includes five individual AWS memberships.

Whether you are a job shop, a captive in-house facility, an equipment or materials supplier, an educational campus, or a surface engineering consultant, ITSA membership will be of value to your organization.

The most valuable member asset is our annual membership meetings where the networking is priceless! Our meetings provide a mutually rewarding experience for all attendees - both business and personal. Our one-day technical program and half-day business meeting balanced by social activities provide numerous opportunities to discuss the needs and practices of thermal spray equipment and processes with one another.

As an ITSA member, your company has excellent marketing exposure by being listed on our website along with a multitude of additional benefits.

ITSA member companies are also highlighted in the ITSA booth at several trade shows throughout the year (International Thermal Spray Conference ITSC, Fabtech Thermal Spray Pavilion and Conference, Fabtech Mexico, Power-Gen, Society of Vacuum Coaters (SVC), TurboMachinery, NACE and TurboExpo).

If you would like to discuss the benefits of your company becoming a member of the International Thermal Spray Association, we suggest you contact Kathy Dusa at ITSA headquarters office, phone 440.357.5400 or visit the membership section at www.thermalspray.org.

Thermal Spray Jobs listed at "For Hire" **www.thermalspray.org**

FABTECH
AWS WELDING FMA SME PMA METALFORM

North America's largest metal forming, fabricating, welding and finishing event will be held at the North and South Halls of McCormick Place, Chicago, Illinois, USA, November 18-21, 2013. The upcoming event is expected to cover more than 500,000 net square feet and anticipates over 35,000 attendees and 1,200 exhibiting companies.

Thermal Spray Pavilion

Join the International Thermal Spray Association at the Fabtech Thermal Spray Pavilion this year in Chicago.

To reserve your booth space, contact Joe Krall, 800.443.9353 x 297 or email jkrall@aws.org.

For event information, visit www.fabtechexpo.com.

International Thermal Spray Association Welcomes New Member

GLOBE METAL
Innovation in Metal Recycling

Globe Metal, Inc. has joined the International Thermal Spray Association.

Since 1974 Globe Metal, Inc. has been in the business of recycling metal. We specialize in extracting valuable metals from industrial generated wastes such as metal powders, metallic sludge, grinding swarf, filter cake, metal fines and metal dust. We also specialize in recycling high temperature alloys, tungsten carbide, stainless steel and nickel scrap.

We buy all grades of ferrous and non-ferrous scrap, spent catalysts, grinding swarf, metal powders, overspray and thermal spray wastes.

We are a scrap metal company, specializing in the processing of all industrially generated metals, high temperature alloy scrap, tungsten carbide scrap in solid or sludge form, tantalum scrap, high speed tool steel scrap as well as powders and oversprays containing nickel, cobalt and molybdenum.

We operate a fully paved, modern processing facility where we package our finished product for direct shipment to various consumers worldwide. Our paved yard helps protect the environment while giving our customers peace of mind in knowing the highest environmental protection standards are being maintained on their behalf. Since 1975, we have helped our customers maximize the value of their scrap metals by providing a more direct access to the marketplace, as well as showing them how to save costs in the handling of their various scrap materials in plant.

Our equipment consists of specially designed leak proof tote boxes and various other material handling devices that help our customers save money in the handling of scrap in their plants as well as protecting the environment from coolant spills and contamination.

Our aim is to tailor a specific program suited to your individual needs!

For more information, contact ITSA company representative Adam Rubin, adam@globemetal.com and visit website www.globemetal.com

NEW "Supporting Societies" Membership

The International Thermal Spray Association is pleased to announce a new "Supporting Societies" membership category to establish communication with other associations/societies involved in thermal spray and surface engineering activities worldwide.

See the Supporting Societies listing on page 15.

This is ideal for membership exchange between organizations. Contact Kathy Dusa at the headquarters office via email to itsa@thermalspray.org

Praxair Surface Technologies Introduces New High Performance Inorganic, Zinc-Rich Sacrificial Coating

Most conventional zinc platings fail within just a few hundred hours of salt spray exposure tests. Praxair's new, Zinc rich, Water-based Sacrificial Coating shows no red rust and significantly diminished formation of white corrosion products after 3,600+ hours of salt spray exposure.

Scribed carbon steel panel showing no red rust after 3,600 hours of neutral salt spray testing per ASTM B117.

The coating is stable at temperatures up to 750°F (400°C), impervious to brake-fluids, grease and solvents and can be applied to powder metallurgy parts. Additional benefits include a zero VOC and chrome free formulation. The coating process also allows flexibility for an air dry or lower temperature cure process for certain applications.

For more information, phone +1 317.246.2756 or contact Anand Samant email anand_samant@praxair.com

Where is your article? We encourage you to send articles, news, announcements and information to spraytime@thermalspray.org.

Scholarship Opportunity

Since 1991, the ***International Thermal Spray Scholarship Program*** has contributed to the growth of the thermal spray community. ITSA offers up to three Graduate Scholarships **worth $2,000.00 each**.

Applications accepted April 15 through June 30 ONLY.

Please visit www.thermalspray.org scholarship area for details and a printable application form.

Become a Member of the International Thermal Spray Association

Your company should join the International Thermal Spray Association (ITSA) now! As a company-member professional industrial association, our mission is dedicated to expanding the use of thermal spray technologies for the benefit of industry and society.

ITSA members invite and welcome your company to join us in this endeavor. See pages 14-17.

FABTECH
AWS WELDING FMA SME PMA METALFORM

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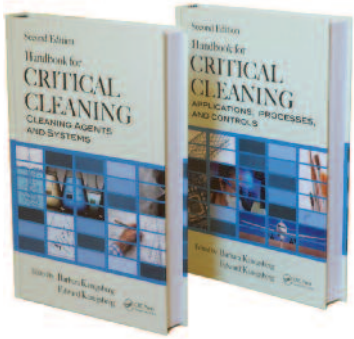
To reserve your booth space, contact Joe Krall, 800.443.9353 x 297 or email jkrall@aws.org.

For event information, visit www.fabtechexpo.com.

INDUSTRY NEWS

BOOK REVIEW



by Steve Norris,
Facility Manager,
Plasma Technology, Inc.

Handbook for Critical Cleaning 2nd Edition is a comprehensive reference book that approaches cleaning from many different perspectives. The book is divided into two parts: Cleaning Agents and Systems, and Applications, Processes, and Controls. Each volume is written by experienced authors who have working expertise in their respective fields. There are more than 70 contributing authors from different walks of life including academic, government, pharmaceutical, medical and medical implants, chemical, thermospray, safety, aerospace, film, and art restoration. There are more than 1,000 pages which include glossaries, indices, bios, tables and formulas. *Critical Cleaning* is edited in such a way that the diverse disciplines overlap, and each chapter has something to offer the whole. Its strongest feature is the clear explanation of solvents and how they work in the cleaning process. Also interesting is the chapter on Regulations written from a regulator's perspective. The explanation on ultrasonics is particularly in depth.

In my opinion, it's more pragmatic than a textbook, and this is why I keep Barbara and Edward Kanegsberg's book in my reference library where I can find formulas and charts quickly. I would recommend it for those that are going to buy equipment, have a need to know the chemical structure of solvents, and those who are working in thermospray who need to know what solvent to use to clean different metals. *Critical Cleaning* is truly a handbook as it has a workman's knowledge of the subject that is useful for technicians and engineers. It is also a sophisticated and in depth tool for working scientists.

For more information, visit www.bfksolutions.com or contact author Barbara Kanegsberg via email barbara@bfksolutions.com or contact reviewer Steve Norris via email s.norris@ptise.com

ISBN 9781439828267. List price for the set of two books is $179.95. Can be purchased through CRC Press or major online booksellers. **Spraytime readers can save 20%**, with free shipping, if they email us; we will send them a discount code to order through CRC Press. They can also reach us by clicking the image of the books on the home page of our website, bfksolutions.com.

Praxair Surface Technologies Signs Long-Term Agreement with Messier-Bugatti-Dowty for Airframe Coatings in Asia

Praxair Surface Technologies, Inc. a wholly-owned subsidiary of Praxair, Inc. (NYSE: PX), has entered into a 10-year agreement with Messier-Bugatti-Dowty (Safran Group) for thermal spray coating services to replace chrome plating on major airframe component programs.

Praxair will commission an airframe production line in its Changzhou, China facility for thermal spray coating and finishing services as well as a coating production cell in Changwon, South Korea for applying automated thermal spray coatings and metallic slurries. Production is expected to commence in 2013.

"Praxair's participation in this project is essential for Messier-Bugatti-Dowty to produce high-quality, environmentally-responsible airframe components with complex geometry for leading aircraft major programs," said Henri Koffel, vice president of Purchasing for Messier-Bugatti-Dowty. "Once again, Praxair has proven itself as a reliable, technologically advanced supplier who has invested in our combined success."

"Praxair is pleased to expand production in Asia for Messier-Bugatti-Dowty and the Safran Group," said Mark Murphy, president of Praxair Surface Technologies. "Through our advanced coating technologies, broad range capabilities in Asia, and global production excellence, we're uniquely positioned to support Messier-Bugatti-Dowty's production of more environmentally-friendly aircraft components."

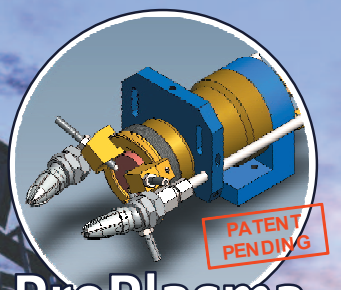
Praxair provides airframe coating services to Messier-Bugatti-Dowty through its production facilities in Canada, France, and the United Kingdom. The company's China and South Korea coating centers are part of a global network of advanced coatings facilities that utilize leading technologies and apply best-in-class safety and quality principles.

About Praxair Surface Technologies: Praxair Surface Technologies offers a comprehensive slate of high-performance coatings and technologies to aviation, industrial gas turbine, oil and gas, and other markets. By continuously advancing coatings technologies, Praxair Surface Technologies helps customers improve environmental performance, decrease energy consumption, extend component life, improve productivity, minimize downtime, reduce operating costs, and produce higher quality products.

Praxair, Inc. is the largest industrial gases company in North and South America, and one of the largest worldwide, with 2011 sales of $11 billion. The company produces, sells and distributes atmospheric, process and specialty gases, and high-performance surface coatings. Praxair products, services and technologies are making our planet more productive by bringing efficiency and environmental benefits to a wide variety of industries, including aerospace, chemicals, food and beverage, electronics, energy, healthcare, manufacturing, metals and others.

For more information, visit www.praxair.com.

INDUSTRY NEWS



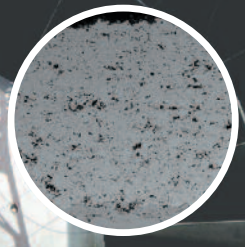
ProPlasma HP

Use our ProPlasma coatings to improve your turbine component efficiency

ProPlasma HP
by Saint-Gobain Coating Solutions

RUBY for wind turbine bearings
2% porosity – 57% DE
4,1 kg/h deposition rate
7,2 kg/h feed rate

SG 204 – YZ for gas turbine components
8 to 15% porosity – 57% DE
5,08 kg/h min deposition rate
9,00 kg/h feed rate



CONTACT US TODAY
USA - +1-800-243-0028
FRANCE - +33 4 90 85 85 00
GERMANY - +49 171 425 56 52

SAINT-GOBAIN
COATING SOLUTIONS

CALENDAR OF EVENTS

2013

JANUARY 2013

7-10 Dubai, United Arab Emirates *Arabia Essen Welding and Cutting Int'l Trade Fair Joining, Cutting, Surfacing* - contact Messe-Essen christina.kleinpass@messe-essen.de

MARCH 2013

13-15 Orlando, FL USA *Above Ground Storage Tank Conference and Trade Show* - contact Jim DeMartini 800.827.3515 or email jdemartini@nistm.org

17-21 Orlando, FL USA *Corrosion 2013* - visit www.nace.org

17-21 Doha, Qatar *Middle East Turbomachinery Symposium* - contact turbolab@tamu.edu.

19-21 Long Beach, CA USA *AERODEF Manufacturing Aerospace and Defense Manufacturing* - visit aerodefevent.com

APRIL 2013

3-4 Bellevue, WA USA *North American Cold Spray Conference*- visit www.asminternational.org "events"

2-5 Bellevue, WA USA *AeroMat Conference and Expo* - contact www.asminternational.org/aeromat

3--5 Kyiv, Ukraine Kyiv Technical Trade Show 2013 - For wire and tube industry, surface preparation and sheet metal industry - visit www.weldexpo.com.ua

20-25 Providence, RI USA SVC TechCon 2013 Vacuum Coating and Surface Engineering - visit www.svc.org

MAY 2013

5-8 Helsingor, Denmark *Int'l conference on Joining Materials JOM 17* - contact jom_aws@post10.tele.dk

6-8 Goregon, Mumbai, India ***Power-Gen India and Central Asia*** - visit www.power-genindia.com

6-9 Houston, TX USA *OTC2013 Offshore Technology Conference* - visit otcnet.org/2013

7-9 Monterrey, Mexico *5th Fabtech Mexico* - visit fabtechmexico.com

13-15 Busan, Republic of Korea *International Thermal Spray Conference and Exposition ITSC2013* - visit www.asminternational.org/itsc

Is Your Event Listed? Send notice to spraytime@thermalspray.org

JUNE 2013

4-6 Edmonton, Alberta Canada *Western Manufacturing Technology Show and Weld Expo Canada* - visit www.wmts.ca

4-6 Vienna, Austria *Power-Gen Europe* - visit www.power-geneurope.com

June 6-8 Ogden, UT USA *International Thermal Spray Association Annual Membership Meeting* - email itsa@thermalspray.org

24-26 Newport News, VA USA *Mega Rust 2013: Naval Corrosion Conference* - visit www.navalengineers.org

25-28 Moscow, Russia *5th Russia Essen Welding & Cutting with Joining, Cutting, Surfacing* - visit www.russia-essen-welding-cutting.com

SEPTEMBER 2013

16-21 Essen, Germany Int'l Trade Fair Joining Cutting Surfacing - visit www.schweissen-schneiden.com

24-26 São Paulo, Brazil *Power-Gen Brazil* - www.power-genbrasil.com

30 SEP-30 OCT Hamburg, Germany *ASME 2013 Turbine Blade Tip Symposium & Course Week* - email igtiprogram@asme.org

OCTOBER 2013

1-4 São Paulo, Brazil *Brazil Welding Show and Congress* - visit www.brazil-welding-show.com

2-4 Bangkok, Thailand *Power-Gen Asia* **-** visit www.power-genasia.com

27-31 Montreal, Quebec, Canada *Materials Science and Technology Conference and Exposition (MS&T) 2013* - visit www.asminternational.org "events"

NOVEMBER 2013

12-14 Orlando, FL USA *Power-Gen 2013* - visit www.power-gen.com

TBD Chicago, IL USA *FABTECH* ***with a Thermal Spray Pavilion and Conference*** - visit www.fabtechexpo.com

2014

MARCH 2014

9-13 San Antonio, TX USA *Corrosion 2014* - visit www.nace.org

17-19 Cape Town, South Africa *Power-Gen Africa* - visit www.powergenafrica.com

CALENDAR OF EVENTS

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ITSA members invite and welcome your company to join us in this endeavor. See pages 14-17.

SVC TechCon 2013

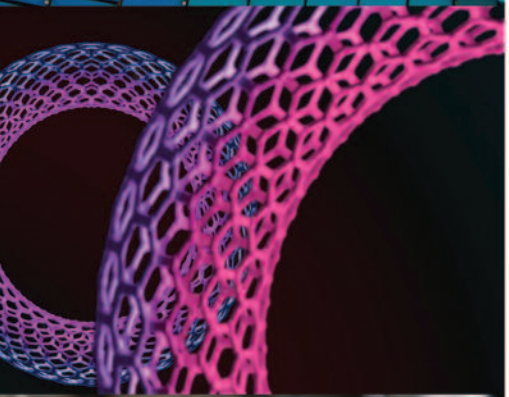
Providence

Rhode Island Convention Center

April 20–25, 2013

2013 TechCon Dates

Technical Program • April 22–25
Technology Exhibit • April 23–24
Education Program • April 20–25



Bringing Together the Best in Vacuum Coating and Surface Engineering Technologies

Join the Society of Vacuum Coaters in the heart of New England's "Technology Corridor" for the 56th Annual Technical Conference, Exhibit, Education Program and Networking events.

Technical Program

This annual international conference features two application-specific themes which are embodied by our symposia on "Coatings and Surface Treatments for Medical Applications" and "Thin Films for Photovoltaics and Batteries." These and other topics will be explored in our 12 Traditional Sessions, a two-day Technology Exhibit, a comprehensive Education Program, and a variety of networking events that link innovation with business.

Technology Exhibit

This "Technology Corridor" is exploding with industrial, technical and academic facilities, making this venue for the 2013 TechCon Exhibit the perfect venue to join researchers with coating, process and equipment experts utilizing a wide variety of applications.

2013 TechCon Education Program

Choose from 26 Tutorial Courses in Providence

This extensive educational offering covers a broad spectrum of vacuum technology – from introductory level subjects to specialized topics.

Learn more at:

www.svc.org

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PEOPLE IN THE NEWS

Sulzer Metco Strengthens Presence in Russia

Sulzer Metco announces the completion of the acquisition of Russian company, Protective Coatings LLC, formerly SP Technicord LLC, as of December 18th, 2012. With this acquisition, Sulzer Metco expands its geographical and technology presence, and will benefit from long-term growth trends in selective Russian industrial markets.

The acquired company, located in the Moscow region, employs a well-experienced team recognized as local specialists in manufacturing of materials for thermal spray and hard surfacing applications. In addition, they offer innovative solutions for new materials and equipment as well as coating services.

"With this acquisition," said Cesar Montenegro, President of Sulzer Metco, "we take a further step towards the implementation of our strategy to strengthen our position in emerging markets. Russia offers substantial growth potential for Sulzer, particularly in oil and gas, power generation, transportation and general industry. Our surface technology solutions in general and the thermal spray processes in particular have proven successful in these markets."

"Through this acquisition we establish a local presence and the foundation to build up Sulzer Metco Russia to provide direct sales and services to customers in Russia," added Howard Lang, Executive Vice President Sales and Marketing.

Sulzer Metco enhances surfaces with coating solutions and equipment. Customers benefit from a uniquely broad range of surface technologies, coating solutions, equipment, materials, services, and specialized machining services and components. The innovative solutions improve performance and increase efficiency and reliability. Sulzer Metco serves industries such as power generation

For more information, visit www.sulzer.com

Where is your article? We encourage you to send articles, news, announcements and information to spraytime@thermalspray.org.

North America's largest metal forming, fabricating, welding and finishing event will be held at the North and South Halls of McCormick Place, Chicago, Illinois, USA, November 18-21, 2013. The upcoming event is expected to cover more than 500,000 net square feet and anticipates over 35,000 attendees and 1,200 exhibiting companies.

Thermal Spray Pavilion

Join the International Thermal Spray Association at the Fabtech Thermal Spray Pavilion this year in Chicago.

To reserve your booth space, contact Joe Krall, 800.443.9353 x 297 or email jkrall@aws.org.

For event information, visit www.fabtechexpo.com.

Finishing Online Website Now Includes Thermal Spray

The website "Finishing Online" (www.finishingonline.com) now includes "thermal spray" in their "industries" area. Go to their website to register and get your free listing.

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Wall Colmonoy LTD (UK) Announces Steve Leahey as Operations Director

Steve Leahey, with a skill-set honed primarily in the aerospace and automotive sectors, is an experienced senior management executive with a track record for developing and implementing business and operational improvement strategies. As a trained Black Belt, he has achieved operational excellence through the application of Lean and Sigma Continuous Improvement methodologies.

Steve demonstrates a strong, 'hands on', people-centric, leadership style.
He facilitates agile team-based organisations with a strong customer focus and builds lasting relationships based on integrity and consistently high performance.

For more information, Steve Leahey may be reached at SteveLeahey@wallcolmonoy.co.uk or +44 (0) 1792 860663.

Is Your Employee Listed? Send notice to spraytime@thermalspray.org

LinkedIn
Has *1700+* Member Thermal Spray Group

The business social network "LinkedIn" has a group titled "Thermal Spray Coating" ***currently with 1700+ members*** and some discussions.

If you are interested, please visit www.linkedin.com and join the network and then join the group.

Mark Harrison Joins Wall Colmonoy Ltd (UK) as Continuous Improvement Manager.

Mark Harrison is a Master Black Belt focused on developing a continuous improvement culture at Wall Colmonoy Ltd - using 5s visual management to drive out variation, making them more robust, and eliminate non-value added waste

Mark has over 18 years experience in Six Sigma and Lean methodologies, he has worked at such leading companies as Honeywell, PowerPartners and Masco UK Windows Group.

Wall Colmonoy Welcomes Nick Clark as Machine Shop Business Unit Manager for UK Operations.

Nick Clark came to Wall Colmonoy in March 2012 as a Process Engineer for the Alloy Products Group. Recently, he was promoted to Machine Shop Business Unit Manager for the UK facility.

Nick graduated with honours from University of Michigan with a BS in Engineering in Industrial and Operations Engineering. He then went to Columbia University, Graduate School of Business with a focus in management and finance. Between Universities, he spent four years as an Intelligence Officer

PEOPLE IN THE NEWS

Journal of Thermal Spray Technology®

A publication of the ***ASM Thermal Spray Society***

Colour Matching in Decorative Thermally Sprayed Glass Coatings

Thierry Poirier, Pierre Bertrand, and Christian Coddet

Coloured coatings were obtained on steel by plasma spraying without severe in-flight alteration of pigments, taking profit of the low thermal conductivity of the glassy matrix of glaze particles. Colour matching was studied by mixing 3 different glazes, comparing Grassmann and Kubelka-Munk based algorithms. Results suggest that the latter method should be preferred upon Grassmann method, particularly when the light absorption/dispersion ratios of coloured feedstocks are very different.

Read the entire article in the February 2013 Issue

Visit www.asminternational.org/tss

Editor: Christian Moreau • **Lead Editor:** Basil Marple
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Kendall Hollis, Seiji Kuroda, Chang-Jiu Li, and Armelle Vardelle

in the United States Marine Corps. He had two combat deployments with an attack helicopter squadron and unmanned aerial vehicle squadron.

About Wall Colmonoy: Wall Colmonoy is a global materials engineering group of companies engaged in the manufacturing of surfacing and brazing products, castings, and engineered components across aerospace, automotive, oil and gas, mining, energy and other industrial sectors.

Known for our unique proven way of creating superior performing alloys that enhance engineered components, we pride ourselves on long-term strategic customer collaboration that produces value-added ideas and creative solutions.

Combining over 70 years of engineering technology with a progressive, visionary outlook, Wall Colmonoy offers customers trusted, customized expertise that results in smart innovation and shared growth.

For more information, visit www.wallcolmonoy.com, http://www.youtube.com/user/WallColmonoy, www.facebook/wallcolmonoy.com, www.twitter/wallcolmonoy.com.

Thermal Spray Technologies Signs Statement Of Support For National Guard and Reserve

The Statement of Support confirms that Thermal Spray Technologies joins in demonstrating support for our armed forces, pledging that

We fully recognize, honor and enforce the Uniformed Services Employment and Reemployment Rights Act (USERRA).

Our managers and supervisors will have the tools they need to effectively manage those employees who serve in the National Guard and Reserve.

We will continually recognize and support our country's service members and their families in peace, in crisis and in war.

Thermal Spray Technologies stands proudly with its Guard and Reserve employees who continue to answer their nation's call to defend our way of life.

Thermal Spray Technologies joins a cadre of Wisconsin companies, state and federal agencies and thousands of America's employers in supporting our armed forces and sending a clear message to their employees that while they are serving their country they do not have to worry about their civilian jobs.

Bill Lenling, President (on left) receives a copy of the Statement of Support to be displayed at Thermal Spray Technologies, from Fred McCormick, Chair Emeritus of the Wisconsin Committee for Employer Support of the Guard and Reserve (ESGR).

Thermal Spray Technologies Receives Patriot Award

Brandon Reilly (left) and Andrea Loppnow receive the award from Fred McCormick.

Thermal Spray Technologies was recognized by the Department of Defense for extraordinary support of employees who serve in the Wisconsin National Guard and Reserve.

In a ceremony at Thermal Spray Technologies today, the Wisconsin Committee for Employer Support of the Guard and Reserve (ESGR), an agency of the Department of Defense, presented the Patriot Award to Thermal Spray Technologies in recognition of extraordinary support of one of their team members – Specialist Brandon J. Reilly, 485th Engineer Company, US Army Reserve.

According to Fred McCormick, Wisconsin's ESGR Chair Emeritus, who presented the award, "The Patriot Award was created by ESGR to publicly recognize those who publicly provide outstanding patriotic support and cooperation to their employees, who like the citizen warriors before them have, have answered their nation's call to serve. Thermal Spray Technologies was nominated for being highly supportive of the US Army Reserve and Specialist Reilly. Supportive supervisors and co-workers are critical to maintaining the strength and readiness of the nation's National Guard and Reserve units."

"We are proud to support our team members in the National Guard and Reserve, as well as everyone who has served in the armed forces. We enjoy our freedom because of their sacrifices", said Andrea Loppnow, Division Manager – Industrial Products.

For more information, visit www.tstcoatings.com

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