

# SPRAYTIME®

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First Quarter 2008

## Interviewing The Manipulator The Qualifications

*Fourth in a Series from Plasma Powders and Systems*

"We can't hire her; she's overqualified!" Being overqualified means that one is skilled or educated beyond what is necessary for a job. There can be high acquisition, training and maintenance costs associated with hiring someone who is overqualified.

The same can be true when "hiring" a manipulator. The "overqualified" manipulator may lead to unnecessarily high costs with respect to training, operation and maintenance. An overqualified manipulator may demand special skills for programming, operation and maintenance. In addition, an overqualified manipulator may be faced with early obsolescence.

The "qualifications" of manipulators fall into one of three categories: fixed, controllable and programmable.

The turntable can be used as an example of the three types. An operation spraying the same part at a fixed turntable speed can get by with a turntable powered by a standard, AC motor/pulley drive.

If the turntable speed is fixed during the spraying of a part but needs to be changed for different parts, a turntable driven by an adjustable belt drive, a DC motor or variable frequency AC drive is suitable.

If the turntable speed needs to be changed during the spraying operation or if the speed needs to be changed for each part being sprayed, a programmable drive is usually needed.

A similar situation exists with gun drives. One operation was able to get by with something like a modified garage-door opener that cycled the gun across a panel as it was indexed after each pass (a "fixed" gun manipulator).

A number of roll coating operations use modified machine lathes where the traverse rate of the gun is fixed during the

**continued on page 4**

## Thermal Spray Crossing Borders Maastricht, The Netherlands

June 2 - 4, 2008



**ITSC 2008**, the worldwide leading conference of thermal spray, returns to Europe. ITSC is an opportunity for the global thermal spray community to meet, exchange information and conduct business.



This outstanding annual event in the world of thermal spray technology is jointly organized by the German Welding Society (DVS), the ASM Thermal Spray Society (ASM TSS), and the International Institute of Welding (IIW).

ITSC 2008 follows the successful path of the previous events in Basel (2005), Seattle (2006) and Beijing (2007). It presents the latest status of application, research and development in the field of thermal spray.

Maastricht is a bustling town of some 180,000 inhabitants. Its twice-weekly market and busy shops attract customers from Belgium and Germany and it draws numerous tourists and businessmen. Current policies

**continued on page 11**



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**SPRAYTIME** First Quarter 2008

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spraying operations. Traverse rates are set with change-gears that are standard in machine lathes; thus a controllable gun manipulator.

Programmable manipulators are often used in coating operations where motions are modified during the coating operations or where motions are more complex than a simple X-Y motion.

Many years ago, programmable controllers in general were based on impressive mechanical systems. Outstanding examples of mechanical control systems in other fields include the Jacquard Loom, the Norden Bomb Sight and the cam-driven sewing machine.

The invention of the transistor, just sixty years ago, made it possible to provide electronic control systems that are both cost-effective and reliable. Therefore, programmable manipulators are now being used in place of simple controllable manipulators.

An example of this is the programmable X-Y traverse gun manipulator. These are often found in job shops that support the aerospace industry. Early versions of these manipulators used mechanical trips for programming the traverse limits while modern units are based on point-and-teach programming.

As indicated, these modern programmable systems are cost-effective and reliable. Still, care needs to be used in selecting such systems. Will special operator training be required? Will the supplier maintain a stock of spare electronic modules? If repairs are required, will the spray

shop be able to make the needed repairs? In the days of mechanical systems, shops were often able to make repairs with standard hardware store components. This is evidenced by a number of mechanical manipulators that are still in operation after many years of service. With many electronic-based manipulators, in-house repairs are no longer possible.

#### Next time, the Programmable Manipulator

**For more information,** contact series author, Dale Moody via email [dalermood@aol.com](mailto:dalermood@aol.com)

### Respiratory Protection Standard Revisions

By Shannon DeCamp, TechneTrain, Inc.

The United States Department of Labor Occupational Safety and Health Administration (OSHA) has recently made some changes to its "Respiratory Protection Standard". The standard revision includes a table giving the Assigned Protection Factors for all types of respirators. Respirators may be required for those portions of your work that produce mists, sprays or dusts. This is a good time to review your respirator program (or determine if you need one) to be sure you are adequately protecting your employees.

There are two types of respirators: (1) air purifying respirators filter the air from the immediate work area before it enters your lungs; and (2) supplied air respirators provide you with clean air from an air line or tank. Each of these types have various models, including those that cover half your face (mouth and nose area), all of your face

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(referred to as a full-face piece) or a helmet or hood. Respirator selection becomes particularly important with air purifying or filtering respirators because you are cleaning the air rather than supplying fresh air.

#### ***How do respirator filters work?***

Air purifying respirators work by filtering the air before it reaches your lungs. For dust or particles, the pores of the filter are small enough to screen out the particulate. For chemical fumes or gases, the filter contains absorbents like charcoal that capture the chemicals before they reach the lungs. Some work operations require both dust and chemical removal.

#### ***How do you know which respirator to use?***

To determine what respirator to use and how long it lasts, OSHA and NIOSH have developed a rating system for respirators, the Assigned Protection Factor (APF). Another new term, Maximum Use Concentration (MUC), has also been incorporated into the revised OSHA Standard.

#### ***What are Assigned Protection Factors (APFs)?***

APFs are numbers that indicate the level of workplace respiratory protection that a respirator, or class of respirators, is expected to provide to the user. APFs are used to select the appropriate type of respirator based upon the permissible exposure limit (PEL) of a contaminant and the level of the contaminant in the workplace. The APF number is the percentage of the contaminant that will be filtered out of the surrounding air.

#### ***What are Maximum Use Concentrations (MUCs)?***

The respirator you select must keep the employee's exposure at or below the PEL. For each specific respirator, the MUC is the largest concentration of an airborne contaminant that that the respirator can handle. The exposure level must be measured using OSHA protocol and compared to the MUC for the respirator you have selected. If the workplace exposure exceeds the respirator's MUC, the employer must choose a respirator with a higher APF.

#### ***What does this mean to business owners in the thermal spray industry?***

You must determine what your employee exposure is for each chemical produced or used in the workplace, and ensure that your respirator's protection level is adequate for the exposure level. OSHA is also proposing to add a new fit-testing protocol for respirators; while this may not affect you, it again emphasizes OSHA's current focus on respirator programs.

#### ***What constitutes an effective respirator program?***

First determine what airborne hazards exist in your workplace. You must be familiar with the permissible exposure limits of airborne contaminants and physical agents used.

Whenever possible, first use general or local welding or other exhaust systems to control dusts, vapors, gases, fumes, smoke, solvents or mists that may be generated in your workplace. Use hazardous materials only in designated work areas that can be ventilated.

If airborne contaminants are still above safe levels, you must then use respirators to reduce exposure to acceptable levels. Respirators must be approved for each chemical and specific application by the National Institute for

Occupational Safety and Health (NIOSH). Match the MUC against the measured airborne contaminants to be sure that you have selected the correct respirator.

Develop written standard operating procedures for your selection and use of respirators. These procedures include when respirators must be worn, and who, specifically, must wear them. Prior to requiring an employee to wear a respirator, they must have a medical evaluation to be sure that they can safely breathe through the restricted air flow of the respirator.

Once the doctor determines that your employee is medically fit to wear a respirator, you must be sure the particular respirator fits the shape and size of the employee's face. This is referred to as fit testing. OSHA regulations list specific protocol for fit testing.

Employees must be trained on the correct use and limitations of their respirator. Respirators must be stored in a convenient and clean location, away from contaminants, and must be regularly inspected and sanitized.

This is a broad overview of one of the many topics pertaining to safety in the thermal spray industry. TechneTrain, Inc. has a full line of reference manuals and employee training programs designed to make it easy for employers to get/stay in compliance.

**For further information,** visit [www.technetrainonline.com](http://www.technetrainonline.com), or contact TechneTrain, Inc. at phone 800.852.8314.

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Since 1991, the ITSA Scholarship Program has contributed to the growth of the Thermal Spray Community, especially the development of new technologists and engineers. The International Thermal Spray Association is very proud of this education partnership and encourages all eligible participants to apply.

New Application Dates: Scholarship applications are now accepted annually April 15 through June 30 ONLY for both the Graduate and Undergraduate scholarships.

Please visit [WWW.THERMALSPRAY.ORG](http://WWW.THERMALSPRAY.ORG) Scholarship area for details and a printable application form.



## Rolls-Royce Acquires License To Use Iowa State Discovery That Improves Jet Engines



Iowa State University and Ames Laboratory researchers Daniel Sordelet, left, and Brian Gleeson are coinventors of a coating that will help turbine blades like the ones they're holding withstand the heat of jet engines. Ames Laboratory photo.

Rolls-Royce Corp. has acquired exclusive rights to use a coating invented by Iowa State University researchers that helps turbines stand up to the heat in jet engines.

The unique bond coating will be applied to engine turbine blades made of nickel-based superalloys. Those superalloys are designed for strength but need help withstanding metal temperatures approaching 2,100°F inside the hot section of a jet engine, said Brian Gleeson, Iowa State's Alan and Julie Renken Professor in Materials Science and Engineering, a scientist with the U.S. Department of Energy's Ames Laboratory on the Iowa State campus and a coinventor of the coating.

The bond coating improves the durability and reliability of a ceramic thermal barrier that's applied over the bond coat, said Daniel Sordelet, a senior scientist and group leader for the Ames Laboratory and a coinventor of the technology.

"This coating composition is very good in terms of performance," Gleeson said. "It offers significant advantages over existing coating technologies."

Dr. William J. Brindley, the chief technologist for Rolls-Royce Corp., said, "This new coating offers excellent oxidation resistance. It's a new concept in coatings and a real step forward in understanding how and why coatings work. The technology also represents a remarkably quick transition from fundamental science to practical application."

Gleeson said the coating is based on a composition comprising platinum, nickel, aluminum and hafnium. It was invented by Gleeson, Sordelet and Wen Wang, a former Iowa State postdoctoral student. Gleeson, Sordelet, Brindley and Bingtao Li, a former Iowa State doctoral student and postdoctoral researcher, also developed a cost-effective method for applying the coating to engine parts.

The coating won a prestigious R&D 100 Award in 2005. The annual awards have been called the "Oscars of applied science" by the Chicago Tribune.

Nita Lovejoy, the associate director of the Iowa State



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University Research Foundation, Inc., said Rolls-Royce will have an exclusive license to commercialize the inventions. She said patents are pending for the inventions and the term of the license agreement is for the life of any patents. She also said the license has the potential to be an important source of revenue for the research foundation.

Inventions developed at Iowa State are protected by the research foundation with patents and are transferred for commercial use under licenses. Any licensing revenues after expenses and administrative fees are split among the inventor, the inventor's college within the university and the research foundation. The research foundation supports itself and the Office of Intellectual Property and Technology Transfer with its share of the revenues and provides grants to support Iowa State research programs.

Sordelet said the coating compositions grew out of basic research that began about seven years ago and was supported by the Office of Naval Research. He said a key advantage to this technology is that it is mechanically compatible with the superalloys it covers and protects. It reacts to the heat and stress of an engine about the same way the superalloy does. And that gives the coating composition -- and therefore the engine parts -- better performance and a longer life.

The Iowa State researchers continue to work on the coating composition project. Sordelet said they're hoping to develop a better and cheaper way to produce the coating. They're also looking for new coating compositions and new ways to deposit them on materials.

"We say that we put science to practice," Gleeson said, referring to the "Science with Practice" motto on the university seal. "And this is an excellent example of that."

Rolls-Royce, a world-leading provider of power systems and services for use on land, at sea and in the air, operates in four global markets -- civil aerospace, defense aerospace, marine and energy. Rolls-Royce has a broad customer base comprising 600 airlines, 4,000 corporate and utility aircraft and helicopter operators, 160 armed forces, more than 2,000 marine customers including 70 navies, and energy customers in 120 countries. Rolls-Royce is a technology leader employing 38,000 people in offices, manufacturing and service facilities in 50 countries.

**For more information**, contact Brian Gleeson, Iowa State Materials Science and Engineering, phone 515.294.5606, bgleeson@iastate.edu or Daniel Sordelet, Ames Laboratory, phone 515.294.4713, sordelet@ameslab.gov

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**For more information**,  
 please visit [www.dvs-ev.de/itsc2008](http://www.dvs-ev.de/itsc2008)

## Nominations Now Being Accepted for ASM Thermal Spray Society Board

The terms of three current members of the ASM Thermal Spray Society Board will expire in October 2008. The ASM TSS Nominating Committee is currently seeking nominations to fill these three positions.

In accordance with the TSS Rules of Governance, the Nominating Committee is particularly seeking nominees for directors from the user, service, and academic communities. Nominations, however, are welcome from all segments of the thermal spray community.

Nominees must be a member of the ASM Thermal Spray Society and must be endorsed by five current TSS members. Board members whose terms are expiring may be eligible for nomination and possible re-election on an equal basis with any other nominee. Nominations must be received no later than May 15, 2008, preferably by May 1, 2008.

**For more information**, go to the ASM TSS web page for the nomination form:

[http://tss.asminternational.org/portal/site/TSS/TSS\\_BoardNominations/](http://tss.asminternational.org/portal/site/TSS/TSS_BoardNominations/)

**If you have questions**, please contact Richard Knight, ASM Thermal Spray Society Nominating Committee Chair, E-mail: [knightr@coe.drexel.edu](mailto:knightr@coe.drexel.edu)

## SCHOLARSHIP Opportunities

See page 24

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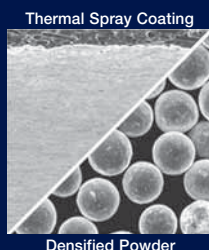
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## Sprayed Particle Diagnostics

*First in a Series*

By Mo VandenBergh – VandenBergh & Associates

New tools have become available in the past few years to help us understand more about what we are trying to accomplish with the systems we use to produce thermally sprayed coatings. Their popularity in the industry has been growing rather quickly during 2–3 years. A class of tools that allows us to measure particle velocity, temperature and the relative number of particles (count or flux) along with all the plume characteristics are helping us look beyond the indirect measurements of spray parameters. These tools allow us to understand more fully the variations between any two given processes as well as how the process may vary with time, if not esoterically or absolutely, relatively. They also give better control and can help to significantly lower costs in day-to-day coating production.

In a short career span in the thermal spray industry I have been led to believe and have experienced that a given coating is the result of:

- Particle mass
  - Particle velocity
  - Particle temperature
- And lastly what I term as:
- Particle placement
    - o Coverage rate
    - o Substrate materials and conditions
    - o Environmental conditions

Historically we looked to experienced operators who pride themselves on their experience and ability to tweak the system. They knew how the flame or plume should look, how it should sound, how long it should take to do the coating. That generation is disappearing. Later we tightened controls, added calibration procedures, improved processes, and tightened materials specifications and developed process procedures. We have tied all to coating reports, physical measurements and developed robust parameters through “design of experiments”. Still we see variation from booth to booth; from the beginning to the end of a long process; from one material lot to another and operators may tell you that as long as the storm or low is passing over they will have trouble spraying a particular coating.

While we still want to continue controlling the processes, keep up with the calibrations, etc; the thought of measuring and monitoring what really affects the coating results (temperature, velocity and flux as well as plume geometry) is very appealing. Because of the cost of the equipment and the need for someone to champion the equipment, the costs should be weighed by the benefits. What are the costs and the payback of incorporating today's technology? What are the other benefits associated with having the new technology available? Of course there are many uses some of which are mentioned below.

- Training of spray technicians
- Trouble shooting
- Fine tuning the spray process
- Monitoring the spray process
- Process development

**continued on page 10**





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continued from page 8

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**See related announcement page 38.**

## New Coating Technology For Bridge Repairs

Xiom, a Long Island, NY-based company that manufactures unique plastic powder spray systems and polymer-based coatings, has announced it has developed a technology that can significantly reduce both the risk of bridge deterioration and the costs involved in maintaining bridges.



Since the collapse of the I-35 Bridge in Minneapolis, there has been widespread concern over the safety of bridges in the USA. Of the nation's 600,000 bridges, it is estimated that well over 100,000 are structurally deficient. Corrosion is a major contributor to bridge failure, and Xiom's on-site plastic powder coatings have superior corrosion-fighting ability.

Xiom Corp. has developed a technology that uses proven materials and revolutionary application methods to ensure an increased lifespan for the nation's bridges. After years of extensive testing, it was determined that a coating of 85 Zn-15 Al provided extraordinary corrosion protection.

Xiom Corp.'s corrosion-resistant coatings offer the ideal 85 Zn-15 Al composition, and a hard plastic coating that is applied over it makes the coating equal to or more durable and weather-resistant than any paint or coating currently on the market.

In addition to coating metals, Xiom's coatings can be used to coat concrete and the rebar embedded in concrete. Xiom coatings have no dripping, no overspray problems and absolutely no VOCs (volatile organic chemicals). And, unlike conventional powder coating, Xiom's coatings cure instantly; no oven-curing is needed so bridges can reopen to traffic more quickly. The 70-pound system is completely portable so operators can reach areas that may have been inaccessible in the past.

Xiom's unique process and coatings last longer than paint so they are more cost-effective as well as more resistant to corrosion. As Andrew Mazzone, CEO of Xiom Corp., states, "The health and safety of the American infrastructure is now at risk. The use of thermally applied polymer coatings could prevent numerous new tragedies from occurring."

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**SPRAYTIME** First Quarter 2008

INDUSTRY NEWS





**continued from page 1**  
emphasize Maastricht's central location in Europe and its European image. In 1981 and 1991 the city hosted the summit meeting of the European Community heads of state. The creation of the "Euregio" area, centered on the cities of Aachen, Liege and Maastricht, is a sign that Maastricht is returning to the central European location it occupied during the reign of Charlemagne.

ITSC 2008 will take place at the MECC Maastricht Congress Centre. MECC Maastricht is a state-of-the-art conference and exhibition center. Visitors can attend ITSC 2008, dine, and also sleep there. Everything is under one roof.

**For more information,** please visit [www.dvs-ev.de/itsc2008](http://www.dvs-ev.de/itsc2008)



### Education Courses at ITSC 2008

The following education courses will be offered immediately prior to the ITSC 2008 conference event in Maastricht, The Netherlands:

#### *Thermal Spray Technology*

May 29-31, 2008

#### *Understanding and Improving Thermal Spray Technology*

May 30-31, 2008

#### *Metallographic Preparation of Gas Turbine Coatings*

May 31, 2008

*More information is available at*

<http://tss.asminternational.org/portal/site/ASM/ITSC2008>

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## Carpenter Expands Powder Capabilities With Acquisition of Ultrafine Powder Technology



Carpenter Technology Corporation recently announced its Carpenter Powder Products (CPP) subsidiary has acquired UltraFine Powder Technology, Inc.; a private company.

UltraFine Powder, which operates a single facility in Woonsocket, R.I., is a leader in the manufacture and sale of fine gas-atomized powders for the metal injection molding (MIM) industry and other specialty markets.

"UltraFine's capabilities will supplement Carpenter Powder Products' existing manufacturing facilities in Bridgeville, Pennsylvania, and Torshalla, Sweden, and will further strengthen our position as the leading supplier of gas-atomized powder to the global MIM industry," said William B. Kent, vice president and general manager of CPP. "The acquisition will enable us to provide greater service to our customers with an expanded range of products and capabilities. With increased demand for finer powders in a variety of high-performance applications, CPP will be well-positioned to satisfy the requirements of our customers in this growing market area."

Carpenter Technology produces and distributes specialty alloys, including stainless steels, titanium alloys and superalloys, and various engineered products.

Carpenter Powder Products offers the industry's most extensive capacity for spherical gas-atomized metal powders, and supplies a wide range of products from advanced aircraft and medical alloys to stainless and tool

steels.

**For further information** about CPP, contact Bill Kent, Bridgeville, PA, USA: phone 412-257-5154; e-mail: WKent@cartech.com, or visit [www.cartech.com](http://www.cartech.com)

### OSHA Information

Two recent publications may be helpful if you want to be better prepared for an United States Department of Labor Occupational Safety & Health Administration (OSHA) inspection of your facility:

OSHA recently issued a new compliance directive for occupational exposure to **hexavalent chromium** (hex chrome). This directive provides guidance to OSHA's compliance staff who are inspecting a facility where hex chrome may be present. It will be helpful to know specifics about such an inspection. The directive can be found on OSHA's web site at:

[http://www.osha.gov/OshDoc/Directive\\_pdf/CPL\\_02-02-074.pdf](http://www.osha.gov/OshDoc/Directive_pdf/CPL_02-02-074.pdf)

"Occupational Safety" magazine recent published an informative article, "**When OSHA Knocks**", that gives a very good list of steps that you should take when an inspector shows up at your door. Advance preparation and following these steps could help you minimize any adverse results of an inspection. You can read the article at:

[http://www.occupationalhazards.com/Issue/Article/78870/When\\_OSHA\\_Knocks.aspx](http://www.occupationalhazards.com/Issue/Article/78870/When_OSHA_Knocks.aspx)

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The ideal candidate for this position has accumulated a number of years working experience in the field of plasma spraying. He has a broad, in-depth knowledge of equipment and processes, preferably in vacuum plasma spraying. Ideally he can also demonstrate an understanding for complex drawings and off-line programming tools. He is self-motivated, team-oriented, open and has a fact-oriented working style.

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**Southwest Purchases Advanced Processing**

Southwest United Industries is proud to announce that it has purchased all the outstanding shares of Advanced Processing Inc. (API) of Concord, ON, Canada. The coordination, amalgamation and the complete integration with Ceel Limited of Brampton, ON will establish the first complete one-stop-shop processing company in Ontario.



Mr. Terrence Martin established Advanced Processing Inc. in 1979 to service the blossoming de Havilland aircraft manufacturing sector. In the year 2000, the company moved to its present location in Concord. At that time API employed 25 people in a facility of 13,000 sq ft. It has since expanded to 18,000 sq ft and employs 45 people in a 3-shift system.

Based in Ontario, API serves an extensive customer base throughout Canada. API is approved by most major aerospace prime contractors including Boeing, Bell Helicopter, Bombardier, Lockheed Martin, Goodrich, and Messier-Dowty. API is an ISO 9001-2000/SAE AS 9001B registered company holding Nadcap accreditations for chemical processing, nondestructive testing and shot peening. Current chemical processes include anodizing, cadmium plating, chemical conversion coating, passivation of stainless steels and application of Prime and Top Coats.

Southwest is very pleased that Terry Martin will continue running the day-to-day operations of API. He will spearhead the addition of several new process lines and assist in the integration of API and Ceel to ultimately develop one seamless processing company.

Southwest United Industries was established in 1953 in Tulsa, OK. It currently operates in Tulsa and Oklahoma City providing nondestructive testing, shot peening, thermal spray coating, plating, grinding, anodizing and painting services to the aerospace industry. It is Nadcap accredited and is certified and approved by all the major aerospace prime contractors.

Plasma Coating Corporation is a wholly owned subsidiary of Southwest United Industries and is located in Gardena, CA. PCC provides thermal spray coating (HVOF, plasma, electric arc, combustion powder and wire), precision grinding, painting, Teflon and dry film lube services to the aerospace industry. It is approved by many aerospace manufacturing companies and is Nadcap accredited.

Ceel Limited is a wholly owned subsidiary of Southwest United Industries and is located in Brampton, ON. It provides chrome and sulfamate nickel plating, HVOF thermal spray and precision grinding to the aerospace, nuclear and defense industries. Ceel is Nadcap accredited and has earned many aerospace process approvals.

**For more information**, please visit Southwest United websites [www.swunited.com](http://www.swunited.com), [www.plasma coatingcorp.com](http://www.plasma coatingcorp.com) or [www.advancedprocessing.com](http://www.advancedprocessing.com)

**For a free copy of "What Is Thermal Spray?" publication, send request to [itsa@thermalspray.org](mailto:itsa@thermalspray.org)**



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***"[Turbo Expo] provides us with high-quality leads and good exposure to the right clientele."***

***"It is a necessary part of a career in Turbine aerodynamics..."***

## Air Products' New Thermal Spray Cooling Technology Takes Off with Delta Air Lines R&D Collaboration Leads to Industrial Gas Contract Win

Air Products' new Thermal Spray Cooling Technology — which uses cryogenic nitrogen vapor (-320°F) to maintain part temperature during thermal spray coating applications — is enabling Delta Air Lines, Inc. to apply quality coatings on critical aircraft parts more effectively and economically than with traditional methods. Additionally, the success of this technological collaboration assisted Air Products in winning a contract to supply Delta's Technical Operations Facility in Atlanta, Ga. with all of its bulk nitrogen, argon, oxygen and hydrogen needs.

"Delta gave us parameters on how they wanted the machine to think and act, and we designed a thermal spray cooling system to meet their specifications," said Matt Thayer, senior principal engineer, Commercial Technology at Air Products.

Air Products' Thermal Spray Cooling Technology is an automated cryogenic gas cooling system that is being used by Delta's HVOF (high velocity oxygen fuel) thermal spray department to coat critical wear parts, such as rotating engine parts and landing gear. By eliminating the need for interpass cooling breaks, the Air Products cooling system has enabled Delta to reduce by as much as 50% of the spray-coating time, amount of feed powder sprayed, and the volume of gases consumed in the coating of its landing gear axles.

Air Products' U.S. patent-pending cooling technology also offers environmental and product quality improvements. The technology has enabled a tungsten carbide-cobalt coating to be more cost-effectively substituted for traditional chrome plating, which can generate a potential



carcinogen. In addition, the new technology minimizes the undesired thermal softening of coated parts by reducing the temperature fluctuations and the duration of the coating process.

"This is another great example of what Air Products does best," said Thayer. "We listen carefully to our customers so we can understand their challenges and needs, and then work closely with them to find a solution. We look forward to working with Delta on this emerging technology by continuing to improve it and expand its use within their facility."

Air Products serves customers in industrial, energy, technology and healthcare markets worldwide with a unique portfolio of atmospheric gases, process and specialty gases, performance materials, and equipment and services. Founded in 1940, Air Products has built leading positions in key growth markets such as semiconductor materials, refinery hydrogen, home healthcare services, natural gas liquefaction, and advanced coatings and adhesives. The company is recognized for its innovative culture, operational excellence and commitment to safety and the environment. Air Products has annual revenues of \$10 billion, operations in over 40 countries, and 22,000 employees around the globe.

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## Metallisation Protecting Anglesey's Aluminium Jetty



Metallisation's customer, Brookes Specialist Contractors Limited, has completed another anticorrosion project using Metallisation equipment. Brookes won a contract with Anglesey Aluminium to protect the reinforced concrete beams on the Anglesey Aluminium Jetty in Wales.

The offloading jetty is an essential asset for Anglesey Aluminium as it enables them to take delivery of raw materials directly into its UK aluminium processing facility. Being exposed to the harsh environment of the sea, the natural presence of salt has contaminated the concrete over time and has resulted in the corrosion of the steel reinforcing bars. The salt seeps into the concrete and erodes the steel reinforcing bar causing cracks and spalling in the concrete and eventually the potential for failure of the structure. The Anglesey Aluminium Jetty had deteriorated quite badly and was in need of urgent repair.

With the high level of salt contamination a simple concrete repair project would not provide sufficient long-term protection. There was also the risk of accelerated deterioration through incipient anode effect. One very effective, long-term solution is thermal spraying the concrete with Brookes Specialist Contractors 'Asset Guard'. Using Metallisation's Arc 140 Spray system, Brookes applied Asset Guard to the concrete surface. Asset Guard is a unique aluminium/zinc/indium anodic coating developed to provide electro-

chemical protection of steel reinforced concrete structures.

The first step in the process was the hydro-demolition of damaged concrete, then the reference electrodes were installed and tested, followed by the thermal spraying of the concrete surface of the jetty. The Metallisation Arc Spray process produces high levels of productivity and can achieve between 108 ft<sup>2</sup> (10m<sup>2</sup>) and 323 ft<sup>2</sup> (30m<sup>2</sup>) of coating to the concrete per hour. Typically Asset Guard produces between 2ma/m<sup>2</sup> and 20ma/m<sup>2</sup> of concrete surface area depending on the electrical resistance of the concrete itself.

Brookes' sacrificial coating, Asset Guard, means that the coating itself will be what is attacked by corrosion, rather than the steel of the reinforcing bar. The metallurgical and electrochemical properties of the arc sprayed Asset Guard have been optimized to meet the requirements of concrete cathodic protection. The unique alloy composition ensures

the coating is easy to apply and provides consistent uniform sacrificial corrosion of the anode, minimal self-protection, negligible wasted current capacity and high anode efficiency.

The Metallisation arc spray process has been used for over 80 years to protect steel structures from corrosion and since the 1980s to protect concrete structures from corrosion. In the arc spray process the raw material, in the form of a pair of metallic wires, is melted by an electric arc. This molten material is atomised by a cone of compressed air and propelled towards the work piece. The molten spray solidifies on the component surface to form a dense, strongly adherent coating suitable for corrosion protection or component reclamation. Sprayed coatings may also be used to provide wear resistance, electrical and thermal conductivity or freestanding shape.

Before repair.



After repair.



Major advantages of the arc spray process are that the coatings are available for almost instant use, with no drying or curing times, and there is no risk of damaging the component. Finally, the use of compressed air and electricity alone provide much more economic coatings.

Using the Arc Spray process means that the surface coating can be applied in a single treatment, which saves both time and cost of materials used. The life of the concrete protection is determined by the thickness of the coating applied. Typically a 10 mils (250 micron) thick coat is applied giving anticorrosion protection

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for around 20 years. Due to the sacrificial nature of Asset Guard there is usually no requirement for a power supply or monitoring and system adjustment. However, due to the exposed nature of the jetty, Brookes recommended that a simple monitoring system based on silver/silver chloride reference electrodes be installed. This provided additional confidence in the protection and allows periodical checks on the reinforcing bars to be undertaken.

Stuart Milton, Sales and Marketing Manager at Metallisation says: "This is yet another example of the effectiveness of our thermal spraying technology in one of the harshest environments. Following the success of the flame spray system we have worked with Brookes to develop an alternative solution, to ensure they can deliver the protection of Asset Guard across a diverse range of applications."

Wayne Brierley, Commercial Director at Brookes, says: "This contract certainly challenged us, both technically and practically. With Metallisation's experience and support, we managed to overcome all adversity to deliver a proven engineered corrosion prevention solution that satisfied both the financial and commercial demands of our client."

**For further information** on surface coatings or the Metallisation equipment and processes, please contact Stuart Milton via phone at + 44 (0) 1384 252 464 or visit [www.metallisation.com](http://www.metallisation.com)

### Kubota Corportion of Japan Pleased with Metallisation Arcspray 170 System

Kubota Corporation of Japan, has taken delivery of a new Metallisation Arcspray 170 system and is delighted with its performance.



Metallisation's Japanese distributor, Sawamura Metalspray Centre Co Ltd, recently delivered the equipment to the Kubota Keiyo Plant in Chiba. Sawamura also provided an intensive one-day training course to the Kubota operators, which included training on how to maintain the system. Sawamura's after-sales maintenance and support service aims to ensure as little down time as possible for its customers. This reflects the high after sales service commitment of Metallisation.

The Arc 170/S700 system provides a consistent, durable coating, which can provide anticorrosion protection for up to 20 years. Kubota manufactures a diverse range of equipment including agricultural machinery, industrial systems such as ductile and steel pipes, environmental engineering systems and life environment machinery such as wastewater treatment tanks and vending machines.

Mr Masao Sawamura, President, Sawamura Metalspray, says: "Our customer is very pleased with the Arc 170 system, so much so that they have now ordered additional Metallisation equipment from us. We are sure that they will be as delighted with the new equipment as they have been with the Arc 170."

### F.W. Gartner Celebrates 85th Anniversary

F. W. Gartner Thermal Spraying, Ltd. celebrated their 85th anniversary on Monday, March 3, 2008.



Gartner is one of the oldest thermal spray companies in the industry and has grown to become one of the thermal spray industries leading service providers in the country.



F. W. Gartner is a full-service job shop that is continuously expanding its range of available services and has seen significant growth over the last 5 to 10 years.

New services added include SealPlex2®, Brencoat BR3, BR4, BR7, laser cladding, and additional CNC capability.

The SealPlex2 is used to surface seal and fill the porosity in other materials. Surface treatments such as nitro-carburizing and tufriding create a porous outer layer. This layer has excellent liquid retention properties and when subjected to the SealPlex densification process, a single-phase ceramic layer is chemically bonded into and over the porous outer layer.

BR3,4 & 7 are primarily thermal barrier coatings (TBC). The focus of development has always been on achieving maximum bond and durability (toughness), while also meeting the needs of corrosion and erosion protection. These coatings have unprecedented thermal cycling, impact and thermal shock resistance, while achieving exceptional wear, corrosion and erosion resistance.

A high power direct diode laser [HPDDL] and its unique beam make for a highly efficient tool to use in cladding operations. Laser cladding is performed by melting a pre-placed powder onto a substrate to ensure a bond with minimal dilution, nominal melting and a small heat-affected zone. This process is highly advantageous in comparison with competing coating methods such as plasma spraying, arc welding, and other laser sources. The rewards are lower porosity, reduced post-machining, and optimum edge detail.

With the new services already added, and the potential for future services to enter the Gartner portfolio, F. W. Gartner is poised to capture additional revenue for continued growth.

**For more information**, visit [www.fwgts.com](http://www.fwgts.com)

**See advertisement page 2.**

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1,133,507.

## UNITED STATES PATENT OFFICE.

MAX ULRICH SCHOOP, OF ZURICH, SWITZERLAND, ASSIGNOR, BY MESNE ASSIGNMENTS,  
TO METALS COATING COMPANY OF AMERICA, OF BOSTON, MASSACHUSETTS, A COR-  
PORATION OF MASSACHUSETTS.

APPARATUS FOR SPRAYING MOLTEN METAL AND OTHER FUSIBLE SUBSTANCES.

1,133,507.

Specification of Letters Patent.

Patented Mar. 30, 1915.

Application filed February 19, 1914. Serial No. 819,722.

To all whom it may concern:

Be it known that I, MAX ULRICH SCHOOP, a citizen of the Swiss Republic, residing at Zurich, in Switzerland, have invented certain new and useful Improvements in Apparatus for Spraying Molten Metal and other Fusible Substances, of which the following is a specification.

The object of this invention is to effect improvements in the art of coating surfaces or articles of various kinds with metal and other fusible substances, by projecting the substance in a molten state, in the form of a spray.

According to my invention the melting is effected by means of electric current passing through two electrodes consisting of pieces of wire or filament of the substance in question, these two electrodes being fed toward each other at the requisite rate.

An embodiment of the invention is shown in the accompanying drawing, in which—

Figure 1 is a front elevation of my apparatus, and Fig. 2 is a sectional view taken on the line 2-2 of Fig. 1, showing the operation of the electromagnet employed.

In the drawing, *a* and *b* designate two feed tubes, which terminate in nozzles and are preferably made of iron, the tube *b* forming the armature of an electromagnet *c*. Through these tubes two wires *w*<sup>1</sup>, *w*<sup>2</sup> are fed by means of feed rolls *d*, so that the ends of the wires, issuing from the nozzles, cross each other as shown in the drawing. The two feed tubes, and the wires issuing therefrom, form parts of an electric circuit, other parts of which are shown at *P*, *P*, and current flows in this circuit, as indicated by arrows. The coils of the electromagnet also form part of the circuit. The tube *b* is elastically supported, so that it can vibrate, and the tubes are placed at an angle of about 90° to each other, with the wires making slight frictional contact where they cross, and with the nozzles spaced apart only a few millimeters. When the electromagnet *c* is energized it attracts the tube *b* and by this means slightly withdraws the wire electrode *w*<sup>2</sup> from the wire electrode *w*<sup>1</sup>. A blast pipe *n* has its nozzle directed toward the place where the wire electrodes cross, in order to direct a stream of air or other gas, on to the electrodes. The blast apparatus may be

used for driving a turbine whereby the wire feed mechanism is actuated.

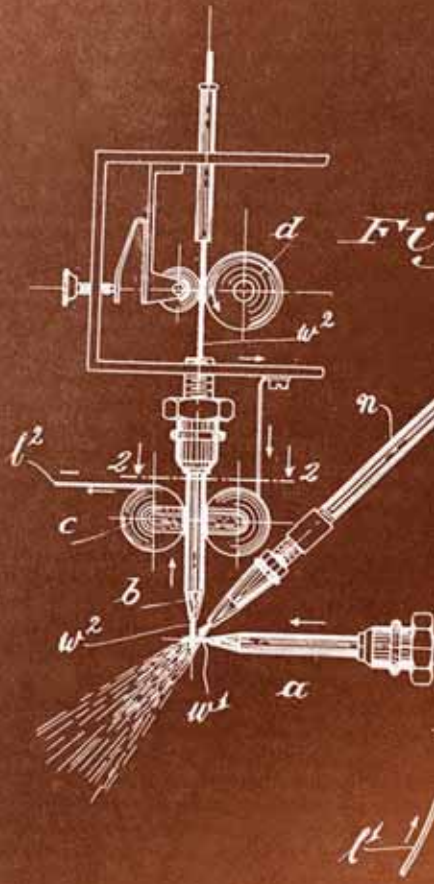
The action of the apparatus is as follows:—Current flowing through the circuit, while the electrodes are in touch, energizes the electromagnet *c*, whereby the electrodes are drawn apart, and a small arc is formed, accompanied by melting of some of the metal. This molten metal is at once driven away, in the form of a fine spray, by the stream of gas from the pipe *n*, which also blows out the arc *in statu nascendi*, so that the magnet allows the electrodes to approach each other again. The magnet is then again energized, and another arc is formed, and so on, the action being repeated with great rapidity, so that a continuous stream of spray is driven from the electrodes and projected on to the surface to be coated.

The potential difference at the electrodes varies, of course, according to the conductivity of the metal or other substance, and the thickness of the filament, values ranging from 40 to 75 volts are generally suitable. The rate of consumption of the positive electrode is somewhat higher than that of the negative electrode, so I use a more rapid feed, or a thicker wire, for the positive electrode.

The vibratory arrangement which I have described may be applied to both the electrodes. Its advantage lies in the fact that it produces a more uniform and localized consumption of the electrodes. If the electrodes are merely fed toward each other, without vibration, there is a tendency for the arc to flicker or to spread and roast the tubes, and in some cases the electrodes tend to become sweated to each other, if a lower potential difference is used in order to avoid an excessive arc.

An angle of about 90° for the two electrode tubes is found most advantageous for most purposes, but the angle may vary. The best angle for the blast nozzle is easily ascertained in each particular case, as is also the most advantageous distance of the blast nozzle from the electrodes: in some cases it is best to have the blast nozzle close to the electrodes, but in others a distance of 20 or 30 mm. from the arc is better.

In the case of some metals, especially those of low melting point, part of the metal



Witnesses.

C. A. Walter.

W. A. Linden.

# Apparatus for Spraying Molten Metal

Photo Courtesy of International Tool



# Original Patent

SCHOOP.  
METAL AND OTHER FUSIBLE SUBSTANCES.  
FILED FEB. 19, 1914.

Patented Mar. 30, 1915.

2

1,183,507

may be vaporized by the current. The vapor forms a fine condensate, or is projected with the spray against the surface to be coated.

5 What I claim as my invention and desire to secure by Letters Patent of the United States is:—

1. In apparatus for the purpose set forth the combination of means for feeding toward each other two fusible electrodes, means for feeding to said electrodes an electric current capable of melting the same, and means for directing a stream of gas toward said electrodes, whereby molten matter is projected from said electrodes in the form of spray.

2. In apparatus for the purpose set forth, the combination of means for feeding toward each other two fusible electrodes, means for feeding to said electrodes an electric current capable of melting the same, means for vibrating one of said electrodes, whereby contact between said electrodes is alternately made and broken, and means for directing a stream of gas toward said electrodes, whereby molten matter is projected from said electrodes in the form of spray.

3. In apparatus for the purpose set forth, the combination of means for feeding toward each other two fusible electrodes, means for feeding to said electrodes an electric current capable of melting the same, electromagnetic means for vibrating one of said electrodes, whereby contact between said electrodes is alternately made and broken, and means for directing a stream of gas toward said electrodes, whereby molten matter is projected from said electrodes in the form of spray.

4. In apparatus for the purpose set forth, the combination of means for feeding toward each other two fusible electrodes, means for feeding to said electrodes an electric current capable of melting the same, electromagnetic means for vibrating one of said electrodes, whereby contact between said electrodes is alternately made and broken, said electromagnetic means being electrically connected in series with said electrodes, and means for directing a stream of gas toward said electrodes, whereby molten matter is projected from said electrodes in the form of spray.

5. In apparatus for the purpose set forth, the combination of means for feeding toward each other two fusible electrodes comprising an elastically supported iron guide tube for one of said electrodes and an elec-

tromagnet to attract same, means for feeding to said electrodes an electric current capable of melting same, and means for directing a stream of gas toward said electrodes, whereby molten matter is projected from said electrodes in the form of spray.

6. In apparatus for the purpose set forth, the combination of means for feeding toward each other two fusible electrodes comprising an elastically supported iron guide tube for one of said electrodes and an electromagnet to attract same, means for feeding to said electrodes an electric current capable of melting same, means for operating said electromagnet whereby contact between said electrodes is alternately made and broken, and means for directing a stream of gas toward said electrodes, whereby molten matter is projected from said electrodes in the form of spray.

7. In apparatus for the purpose set forth, the combination of means for feeding toward each other two fusible electrodes comprising an elastically supported iron guide tube for one of said electrodes and an electromagnet to attract same, means for feeding to said electrodes an electric current capable of melting same, means to electrically connect said electromagnet in series with said electrodes whereby contact between said electrodes is alternately made and broken, and means for directing a stream of gas toward said electrodes, whereby molten matter is projected from said electrodes in the form of spray.

8. In apparatus for the purpose set forth, the combination of means for feeding toward each other two wires comprising an iron guide tube for one of said wires, whereby said wires are brought into contact with each other, means elastically supporting said guide tube, an electromagnet positioned to attract said guide tube, whereby the wire in the tube is removed from contact with the other wire to form an arc gap, means for feeding electric current to said wires and the coil of said electromagnet in series, and means for directing a stream of gas toward said arc gap, whereby material melted off said wires by said electric current is projected in the form of spray.

In witness whereof I have signed this specification in the presence of two witnesses.

MAX ULRICH SCHOOP.

Witnesses:

PAUL ZOLLER,  
CARL GUBLER.

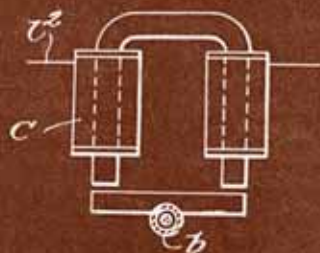
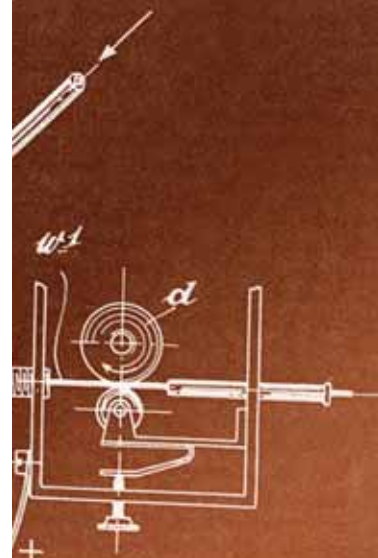


Fig. 2.

Fig. 1.



Inventor:  
Max ULRICH SCHOOP

by *R. H. Adams*  
his Attorney.

## Metal and Other Fusible Substances

Thermal Spray Association Historical Collection • [www.thermalspray.org](http://www.thermalspray.org)





### JOB SHOP MEMBER COMPANIES

**Accuwright Industries, Inc.** - Gilbert, AZ, USA  
www.accuwright.com 480.892.9595  
Mr. David Wright, dave@accuwright.com

**BASF Catalysts LLC** - East Windsor, CT USA  
www.basf.com 860.623.9901  
Mr. Marc Froning, marc.froning@basf.com

**Bender Machine & Surface Technologies, Inc.**  
Vernon, CA USA www.benderus.com 323.232.2371  
Mr. Doug Martin, doug.martin@woodgroup.com

**Cascadura Industrial S.A.** - Sorocaba SP Brazil  
www.cascadura.com.br 55.15.3332.9620  
Mr. Ricardo Leoni, ricardo.maffei@cascadura.com.br

**Cincinnati Thermal Spray, Inc.** - Cincinnati, OH USA  
www.cts-inc.net 513.793.0670  
Mr. Ed Simonds, esimonds@cts-inc.net

**Ellison Surface Technologies, Inc.** - Cincinnati, OH USA  
www.ellisonsurfacetech.com 513.770.4924  
Mr. David Terkosky, dterkosky@ellisongroup.com

**Exline, Inc.** - Salina, KS USA  
www.exline-inc.com 785.825.4683  
Mr. Doug Porter, d.porter@exline-inc.com

**F.W. Gartner Thermal Spraying** - Houston, TX USA  
www.fwgts.com 713.225.0010  
Mr. Jimmy Walker, jwalkerjr@fwgts.com

**Ferrothermal Spray Coating - Monterrey N.L. Mexico**  
www.drexel.com.mx 52.818.331.08  
Mr. Renato Drexel, renato@drexel.com.mx

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

**Hayden Corporation** - West Springfield, MA USA  
www.haydencorp.com 413.734.4981  
Mr. John O. Hayden, john@haydencorp.com

**Machine-Aid Tech Philippines, Inc.** - Sucat, Muntinlupa City, Philippines 632.838.7551 to 54  
Mrs. Marivic R. Dela Cruz, matpi@vasia.com

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

**National Coating Technologies Inc.** - Winnipeg, MB Canada  
www.nationalcoating.com 204.632.5585  
Mr. John Read, johnr@nationalcoating.com

**Nooter Construction Company** - Treviso, PA USA  
www.nooterconstruction.com 215.244.3526  
Mr. Mike Murphy, mjmurphy@nooter.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

**Sermatech International, Inc.** - Limerick, PA USA  
www.sermatech.com 610.948.5100  
Mr. Thomas F. Lewis III, tlewis@sermatech.com

**Spraymetal, Inc.** - Houston, TX USA  
713.921.0012  
Mr. Jim Hollingsworth, jimh@schumachercoinc.com

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

**Surface Modification Systems** - Santa Fe Springs, CA USA  
www.surfacemodificationsystems.com 562.946.7472  
Dr. Rajan Bamola, rajanb@surfacemodificationsystems.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, kmoore@ust.com.au

### SUPPLIER MEMBER COMPANIES

**3M Abrasive Systems Division** - St. Paul, MN USA  
www.mmm.com 800.362.3550 or 651.736.5459  
Mr. Troy Heuermann, twhuermann1@mmm.com

**Action SuperAbrasive** - Brimfield, OH USA  
www.actionsuper.com 800.544.5461  
Mr. Dan Noonan, noonand@actionsuper.com

**Air Products and Chemicals** - Allentown, PA USA  
www.airproducts.com/metals 800.654.4567  
Mr. Stewart Stringer, stringrs@airproducts.com

**Alloy Sales** - Delta, BC Canada  
www.alloysales.com 604.940.9930  
Mr. Lloyd Johannesen, lloyd@alloysales.com

**AMETEK, Inc.** - Eighty-Four, PA USA  
www.ametekmetals.com 724.250.5182  
Mr. Richard Mason, dick.mason@ametek.com

**Ardleigh Minerals, Inc.** - Shaker Heights, OH 44122 USA  
www.ardleigh.net 216.921.6500  
Mr. Ernie Petrey, epetrey@ardleigh.net

**Bay State Surface Technologies, Inc.** - Millbury, MA USA  
www.aimtek.com/baystate 508.832.5035  
Mr. Jay Kapur, jkapur@aimtek.com

**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

**Climax Engineered Materials** - Sahuarita, AZ USA  
www.climaxengineeredmaterials.com 520.806.8759,  
Mr. Christopher Michaluk, chris\_michaluk@fmi.com



**Deloro Stellite Company, Inc.** - Goshen, IN USA

www.stellite.com 574.534.8631

Mr. David A. Lee, dlee@stellitecoatings.com

**Donaldson Company, Inc.** - Minneapolis, MN USA

www.donaldson.com/en/industrialair 800.365.1331

Ms. Lori Lehner, llehner@mail.donaldson.com

**Farr APC** - Jonesboro, AR USA

www.farrapc.com 800.479.6801

Mr. Lee Morgan, morganl@farrapc.com

**Flame Spray Technologies, Inc.** - Grand Rapids, MI USA

www.fst.nl 616.988.2622

Mr. Terry Wilmert, twilmert@aol.com

**Genie Products, Inc.** - Rosman, NC USA

www.genieproducts.com 828.862.4772

Mr. Richard Grey, rwgrey@genieproducts.com

**Green Belting Industries LTD** - Mississauga, ON, Canada

www.greenbelting.com 905.564.6712

Mr. Tim Connelly, timconnelly@sympatico.ca

**H. C. Starck, Inc.** - Newton, MA USA

www.hcstarck.com 513.942.28155

Mr. Jim Ryan, james.ryan@hcstarck.com

**HAI Advanced Material Specialists** - Placentia, CA USA

www.hardfacealloys.com 877.411.8971

Mr. Daren Gansert, dgansert@haiams.com

**Haynes Wire Company** - Mountain Home, NC USA

www.haynesintl.com 828.692.5791

Mr. Robert Jenkerson, rjenkerson@haynesintl.com

**Kennametal** - Houston, TX USA

www.kennametal.com 281.387.4287

Mr. Eric Hanson, eric.hanson@kennametal.com

**Lineage Alloys** - Baytown, TX USA

www.lineagealloys.com 281.426.5535

Mr. Gordon Jones, gjones@lineagealloys.com

**Linde Gas USA LLC** - Murray Hill, NJ USA

www.us.linde-gas.com 908.771.13538

Dr. Joe Berkmanns, joachim.berkmanns@us.linde-gas.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 814.361.6857

Mr. Jim Morris, jim.morris@nah.com

**Northwest Mettech Corporation**

North Vancouver, BC Canada

www.mettech.com 604.987.1668

Mr. Alan Burgess, alan.burgess@mettech.com

**Osram Sylvania** - Towanda, PA USA

www.sylvaniathermalspray.com 570.268.5398

Ms. Stacy Garrity, stacy.garrity@sylvania.com

**PM Recovery, Inc.** - Harrison, NY USA

www.pmrecovery.com 860.536.5396

Mr. Paul Sartor, paul@pmrecovery.com

**Parker Hannifin, domnick hunter Division**

Charlotte, NC USA

www.domnickhunter.com 800.345.8462

Mr. Jim Tomczyk, jim.tomczyk@parker.com

**Plasmatec, Inc.** - Montreal, Quebec Canada

www.plasmatec.com 514.931.1301

Mr. Michael Hacala, info@plasmatec.com

**Polymet Corporation** - Cincinnati, OH USA

www.polymet.us 513.874.3586

Mr. Bob Unger, runger@polymet.us

**Powder Alloy Corporation** - Cincinnati, OH USA

www.powderalloy.com 513.984.4016

Mr. Steve Payne, spayne@powderalloy.com

**Praxair Surface Technologies** - Concord, NH USA

www.praxair.com/thermalspray 603.224.9585

Mr. Richard Thorpe, richard\_thorpe@praxair.com

**Progressive Technologies, Inc.** - 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

**Soleras LTD** - Biddeford, ME USA

www.soleras.com 207.282.5699

Mr. Guy Laverriere, guy@soleras.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, davelewis@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

Mr. Robert Gansert, rgansert@adv-mtv.com

**ASM Thermal Spray Society** - Materials Park, OH USA

www.asminternational.org 440.338.5151

Thom Passek, tspassek@asminternational.org

**R.A. Miller Materials Engineering** - Indianapolis, IN USA

www.ram-mat.com 317.259.7632

Mr. Robert Miller, robert\_a\_miller@mymailstation.com

**State University of New York at Stony Brook**

Stony Brook, NY USA

www.matscieng.sunysb.edu/tsl/ctsr 631.632.45678

Ms. Lysa D. Russo, lysa.russo@sunysb.edu

**The Zanchuk Group, LLC** - Concord, NH USA

www.zanchuk.com 603.226.3712

Mr. Val Zanchuk, zanchuk@comcast.net

### International Thermal Spray Association

#### Headquarters Office

208 Third Street • Fairport Harbor, Ohio 44077

voice: 440.357.5400 • fax: 440.357.5430

email: itsa@thermalspray.org

web: www.thermalspray.org



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



**Chairman Froning**

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.

A company-member trade association, ITSA invites all interested companies to talk with our officers, committee chairs, and

company representatives to better understand member benefits. A complete list of ITSA member companies and their representatives are at [www.thermalspray.org](http://www.thermalspray.org)

### ITSA Mission Statement

*The International Thermal Spray Association is a professional trade organization dedicated to expanding the use of thermal spray technologies for the benefit of industry and society.*

### Officers

Chairman: **Marc Froning**, BASF Catalysts LLC  
 Vice-Chairman: **Dan Hayden**, Hayden Corporation  
 Treasurer: **Bill Mosier**, Polymet Corporation  
**Executive Committee** (above officers plus)  
 Corporate Secretary: **Kathy Dusa**  
 Past Chairman: **Ed Simonds**, Cincinnati Thermal Spray, Inc.  
 6-Year Term: **John Read**, National Coating Technologies  
 4-Year Term: **Scott R. Goodspeed**, H. C. Starck, Inc.  
 2-Year Term: **John Hayden**, Hayden Corporation

### ITSA Scholarship Opportunities

The International Thermal Spray Association offers annual Graduate and Undergraduate 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](http://www.thermalspray.org) for criteria information and a printable application form.

### ITSA Materials Camp Student Sponsor

Commencing in 2001, the International Thermal Spray Association provides an annual \$1,500 student scholarship to the ASM International Foundation Materials Camp.

### 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, Ohio 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 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.

For a free **SPRAYTIME** subscription, visit [www.spraytime.org](http://www.spraytime.org) and complete the short questionnaire.

### ITSA Headquarters

208 Third Street, Fairport Harbor, Ohio 44077 USA  
 tel: 440.357.5400 fax: 440.357.5430  
[itsa@thermalspray.org](mailto:itsa@thermalspray.org) [www.thermalspray.org](http://www.thermalspray.org)

### SCHOLARSHIP OPPORTUNITIES

**Up to two(2) Graduate scholarships worth \$2,000.00 each to be awarded each calendar year.**

**Up to three(3) Undergraduate scholarships worth \$750.00 each to be awarded each calendar year**

Since 1991, the ITSA Scholarship Program has contributed to the growth of the Thermal Spray Community, especially the development of new technologists and engineers. The International Thermal Spray Association is very proud of this education partnership and encourages all eligible participants to apply.

New Application Dates: Scholarship applications are now accepted annually April 15 through June 30 ONLY for both the Graduate and Undergraduate scholarships.

**Please visit** [WWW.THERMALSPRAY.ORG](http://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 now! As a company-member, professional trade 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.

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, in every issue of SPRAYTIME, as well as in our free edition of "What Is Thermal Spray?". ITSA members also receive an additional 10% advertising discount in the SPRAYTIME newsletter. ITSA member companies are also highlighted in the ITSA booth at several trade shows throughout the year (International Thermal Spray Conference ITSC, Fabtech International and AWS Welding Show Thermal Spray Pavilion, Weldmex Mexico, and TurboExpo in 2008).

**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 our headquarters office or our membership chairman Jim Ryan at james.ryan@hcstarck.com or visit the membership section of our [www.thermalspray.org](http://www.thermalspray.org) website.

## International Thermal Spray Association Welcomes New Members

**Kennametal** has joined the International Thermal Spray Association.

Kennametal, Inc is a leading global supplier of tooling, engineered components, and advanced materials consumed in production processes in a variety of industries. In thermal spray, Kennametal's tooling is used to machine components prior to being coated and to finish coated surfaces. Their advanced materials portfolio includes a variety of thermal spray powders that

are tailored to their customer's specifications, with capabilities in Carbides, Alloys, and Ceramics. And, Kennametal's engineered components incorporate advanced surface technologies such as thermal spray into their design, as the demands continue to push the limits of materials science in many applications.

**For more information**, contact ITSA company representative Eric Hanson, [eric.hanson@kennametal.com](mailto:eric.hanson@kennametal.com), tel: 281.387.4287, web [www.kennametal.com](http://www.kennametal.com)



**Lineage Alloys** has joined the International Thermal Spray Association.

Thermal spray powders have been produced on the plant site at Lineage Alloys, Baytown, Texas, USA for more than thirty-five years. Lineage Alloys specializes in the production of carbide, oxide and certain metal powders. Lineage Alloys has achieved ISO 9001/2000 approval.

Lineage Alloys supplies powders to the aerospace, off-shore, petrochemical, chemical and general engineering sectors of industry.

The Mission Statement of Lineage Alloys is to be a world class supplier and manufacturer of thermal spray powders to the coatings industry.

**See advertisement page 29**

**For more information**, contact ITSA company representative Gordon Jones phone 281.426.5535, email [lineage@lineagealloys.com](mailto:lineage@lineagealloys.com), web [www.lineagealloys.com](http://www.lineagealloys.com) for a guide to aiding the selection of the correct choice of consumables for thermal spraying.



**Soleras LTD** has joined the International Thermal Spray Association.

Soleras Ltd., located in Biddeford, Maine, has supplied the vacuum-coating industry for over 30 years. Soleras is a supplier of sputter targets, metallic bonding, original and enhanced backing plates and vacuum metalization related spare parts. Soleras has evolved into a multidisciplined manufacturer of materials, vacuum components and consumables.

The company has capabilities in product design, reverse engineering, and failure analysis.

**For more information**, contact the sales department, phone 207.282.5699, email [soleras@soleras.com](mailto:soleras@soleras.com).

## HELP WANTED

**New coatings facility needs experienced spray operators and engineers:**

**Experienced Thermal Spray Operator  
Coating Development Engineer**

**Northern Ohio Location**

**email resume to [ajsherman@mesocoat.com](mailto:ajsherman@mesocoat.com)**

### Sulzer Metco

This year, 2008, marks the 75th year of the founding of the Metallizing Engineering Company, now known as Sulzer Metco.

We could tell you about our history, and the many thermal spray visionaries who founded the many companies that later became Sulzer Metco, but for that, you can read the history page on our web site. We could tell you how young we are compared to our 174-year-old parent corporation, Sulzer. We could tell you about all of the technological innovations Sulzer Metco, and our founding companies before us, brought to the thermal spray industry. Or, we could tell you about the dedication and talent of our more than 1900 employees worldwide. Without doubt, all of these things define Sulzer Metco.

Instead, we want to tell you about the foundation of any successful company — you, our customer. Your continuing patronage and devoted loyalty to our organization throughout our 75-year history have defined Sulzer Metco and our extensive product portfolio.

When Rea Axline opened the doors of the Metallizing Engineering Company during the Great Depression of 1933, industry needed a way to increase component service life by preventing corrosion and salvaging worn parts to serviceable condition. During World War II, our customers needed alternatives to materials that were difficult to source. As the size of passenger aircraft grew, so did the critical concepts of fuel-to-weight ratios and unprecedented safety, prompting the need for new classes of thermal spray materials that included abradable materials and MCrAlY's. Many of these materials have chemistries that were specifically developed by our customers. To apply these new materials and achieve the surface properties that our customers needed led to new thermal spray processes such as atmospheric plasma spray, chambered plasma spray and HVOF. In each case, a Sulzer Metco company, such as Metco, Alloy Metals or EPI, in partnership with our customers, brought these technologies to the marketplace. As customers demanded better process control and repeatability, Plasma Technik, another company that is part of Sulzer Metco's heritage, developed the first truly automated spray cells.

Today, our customers tell us they need faster processing speeds, less material waste and even greater reliability. In addition, customers must meet evermore stringent environment and safety regulations. To remain competitive, our customers also require surfaces that keep the components they market in service longer, with better performance than ever before. An example are cylinder bore coatings on aluminum engine blocks, for automobiles that are lighter, more fuel efficient and have improved on-road life. To apply these coatings with the highest efficiency, fully automated, in-line production systems were developed, that feature our MultiCoat® controller and multiple spray guns manipulated by Sulzer Metco's RotaPlasma®. TriplexPro®-200, our new triple cathode

plasma spray gun, can apply coatings at speeds and deposit efficiencies that are up to 300% better than previous technologies, and go more than 200 hours without maintenance.

As our world continues its technological advance, new industries arise that need new surface solutions. Such is the case with solid oxide fuel cells. Here, our customers need very thin, very dense ceramic coatings that can be quickly applied to large surface areas. Sulzer Metco's LPPS®-TF technology shows great promise in meeting these needs, applying fully dense ceramic coatings that are only 0.4 mils (10 µm) thick at the rate of 10.8 ft<sup>2</sup> (1m<sup>2</sup>) /min.

As you can see, the challenges set before us by our customers over the past 75 years are our legacy. As our future is fully reliant on helping our customers to succeed, we hope you will continue to present us with new and exciting surface technology challenges in the future. We certainly look forward to it. **See related advertisement on back cover.**

**The employees of Sulzer Metco join together to say,**

***It Takes Teamwork...***

***Thank You for 75 Years of Success!***

***We Look Forward to Continuing Success Together!***



**Surface technology shows its strength in car engine production: plasma coating of the cylinder bores has replaced the need for cast iron cylinder liners. (Reprinted with permission from TeroLab Surface News, Number 13, July 2007.)**



## New DeWAL Thermal Spray Brochure



A new color brochure from DeWAL Industries describes a broad range of high performance thermal spray masking tapes.

DeWAL tapes are widely used in the thermal spray industry to cover both sharp edges and intricate part shapes.

The DeWAL brochure gives specifications and lists pertinent features of non-carbonizing, aggressive-adhesion tapes used for grit blasting, ceramic, plasma and arc spraying, as well as HVOF.

DeWAL's brochure describes high temperature applications for tapes as different as double-sided adhesive-coated glass fabric and silicone-coated double-ply composites of glass fabric and aluminum foil.

The brochure illustrates the masking of channels and the application of elasticity-controlled plasma tapes.

**For a free brochure or more information**, phone Christopher Brooks, director of sales and marketing, DeWAL Industries, at (800) 366-8356 (North America only) or (401) 789-9736 (international). Fax (401) 783-6780 or email [cbrooks@dewal.com](mailto:cbrooks@dewal.com).

Since its founding in 1974, DeWAL has become an industry leader in the manufacture of skived PTFE and UHMW-PE

film. Its thermal spray and plasma tapes are used in tight-tolerance aircraft engine, automotive, medical and mission-critical manufacturing.

DeWAL also manufactures pressure sensitive tapes from PTFE, UHMW-PE, Polyimide, and PTFE coated glass fabric. DeWAL constructs Poro-Tex and UniPore specialty products providing unique combinations of porosity, chemical resistance and heat resistance for filtration and venting applications. *See related news pages 32 and 36.*

**For a free copy of "What Is Thermal Spray?" publication, send request to [itsa@thermalspray.org](mailto:itsa@thermalspray.org)**

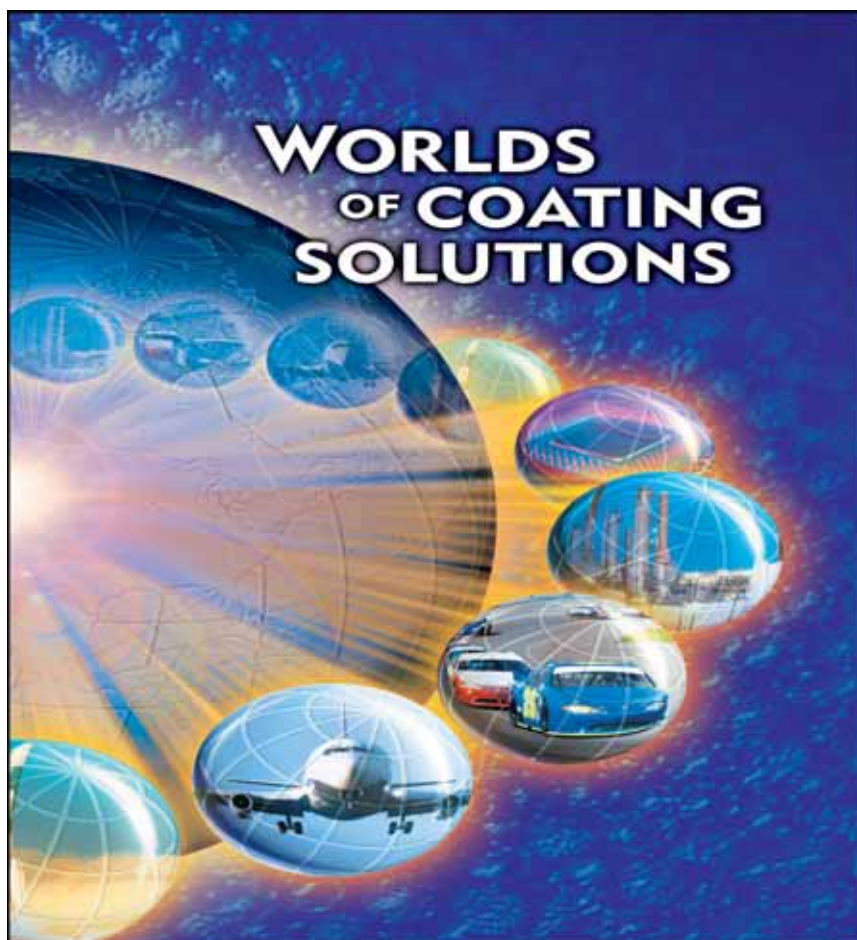
## New Address for HAI Advanced Material Specialists

HAI Advanced Material Specialists, Inc. have moved. Please note the following new contact information:

HAI Advanced Material Specialists, Inc.  
1688 Sierra Madre Circle, Placentia, CA 92870  
phone: 1-877-411-8971 • web: [www.haiams.com](http://www.haiams.com)

## WHERE IS YOUR ARTICLE?

**You and your company have the opportunity to help design the content of your thermal spray community newsletter. The *SPRAYTIME* Editorial Staff encourages and welcomes your contribution.**



## HAI Advanced Material Specialists provides Worlds of Coating Solutions. . .

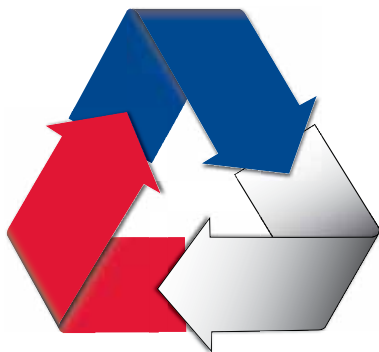
Whether you are looking to extend your products life, increase your products performance or reduce your production and maintenance costs, our experts will develop workable solutions for your most demanding coating needs.

- Powders/Wires
- Coated Powders
- Nano Particle
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### SPRAYDUCO #2

	V					Ar	N <sub>2</sub>	
	Ar							H
He			H	C				
	H	He	X					
			Ar	N <sub>2</sub>	I			
					C	I	X	
				V	X			N <sub>2</sub>
H							V	
	X	C					W	

### SPRAYDUCO #2 - SPRAY PARAMETERS

I = Current      V = Voltage      W = Power  
Ar = Argon      He = Helium      H = Hydrogen  
N<sub>2</sub> = Nitrogen      C = Carrier      X = Standoff

Spraydoku is similar to Sudoku where spray parameters are used instead of numbers. Math skills and calculations are not required. This is a puzzle where parameters are placed in squares, using rules of logic and deduction. The objective is to fill all the blank squares with the correct parameter. There are three very simple constraints to follow. In a Spraydoku game:

- Every row of 9 parameters must include all parameters in any order
- Every column of 9 parameters must include all parameters in any order
- Every 3 by 3 subsection of the 9 by 9 square must include all nine parameters

Every Spraydoku puzzle begins with a number of squares already filled in, and the difficulty of each game is largely a function of how many squares are filled in. The more squares that are known, the easier it is to figure out which parameters go in the open squares. As you fill in squares correctly, options for the remaining squares are narrowed and it becomes easier to fill them in. The difficulty level ranges from novice (easiest) to Journeyman to Master (hardest). This one is novice.

*To receive a copy of the puzzle solution before the next issue, send an email request to [itsa@thermalspray.org](mailto:itsa@thermalspray.org)*

### Solution to SPRAYDUCO #1 - 4th Quarter SPRAYTIME 2007

C	H	I	V	Ar	N <sub>2</sub>	W	He	X
Ar	He	N <sub>2</sub>	X	W	H	I	V	C
W	X	V	C	He	I	N <sub>2</sub>	Ar	H
He	Ar	W	H	X	V	C	N <sub>2</sub>	I
H	N <sub>2</sub>	X	I	C	He	V	W	Ar
V	I	C	Ar	N <sub>2</sub>	W	H	X	He
I	C	Ar	N <sub>2</sub>	V	X	He	H	W
X	V	He	W	H	C	Ar	I	N <sub>2</sub>
N <sub>2</sub>	W	H	He	I	Ar	X	C	V

### WHERE IS YOUR ARTICLE?

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## Book Review

### "Materials Processing Handbook"

Editors Joanna R. Groza, et al.  
CRC Press, Boca Raton, FL, 2007

Reviewed by Robert A. Miller  
(R. A. Miller Materials Engineering)

This thick book is actually a set of full-length, scholarly, well-referenced review articles covering key areas in modern materials processing. Some of the reviews cover or include topics directly relevant to thermal spray technology. The other reviews should interest materials researchers in general and could provide ideas exploitable in a thermal spray context. Throughout this book, the level of discussion is advanced and the tone is academic.

My intent here is not to review the reviews, but to map out the topics discussed, revealing this volume's breadth of coverage, and alerting readers who may already be exploring one or more of the reviewed subject areas. The Roman numerals below are those the book uses to denote major sections.

#### I. Nanoscale

The first set of reviews deals with nanotubes (Review 1), self-assembly (Review 2), ion-beam processing (Review 3), spinodal decomposition (Review 4), and Ostwald ripening (Review 5).

Next, Review 6 discusses the crystallization of amorphous materials associated with the devitrification of glasses, focusing largely on zirconium alloys. The concepts are also relevant to other materials.

Review 7 covers nanostructured ceramics and discusses the production of metastable powders, and the use of conventional, shrouded, and solution plasma processes for this purpose.

#### II. Deposition

Review 8 describes physical vapor deposition (PVD) and chemical vapor deposition (CVD). Review 9 focuses on epitaxial growth in PVD processing. Review 10 covers ion beam deposition. These techniques compete to some degree with thermal spray processes, and many manufacturers utilize both them and thermal spray.

Review 11 is devoted to thermal spray deposition and coating processes, thoroughly covering the main process steps and most common spray methods, including variations of "cold spray". Aspects of deposition and the structure and properties of deposits are examined in light of the relevant physical and chemical mechanisms.

#### III. Dislocation-Based

Review 12 deals with metalworking, and Review 13 with mechanical alloying and severe plastic deformation. Review 14 addresses superplasticity.

#### IV. Microstructure Change

These reviews are all of fundamental interest, especially in advanced industries such as aerospace.

Topics covered include single crystal

growth (Review 15), casting and solidification (Review 16), rapid solidification and metallic glasses (Review 17), diffusion-based processes (Review 18), phase transformations in heat treating (Review 19), transformation toughening (Review 20; this subject has relevance to TBCs), bonding (Review 21; this discussion includes active metal brazing), and electrolytic and electroless processes (Review 22).

#### V. Macroprocesses

Review 23 describes glass processing and Review 24 ceramic processing. Various forms of powder processing used to make parts, including sintering and hot isostatic pressing (HIP) are covered in Review 25. Layer-based additive manufacturing, including associated processes for metal deposition and formation of shapes is outlined in Review 26. Review 27 deals with casting.

#### VI. Multiscale

Here we find nanomaterials (nanocomposites in Review 28, and polymers and nanocomposites in Review 30) along with more general topics, thermochemical processing (Review 29) and surface deformation (Review 31, including shot peening).

#### Conclusion

I can't possibly do justice to the fine treatment the authors gave to their various topics, but I can state confidently that this volume would benefit any academic, industrial, or government department looking to advance and exploit these aspects of materials processing.

To obtain a copy of "Materials Processing Handbook" by Joanna R. Groza (Editor), James F. Shackelford (Editor), Enrique J. Lavernia (Editor), Michael T. Powers (Editor), we suggest you visit a book store or purchase online from CRC Press for \$149.95.

To contact reviewer and consultant Robert A. Miller, phone 317.259.7632, email: robert\_a\_miller@mystation.com

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## CALENDAR OF EVENTS MAY 2008

**5-8 Pittsburgh, PA USA** *Iron & Steel Technology Conference/Expo AISTech2008* - tel: 724.776.6040, email: [infor@aist.org](mailto:infor@aist.org), web: [www.aist.org](http://www.aist.org)

**6-8 Maastricht, The Netherlands** *European Association for Brazing and Soldering Spring 2008 Technical Training Seminar* - visit EABS Secretariat website at [www.brazingandsoldering.org](http://www.brazingandsoldering.org)

**17-20 Atlanta, GA USA** *112th Metalcasting Congress* - contact American Foundry Society, tel: 800.537.4237, web: [www.afsinc.org](http://www.afsinc.org)

**26-28 Buenos Aires, Argentina** *International Conference on New Developments in Metallurgy & Applications of High Strength Steels* - visit [www.steelconfbas08.com](http://www.steelconfbas08.com)

**27-30 Moscow, Russia** *Int'l Trade Fair Joining, Cutting, Surfacing* - Mr. Claus-Peter Regiani, email: [cp.regiani@messe-essen.de](mailto:cp.regiani@messe-essen.de), web: [www.schweissen-schneiden-russia.com](http://www.schweissen-schneiden-russia.com)

## JUNE 2008

**1-5 Algiers, Algeria** *Failure Analysis of Engineering Materials and Structures - African InterQuadrennial ICF Conference of Fracture (AIQ-ICF)* - contact Mimoun Elboudjaini, AIQ-ICF2008, email: [melboudjd@NRCan.gc.ca](mailto:melboudjd@NRCan.gc.ca)

**1-5 Wiesbaden, Germany** *2nd Int'l conference on Steels in Cars & Trucks* - contact Markus Bau tel: +49.241.88970-57, email: [bau@sct2008.de](mailto:bau@sct2008.de), web: [www.sct2008.com](http://www.sct2008.com)

**2-6 Pine Mountain, GA USA** *8th Int'l Conference on Trends in Welding Research* - contact ASM Int'l tel: 440.338.5151, web: [www.asminternational.org](http://www.asminternational.org), email: [customerservice@asminternational.org](mailto:customerservice@asminternational.org)

**2-4 Maastricht, the Netherlands** *International Thermal Spray Conference/Expo (ITSC 2008)* - visit web [www.dvs-ev.de/itsc2008](http://www.dvs-ev.de/itsc2008) or contact ASM Int'l tel: 440.338.5151, [customerservice@asminternational.org](mailto:customerservice@asminternational.org), web: [www.asminternational.org](http://www.asminternational.org)



**8-12 Washington, DC USA** *World Congress on Powder Metallurgy & Particulate Materials* - email: [info@mpif.org](mailto:info@mpif.org), web [www.mpif.org](http://www.mpif.org)

**9-12 Chongqing, China** *MRS International Materials Research Conference* - contact tel: 724.779.3003, web: [www.mrs.org](http://www.mrs.org)

**9-13 Berlin, Germany** *ASME Turbo Expo 2008* - visit [www.turboexpo.org](http://www.turboexpo.org)

**18-20 Kyiv, Ukraine** *4th Surface Engineering 2008 Technical Trade Show* - TDS Expo, tel: +380.44.596.91.84.596, [olga@welding.kiev.ua](mailto:olga@welding.kiev.ua)

**22-26 Austin, TX USA** *AeroMat 2008 ASM Advanced Aerospace Materials & Processes Conference/Expo* - contact ASM International 440.338.5151, email: [customerservice@asminternational.org](mailto:customerservice@asminternational.org), web: [www.asminternational.org](http://www.asminternational.org)

## JULY 2008

**20-23 Hartford, CT USA** *44th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit* - visit [www.aiaa.org/jpc](http://www.aiaa.org/jpc)

## AUGUST 2008

**18-21 Louisville, KY USA** - *MegaRust 2008 Marine Coatings & Corrosion Conference* - visit [www.nstcenter.com](http://www.nstcenter.com)

## SEPTEMBER 2008

**2-3 Hanover, Germany** *Aluminum Brazing Seminar* - by European Assoc for Brazing and Soldering- visit EABS Secretariat website at [www.brazingandsoldering.org](http://www.brazingandsoldering.org)

**14-18 Champion, PA USA** *11th Int'l Symposium on Superalloys (Superalloys 2008)* - contact TMS tel: 724.776.9000 x 243, email: [mtgserv@tms.org](mailto:mtgserv@tms.org), web: [www.tms.org](http://www.tms.org)

**29 SEP-1 OCT Mannheim, Germany** *EuroPM2008 Int'l Conference* - contact European Powder Metallurgy, tel: +44(0)1743.248899, web: [www.epma.com](http://www.epma.com)

## OCTOBER 2008

**6-8 Las Vegas, NV USA** *FABTECH Int'l & AWS Welding Show - with a Thermal Spray Pavilion* - organized by American Welding Society, [www.aws.org](http://www.aws.org), Fabricators and Mfgs Assoc, [www.fmafabtech.com](http://www.fmafabtech.com), Society of Manufacturing Engineers, [sme.org/fabtech](http://sme.org/fabtech)



**6-9 Pittsburgh, PA USA** *Materials Science & Technology 2008 Conference & Exhibition (MS&T'08)* - organized by ASM, ACerS, AIST, and TMS tel: 440.338.5151 [customerservice@asminternational.org](mailto:customerservice@asminternational.org), web: [www.asminternational.org](http://www.asminternational.org)

**15-16 Hartford, CT USA** *TSS Aerospace Coating Symposium*

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**29-30 Paris, France** *Industrial Gas Turbine O&M Conference* - contact Ruth Martin, email [ruth@gasturbine-events.com](mailto:ruth@gasturbine-events.com), tel: +44 207 932 5587,

### DECEMBER 2008

**1-5 Boston, MA USA** *2008 MRS Fall Meeting & Exhibit* - contact MRS tel: 724.779.3003, email: [info@mrs.org](mailto:info@mrs.org), web: [www.mrs.org](http://www.mrs.org)

**2-3 Montreal, Quebec Canada** *Symposium on Improving Reliability and Control in Thermal Spray* - Sponsored by ASM Thermal Spray Society, email contact [Kristin.Minihan@asminternational.org](mailto:Kristin.Minihan@asminternational.org)  
**7-10 Bangkok, Thailand** *PMP-III 3rd Int'l Conference on Processing Materials for Porperties* - contact TMS tel: 724.776.9000, email: [mtgserv@tms.org](mailto:mtgserv@tms.org), web: [www.tms.org](http://www.tms.org)

### FEBRUARY 2009

**15-18 New Orleans, LA USA** *PACE 2009* - contact Society for Protective Coatings, web [www.pace2009.com](http://www.pace2009.com)

### MAY 2009

**3-6 Helsingør Denmark** *15th Int'l Conference on the Joining of Materials* - contact: JOM tel: +45.48355458, email: [jom\\_aws@post10.tele.dk](mailto:jom_aws@post10.tele.dk)

**4-7 Las Vegas, NV USA** *ITSC 2009 International Thermal Spray Conference & Expo* - contact ASM Int'l tel: 440.338.5151, web: [www.asminternational.org](http://www.asminternational.org), email: [customerservice@asminternational.org](mailto:customerservice@asminternational.org)

### JUNE 2009

**8-12 Orlando, FL USA** *ASME Turbo Expo 2009* - Orlando World Marriott Resort - visit [www.turboexpo.org](http://www.turboexpo.org)

### JULY 2009

**12-17 Ottawa, Ontario Canada** *12th Int'l Conference on Fracture (ICF12)* - visit [www.icf12.com](http://www.icf12.com)

### SEPTEMBER 2009

**14-19 Essen, Germany** *International Trade Fair - Joining, Cutting, and Surfacing* - visit web: [www.messe-essen.de](http://www.messe-essen.de), contact email: [christina.kleinpass@messe-essen.de](mailto:christina.kleinpass@messe-essen.de)

### NOVEMBER 2009

**15-18 Chicago, IL USA** *FABTECH Int'l & AWS Welding Show and Metalform- with a Thermal Spray Pavilion* - organized by American Welding Society, [www.aws.org](http://www.aws.org), Fabricators and Mfgs Assoc, [www.fmafabtech.com](http://www.fmafabtech.com), Society of Manufacturing Engineers, [www.sme.org/fabtech](http://www.sme.org/fabtech)

### NOVEMBER 2010

**2-4 Atlanta, GA USA** *FABTECH Int'l & AWS Welding Show and Metalform- with a Thermal Spray Pavilion* - organized by American Welding Society, [www.aws.org](http://www.aws.org), Fabricators and Mfgs Assoc, [www.fmafabtech.com](http://www.fmafabtech.com), Society of Manufacturing Engineers, [www.sme.org/fabtech](http://www.sme.org/fabtech)



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## Fabtech International and AWS Welding Show Announce Strategic Alliance With Metalform

Four industry-leading trade show organizers have formed an alliance to better serve the needs of trade show exhibitors and manufacturers in North America from the fields of fabricating, tube & pipe, welding and cutting, metalforming, and related processes. The show alliance between the three organizers of the FABTECH International & AWS Welding Show [the Society of Manufacturing Engineers (SME), the Fabricators and Manufacturers Association International (FMA) and the American Welding Society (AWS)] and the organizer of METALFORM [the Precision Metalforming Association (PMA)] will result in a combined annual exhibition.

While the first official combined exhibition will take place in November 2009, the partners have agreed to a "soft start" at the 2008 FABTECH International & AWS Welding Show, to be held October 6-8 at the Las Vegas Convention Center, Las Vegas, NV. The Vegas show will include a METALFORM pavilion, displaying innovations in stamping technology. An estimated 20,000 people from around the world are expected to visit the show, which will feature more than 800 exhibits.

By uniting the industry under one roof, the newly combined event will be significantly more inclusive, adding value for both exhibitors and attendees. The 2009 show is expected to cover 650,000 net sq ft with 1,300 exhibiting companies, becoming the "one-stop shop" in North America where attendees can access the latest materials, equipment and

services for all metalforming, fabricating, tube and pipe, welding and cutting technologies. As the most comprehensive event in the industry, the FABTECH International & AWS Welding Show and METALFORM will be the Western Hemisphere's single, must-see annual exhibition.

"This alliance will deliver the broadest array of metalforming, fabricating, cutting and joining technologies for manufacturing," said Mark Tomlinson, SME executive director. "Manufacturers need comprehensive exposure to every one of these technologies to compete in the global marketplace, and now they only have to go to one show to find them."

Gerald M. Shankel, FMA president and CEO said, "This is a good move for the industry. The METALFORM exhibition, with its focus on metal stamping and related technologies brings in-depth metalforming technology together with the FABTECH International & AWS Welding Show's unparalleled showcase of fabricating machinery, tube and pipe, welding and cutting technologies, and will offer a first-rate venue."

"AWS is pleased that METALFORM will join with the FABTECH International & AWS Welding Show," said Ray Shook, AWS executive director. "Metalforming companies are major customers of the welding and cutting industries. We're confident this alliance will add significant value for both exhibitors and attendees."

William Gaskin, PMA president, said, "The combination of PMA's METALFORM event with the FABTECH International & AWS Welding Show joins the leading exhibitions in each of the core manufacturing technology areas and also brings together four leading manufacturing trade associations and societies to better serve their respective industries."

Combining these shows creates unique opportunities for networking, interaction and learning that won't exist at any other industry event. In addition to the expanded show floor, FABTECH International, AWS and PMA will also conduct independent, but complementary, professional conferences and technical education programs during the 2009 show.

In 2010, the FABTECH International & AWS Welding Show and METALFORM event will be held November 2-4 in Atlanta, GA.

**ABOUT SME** - The Society of Manufacturing Engineers is the world's leading professional society supporting manufacturing education. Through its member programs, publications, expositions and professional development resources, SME promotes an increased awareness of manufacturing engineering and helps keep manufacturing professionals up to date on leading trends and technologies. [Visit www.sme.org](http://www.sme.org).

**ABOUT FMA** - The Fabricators and Manufacturers Association International, headquartered in Rockford, IL, is a nonprofit association dedicated to the professional development of metalforming and fabricating professionals and the companies that employ them. FMA brings the industry together through networking sessions, educational programs, trade publications, volunteer opportunities, and award programs and provides the tools and resources needed by companies to improve operations. [Visit www.fmanet.org](http://www.fmanet.org).

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**ABOUT AWS** - The American Welding Society is the largest organization in the world dedicated to advancing the science, technology, and application of welding and allied processes including joining, brazing, soldering, cutting and thermal spray. Headquartered in Miami, FL, AWS serves almost 53,000 members in the United States and around the world. For additional information on AWS programs and publications, visit [www.aws.org](http://www.aws.org).

**ABOUT PMA** - PMA is the full-service trade association representing the \$91-billion metalforming industry of North America—the industry that creates precision metal products using stamping, fabricating and other value-added processes. Its nearly 1200 member companies include metal stampers, fabricators, spinners, slide formers and roll formers as well as suppliers of equipment, materials and services to the industry. Members are located in 30 countries, with the majority found in North America - in 41 states of the United States as well as Canada and Mexico. Visit [www.pma.org](http://www.pma.org).

For more information, contact:

**AWS:** Adrienne Zalkind (800) 443-9353 ext. 416, [azalkind@aws.org](mailto:azalkind@aws.org)

**FMA:** Patricia Lee (815) 227-8286, [patl@fmanet.org](mailto:patl@fmanet.org)

**PMA:** Christie Carmigiano (216) 901-8800, [ccarmigiano@pma.org](mailto:ccarmigiano@pma.org)

**SME:** Lori Ann Dick (313) 425-3187, [communications@sme.org](mailto:communications@sme.org)

**Editors Note:** The Fabtech International and AWS Welding Show now includes the International Thermal Spray **Thermal Spray Pavilion**.

To reserve space in the ITSA Thermal Spray Pavilion, please contact Joe Krall, Director of Exposition Sales via email [jkrall@aws.org](mailto:jkrall@aws.org) or via phone 800.443.9353, extension 297.

For event information, visit [www.aws.org/expo](http://www.aws.org/expo) or [www.fmafabtech.com](http://www.fmafabtech.com) or [www.sme.org](http://www.sme.org) See advertisement page 13.

### Accuwright Industries Inc. Achieves ISO 9000 Certification

On January 28, 2008, Accuwright Industries Inc. was audited by QAS International to the quality management systems, standards and guidelines for ISO 9001:2000 and achieved certification.



Woman holding certificate is Jaylyn Harmon. From left to right behind her are Edgar Marquez, Cesar Boneo, Linda Lea, Jaren Wright, Rene Dominguez, Sajjan Singh, Ulises Yeomans, and Jory Wright

Accuwright Industries Inc. is an industry leader in metal spray technology offering a wide range of flame spray services including training and consultation. Flame spray processes are applied to everything from microchip tooling, aircraft parts and

continued on page 34

## Ask the Expert



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Research  
Technician

**Q** How do I know if I'm wasting gas due to leaks in my gas piping?

**A** Gas piping leaks can result from various conditions, including improper thread sealing, missed solder joints, defective piping, over-pressurization, even vibration and shocks. A pinhole leak can be a serious safety concern and it can cost you tens of thousands of dollars per year, depending on the size, number and severity of the leak(s). There are many ways to detect leaks, like bubble tests, pressure drop tests, mass spectrometer and thermal conductivity tests. They all have their place; however, they also often come with limitations in precision, speed or difficulty.

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Hear John describe various methods for identifying leaks in more detail at [www.airproducts.com/leak1](http://www.airproducts.com/leak1).

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continued from page 33

satellite rocket motors. Industries served include aerospace, automotive, electronic and semiconductor markets. The company is headquartered in Gilbert, Arizona.

David Wright, President of Accuwright Industries Inc. said: "The Company is committed to providing our customers with high quality flame spray services at a fair market price, exceeding their expectations. To meet this goal, Accuwright has achieved and will maintain the ISO 9001:200 registration."

Jory Wright, Quality Manager, added: "The initial decision to seek ISO 9001:2000 certification was taken to address potential quality requirements from new and existing customers. The process, however, has also helped us to formalize the company's internal procedures and improve the ways we do things."

Mr. Wright went on to say that the contributions of Marcus Camm and Lewis Hartle, consultants from International Management Systems, and the entire staff of Accuwright were instrumental in the achievement of this prestigious certification.



ISO 9001 is the internationally recognized quality management system that insures that a company's customers can count on a consistent level of quality products. The system documents all of the important steps needed to deliver that quality, from the initial design stage all the way through final delivery and support of the product. Regular re-certification by a qualified registrar insures that the Quality System remains in place and is effective.

For more information, please contact David Wright, phone 480.892.9595, email dave@accuwright.com

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### **SCHOLARSHIP Opportunities** See page 24

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The editor reserves the right to select letters for publication, and due to space and time limitations not all letters will be published nor acknowledged. If you have any questions please contact SPRAYTIME via email [spraytime@thermalspray.org](mailto:spraytime@thermalspray.org), or via phone 440.357.5400.

#### **Journal of Thermal Spray Technology®**

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

#### **Abstract: Clogging and Lump Formation During Atmospheric Plasma Spraying with Powder Injection Downstream the Plasma Gun**

**Isabelle Choquet, Stefan Björklund, Jimmy Johansson,  
and Jan Wigren**

This study aimed to numerically and experimentally investigate lump formation during atmospheric plasma spraying with powder injection downstream the plasma gun exit. A first set of investigations was focused on the location and orientation of the powder port injector. It turned out impossible to keep the coating quality while avoiding lumps by simply moving the powder injector. A new geometry of the powder port ring holder was designed and optimized to prevent nozzle clogging, and lump formation using a gas screen. This solution was successfully tested for applications with Ni-5wt.%Al and  $ZrO_2$ -7wt.% $Y_2O_3$  powders used in production. The possible secondary effect of plasma jet shrouding by the gas screen, and its consequence on powder particles prior to impact was also studied.

**Read the entire article in the December 2007**

**Journal of Thermal Spray Technology.**

For more information, visit  
[www.asminternational.org/tss](http://www.asminternational.org/tss)

**Editor: Christian Moreau**

**Associate Editors: Kendall Hollis, Seiji Kuroda, and Armelle  
Vardelle**



## Praxair Surface Technologies and FMC Technologies Sign Agreement for Thermal Spray Coatings Service

Praxair Surface Technologies, a wholly-owned subsidiary of Praxair, Inc. (NYSE: PX), has reached agreement with FMC Technologies to supply thermal spray coatings for gate valve components used in oil and natural gas production. The new agreement includes plans for Praxair Surface Technologies to establish a facility at Coimbatore in southern India that is expected to be in full production by mid-2008.

The facility will include a manufacturing plant for coating oilfield gate valve components manufactured in India. Praxair Surface Technologies' thermal spray coating provides wear and corrosion protection for gate valves in critical service applications.

"We're very pleased to be expanding our long-standing relationship with FMC by establishing a production capability in India," said Mark Gruninger, president, Praxair Surface Technologies. "This state-of-the-art facility will strengthen our ability to provide highly reliable service to FMC Technologies in a key geographic region."

Praxair Surface Technologies also provides FMC Technologies with thermal spray coating from its operations in Houston, Texas, and St. Etienne, France.

"Praxair Surface Technologies understands the difficult operating conditions wellhead gate valves are subjected to in the oilfield service industry," said Robert Potter, senior vice president for Energy Processing and Global Surface Wellhead, FMC Technologies. "We're confident that our expanded relationship with Praxair Surface Technologies will continue to bring value to FMC."

"This is Praxair Surface Technologies' first coatings facility in India and we are confident this will lead to other significant opportunities in this fast-growing market," Gruninger added.

**About FMC** - FMC Technologies, Inc. (NYSE:FTI) is a leading global provider of technology solutions for the energy industry and other industrial markets. The Company designs, manufactures and services technologically sophisticated systems and products such as subsea production

and processing systems, surface wellhead systems, high pressure fluid control equipment, measurement solutions, and marine loading systems for the oil and gas industry. The Company also produces food processing equipment for the food industry and specialized equipment to service the aviation industry. Twice named as the Most Admired Oil and Gas, Equipment Service Company by FORTUNE magazine, FMC Technologies employs approximately 11,000 people and operates 33 manufacturing facilities in 19 countries.

**About Praxair Surface Technologies** - Praxair Surface Technologies produces and markets high-performance coatings that reduce the harmful effects of abrasion, oxidation, corrosion, erosion, wear and extreme temperatures on metal parts for the aviation, oilfield, power generation and printing industries. Praxair, Inc., parent company of Praxair Surface Technologies, is the largest industrial gases company in North and South America, and one of the largest worldwide, with 2006 sales of \$8.3 billion. The company produces, sells and distributes atmospheric and process gases, and high-performance surface coatings. Praxair products, services and technologies bring productivity and environmental benefits to a wide variety of industries, including aerospace, chemicals, food and beverage, electronics, energy, healthcare, manufacturing, metal, and others.

**For more information** on Praxair Surface Technologies services and products, visit website [www.praxair.com](http://www.praxair.com) or [www.praxairsurfacetechologies.com](http://www.praxairsurfacetechologies.com).

**See advertisement page 10**

### Thermal Spray Crossing Borders Maastricht, The Netherlands June 2 - 4, 2008

This outstanding annual event in the world of thermal spray technology is jointly organized by the German Welding Society (DVS), the ASM Thermal Spray Society (ASM TSS), and the International Institute of Welding (IIW).

**For more information,**  
please visit [www.dvs-ev.de/itsc2008](http://www.dvs-ev.de/itsc2008)

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Since 1991, the ITSA Scholarship Program has contributed to the growth of the Thermal Spray Community, especially the development of new technologists and engineers. The International Thermal Spray Association is very proud of this education partnership and encourages all eligible participants to apply.

New Application Dates: Scholarship applications are now accepted annually April 15 through June 30 ONLY for both the Graduate and Undergraduate scholarships.

**Please visit** [WWW.THERMALSPRAY.ORG](http://WWW.THERMALSPRAY.ORG) Scholarship area for details and a printable application form.



For a free copy of the International Thermal Spray Association "What Is Thermal Spray?" publication, email a request to [itsa@thermal spray](mailto:itsa@thermal spray)

## DeWAL Industries Adds Mike McBain To Sales Team

DeWAL Industries, Inc., a leading manufacturer of PTFE and UHMW-PE film and tape, has added **Michael B. McBain** to its sales team in the Midwest.

McBain brings with him years of experience designing, developing and implementing use of self-lubricating polymer-based components for major Fortune 500 companies.

Based outside of Chicago, he will handle sales for DeWAL in Illinois, Wisconsin, Michigan and Indiana.

Mike will be responsible for all products supplied by DeWAL Industries to existing and new customers. He will assist them with selection and application of PTFE and UHMW-PE films and tapes, including unsintered and low-density PTFE films and specialty laminations.

McBain, a former University of Illinois football player, lives with his wife and children in Naperville, IL.

**For more information**, contact Mike at 630.548.0908 or [mmcbain@dewal.com](mailto:mmcbain@dewal.com). He can also be reached through DeWAL Industries, 800.366.8356.

Since its founding in 1974, DeWAL has become an industry leader in the manufacture of pressure sensitive tapes from PTFE, UHMW-PE, Polyimide, and PTFE coated glass fabric. The company also manufactures skived PTFE and UHMW-PE film, friction-reducing Dynaglide® PTFE-based compounds, and Poro-Tex® and UniPore® specialty products.

*See related news pages 27 and 32.*



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## Randy Eckert Joins Alloy Sales



Alloy Sales Inc. is pleased to announce a new addition to the team, **Mr. Randy Eckert**, PE. As of March 1, 2008, Randy has assumed the management responsibilities of Alloy Sales President, Lloyd Johannesen. Mr. Johannesen will be available to provide continuing support to the Alloy Sales team.

Randy is based in Vancouver, BC and has a BS in Metallurgical Engineering from the Montana School of Mines in Butte, Montana. He is a Professional Engineer with registration in British Columbia and has extensive experience in the wear mitigation, corrosion, quality assurance, fabrication, machining and welding/joining fields.

For over 25 years Alloy Sales has been an independent supplier of high alloy welding consumables, thermal spray powders and equipment with locations in British Columbia, Alberta and Washington State. Alloy Sales services many diverse industries including pulp and paper, oil and gas, energy, mining, manufacturing, machining and fabrication. With the addition of Mr. Eckert, Alloy Sales will be in a position to deliver an even more enhanced level of service and support to our valued client base.

Please do not hesitate to call Randy or any of the Alloy Sales team for additional information on any of our welding consumables, thermal spray powders and equipment or any other alloy requirements you may have.

**For more information**, Randy can be reached at 604.940.9930 (BC), the Alberta branch can be reached at 780.466.9454 and the Washington office at 800.652.5569.

## Howes Joins Integrated Risk Management Associates



**Charles P. Howes**

(www.charleshowes.com) has joined the team of Integrated Risk Management Associates, LLC of Green Bay, Wisconsin.

Integrated Risk Management Associates (IRMA) is a full service provider of safety and security audits and training, and business asset loss prevention.

Howes, formally with Miller Thermal/Praxair, has extensive experience in thermal spray safety and environmental compliance, and in the industrial security industry.

**For more information**, contact IRMA at 920.432.2222, or visit [www.irmaassociates.com](http://www.irmaassociates.com) and sign up for their free e-newsletter

## Michael Breitsameter

### New Business Development Manager

LaserBond Ltd (formerly HVOF and Laser Technologies), of Sydney Australia, has recent become a publicly listed company, and as part of their expansion proudly announces the appointment of **Michael Breitsameter** as their new Business Development Manager.

**For more information** on LaserBond, visit website [www.laserbond.com.au](http://www.laserbond.com.au) <http://www.laserbond.com.au> or email [michaelb@laserbond.com.au](mailto:michaelb@laserbond.com.au)



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VandenBergh and Associates, independent consultants, contractors and manufacturers representatives is completing five years of service to the thermal spray industry on June 1, 2008.

Incorporated the end of 2007, V&A continues to assist clients in growing of their bottom line through measurement and improvement of processes, and sales of new and used equipment, and quality parts and supplies.

With 5 years passing, **Mo VandenBergh** thanks his Clients for their continued business, confidence and trust to bring new and valuable products and process to their attention. Likewise many thanks go to V&A's Partners:

- Alamo Supply Co. Ltd. - manufacture of the PG-550
- BECO - supplier of arc spray equipment and wire
- Beckman Consulting Service - manufacturer of manipulation equipment and antistatic powder hoses
- G-TEC - natural gas torch boosters for HVOF and flame spray
- Oseir - SprayWatch family of particle and process diagnostic equipment
- Thermach Inc. - manufacturer and designers of thermal spray processes and parts

A "thank you" is also extended to the many people and organizations that have supported V&A with powder, wire, masking, sealers and services.

Teamwork is a necessity to put together solutions for today's coating needs. We have and are improving the technology to meet the demands.

**For more information**, contact VandenBergh & Associates via email [Mo\\_VandenBergh@earthlink.net](mailto:Mo_VandenBergh@earthlink.net), phone 317.718.8403, and web [www.MoVandenBergh.com](http://www.MoVandenBergh.com)

**See related article page 8.**

**SPRAYTIME Circulation Reaches 7000**

SPRAYTIME thermal spray industry newsletter has reached a circulation of over 7,000 copies.



**Stork Appoints Barb Taylor Manager**

Stork Cellramic of Milwaukee, Wisconsin, is pleased to announce the appointment of **Barb Taylor** as the new Regional Sales Manager for Engineered Coatings for the Great Lakes Region.

With more than 21 years of engineered coatings sales experience, Taylor brings specialized expertise in coatings and applications. In sales positions with Whitford Corporation and General Magnaplate, she represented flouropolymer, nano and high temperature coatings, hard coat anodizing, electro-less nickel, PVD, and many other synergistic coatings. Her education includes a Bachelor's Degree in Business Administration from Grand Valley State University.

Stork Cellramic General Manager Daniel Ruiter said, "Barb is an important part of Stork Cellramic's growth plan for the future. Barb's history in the industries we serve and her demonstrated commitment to excellent customer service are what we need as we reach out to new and existing customers throughout the Midwest and the Great Lakes region. We are delighted to bring her on board."

Taylor began work on January 14. She will represent Stork Cellramic products and services in Illinois, Indiana, Ohio and Michigan. Contact her at [barb.taylor@stork.com](mailto:barb.taylor@stork.com).

Stork Cellramic, Inc. (a member of the Stork Materials Group of companies) is a high-tech company specializing in the application and finishing of thermally sprayed coatings for industrial applications such as printing, converting, gas turbine, food processing and packaging. In addition, Stork Cellramic is a leading manufacturer of anilox rolls, and specializes in the resurfacing of worn anilox, idler and water rolls, and the application of engineered coatings for industrial components. For more information, please visit the Stork Cellramic website at [www.storkcellramic.com](http://www.storkcellramic.com).

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